DRAWING NUMBER	TITLE
COSSM-14-R8-STORES-STR-CO1	TITLE PAGE
COSSM-14-R8-STORES-STR-CO2	SITE PLAN - STAGING AREAS
COSSM-14-R8-STORES-STR-CO3	EXISTING SERVICES PLAN
COSSM-14-R8-STORES-STR-CO4	SERVICES PLAN - RESTORATION
COSSM-14-R8-STORES-STR-CO5	SERVICES - DETAILS
COSSM-14-R8-STORES-STR-S01	GENERAL NOTES
COSSM-14-R8-STORES-STR-S02	GND FLOOR PLAN - DECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S03	SECOND FLOOR PLAN & ROOF PLAN - DECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S04	WEST ELEVATION - DECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S05	EAST ELEVATION - DECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S06	SECTIONS - DECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S07	FOUNDATION PLAN - RECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S08	SECOND FL PLAN & ROOF PLAN - RECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S09	WEST ELEVATION - RECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S10	EAST ELEVATION - RECONSTRUCTION WORK
COSSM-14-R8-STORES-STR-S11	SECTIONS (SHEET 1) - RECONSTRUCTION
COSSM-14-R8-STORES-STR-S12	SECTIONS (SHEET 2) - RECONSTRUCTION
COSSM-14-R8-STORES-STR-S13	REINFORCED CONCRETE DETAILS (SHEET 1)
COSSM-14-R8-STORES-STR-S14	REINFORCED CONCRETE DETAILS (SHEET 2)
COSSM-14-R8-STORES-STR-S15	REINFORCED CONCRETE DETAILS (SHEET 3)
COSSM-14-R8-STORES-STR-S16	REINFORCED CONCRETE DETAILS (SHEET 4)
COSSM-14-R8-STORES-STR-S17	SHORING & BRACING (SHEET 1)
COSSM-14-R8-STORES-STR-S18	SHORING & BRACING (SHEET 2)
COSSM-14-R8-STORES-STR-S19	SHORING & BRACING (SHEET 3)
COSSM-14-R8-STORES-STR-S20	SHORING & BRACING (SHEET 4)
COSSM-14-R8-STORES-STR-S21	SHORING & BRACING (SHEET 5)

SUPPLEMENTARY INFORMATION - APPENDICES

APPENDIX A - AMEC GEOTECHNICAL REPORT #TY1230281
APPENDIX B - CEEA ENVIRONMENTAL SCREENING
APPENDIX C - HISTORIC BUILDING PLANS & SPECIFICATIONS
APPENDIX D - REFERENCE DRAWING COSSM 97/HR24 (SHEET H1)
APPENDIX E - SAMPLE MASONRY RECORDS FOR DISMANTLING
APPENDIX F - POTENTIAL HAZARDS INFORMATION/ATTESTATION SHEETS

END

END

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract generally comprises of interior demolitions, careful removal of historic doors and windows, lead paint abatement, shoring and bracing, historic masonry dismantling, mortar analysis, carpentry infill work, masonry pressure grouting, installation of micropiles, interior and exterior concrete slab removals, dewatering, removal of mass stone foundations, construction of concrete cast in place foundations, underpinning utilizing a unified hydraulic jacking system, reconstruction of historic masonry walls and building features, reinstallation of historic doors, windows and other building features, restorations under cash allowances, construction of gabion walls and drainage systems, site grading, reinstallation of existing services and utilities.

.2 Located at the Sault Ste. Marie Canal Stores Building.

1.2 CONTRACT METHOD

.1 Construct Work under stipulated sum contract.

1.3 WORK SEQUENCE

.1 Construct Work in stages to accommodate overall building construction plans.

.2 Co-ordinate Progress Schedule with Departmental Representative during construction.

.3 Indicative Construction Sequence: (Full procedure is noted on drawing S01)
.1 Isolation and/or temporary relocation of services and utilities,
.2 Demolition of interior walls and finishes to face of mass stone wall,
.3 Lead paint removal - interior faces of masonry walls and surface of historic wood flooring,

1.3 WORK SEQUENCE (Cont'd)

.3 Indicative Construction Sequence:(Cont'd)

.4 Carpentry work - splice floor joists and infill stairwell opening with planking.

.5 Install temporary shoring and bracing for masonry wall removal,

.6 Carefully remove and salvage windows and doors in deconstruction area, provide solid timber framing and panels in openings,

.7 Provide moisture and thermal protection and heating of interior space for freeze protection (min 10 degrees C) to the foundation perimeter and all areas within the Stores Building.

.8 Install micropiles.

.9 Dismantle southern portion of historic mass stone walls as noted on drawings, but leaving the foundations, slabs and roof intact,

.10 Maintain power, heat, communications to Welding Shop and Carpentry Shop throughout work. Maintain fire access/control.

.11 Dewater area in preparation of foundation work.

.12 Carefully remove 1000mm wide sections of foundation wall to permit installation of pile caps. Minimize excavations adjacent to foundations for pile caps.

.13 After all pile caps are completed, provide unreinforced concrete fill between top of pile cap and underside of plinth stones. Allow concrete to reach 75% strength before proceeding.

.14 Carefully remove foundation stones to create pockets, install needle beams, provide temporary shoring complete (cribbing jack pads etc.) to stone mass walls to permit foundation work.

.15 Provide unified hydraulic jacking system to raise or lower the building in unison regardless of jack loads. Raise building maximum 3 mm to remove loads from foundation.

.16 Provide temporary blocking/shims at jack locations to hold building during remainder of foundation work. Monitor building for movement and report findings wekly. Rejack as necessary.

.17 After concrete has reached 75% strength complete remainder of foundations in the following sequence: a) Monolithic pour southern portion of foundation including grade

1.3 WORK SEQUENCE (Cont'd)

.3 Indicative Construction Sequence:(Cont'd)
.17 (Cont'd)
beam CB2 which is partially beneath mass stone wall. b) Foundations along line D and E including pile cap type C and grade beams CB4 and CB5. c) Grade beams CB3 on line 1 and 2 between B and D. d) Remove temporary concrete fill and provide reinforced concrete fill 340mm thick between all needle beams.
.18 After concrete beams and fill have reached 75% strength, lower building, release jacks and remove shoring.
.19 Complete infill concrete work at needle beam locations.
.20 Complete all other work including masonry reconstruction, foundation drainage, backfill, insulation, installations of slabs, windows, doors etc.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Perform work in accordance with construction sequencing.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 ACCESS AND EGRESS

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

.2 Submit Proposed Plans for access and egress, temporary enclosures, and work schedules to

1.2 ACCESS AND EGRESS (Cont'd)

.2 (Cont'd)
Departmental Representative for review and approval.

1.3 USE OF SITE AND FACILITIES

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

.2 Contractor will be provided work areas adjacent to the work site as indicated on contract drawings, and as further required upon approval by Departmental Representative

.3 Contractor will be provided sole use of building during the construction period, subject to rules and restrictions presented by Departmental Representative.

.4 The building is closed to the public due to safety concerns with the south masonry wall. Install owner supplied signs indicating alternate route for general public.

.5 Occasional access to the building may be required by Parks Canada personnel during the construction period.

.6 Where security is reduced by work provide temporary means to maintain security.

.7 Departmental Representative will allow use of public washrooms on site by Contractor's personnel during standard seasonal business hours. Keep facilities clean. These washrooms will be locked and unavailable for use after standard business hours.
.1 If required, sole use of public washrooms by Contractor's personnel during winter months will be provided, subject to rules and restrictions presented by Departmental Representative.

.8 Use only designated access areas for moving workers and material.
.1 Protect all surfaces of Historical building/Structures/objects from damage due to construction activities. Receive approval of

1.3 USE OF SITE AND FACILITIES (Cont'd)

.8 (Cont'd)
.1 (Cont'd)
Departmental Representative prior to moving materials and equipment through the building.
.2 Accept liability for any damage caused to historic building due to construction or moving of materials and equipment, safety of equipment and overloading of existing equipment.
.3 Prevent damage to historic site by heavy equipment use. Damage caused by equipment, trailers, and installation of temporary services to be reinstated at end of project to the satisfaction of the Departmental Representative.

.9 Enclosures: protect work temporarily until permanent enclosures are completed.

.10 Provide outdoors protective measures to ensure mature plants and other landscape items are not damaged from construction activity.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building and services. Arrange access and scheduling of the work with Departmental Representative to facilitate execution of work.

.2 Prior to removal of load bearing walls, provide shoring and bracing in accordance with Provincial(OHSA)regulations and as noted in Section 01 41 00 Regulatory Requirements and 31 04 31 Historic - Shoring and Bracing.

1.5 RECOGNIZED FEDERAL HERITAGE BUILDING

.1 The Stores Building is a Recognized Federal Heritage Building, and a Level 2 Cultural Resource, as per Parks Canada CRM policy.
.1 All aspects of the building exterior and interior must be protected and conserved.
.2 Maintain strict adherence to limits of remedial work as specified on the contract drawings.
.3 Removal of existing interior features to be limited to a minimum as required to perform

1.5 RECOGNIZED FEDERAL HERITAGE BUILDING (Cont'd)

.1 (Cont'd)
.3 (Cont'd)
the work, or as otherwise specified on the contract drawings.
.4 Media (soda)blasting technique on masonry surfaces with lead based paint to ensure integrity of base materials is not compromised. Mock-ups are required to demonstrate acceptable results.
.5 Surfaces adjacent to media blasting are to be protected from damage prior to commencing work.
.6 Use caution when performing all aspects of work to prevent damage to any building features scheduled to remain.
.7 Provide outdoors protective measures to ensure mature plants and other landscape items are not damaged from construction activity.
.8 Provide indoors protective measures in all construction areas to ensure all character defining elements of the building remain intact.
.9 Cleanup to be performed using techniques and products that will leave cleaned surfaces intact and in original condition.
.10 Ornate windows, doors, metalwork, and landscape features adjacent to the work are to be protected prior to commencing work.
.11 Avoid damage to masonry and woodwork when dismantling and performing rehabilitative work.
.12 Advise Departmental Representative of any clues to original or previous features that may be discovered during repairs.
.13 Cooperate with Parks Canada, allowing access to site for photography of historic building at various stages of construction.

1.6 RELICS AND ANTIQUITIES

.1 The site is a National Historic Site of Canada and must be treated as such. The contractor must recognize that all work at the National Historic Site is subject to the Standards and Guidelines for the Conservation of Historic Places in Canada.

.2 Relics, buried artifacts, antiquities, and other items of historical or scientific interest such as: cornerstones and contents,

1.6 RELICS AND ANTIQUITIES (Cont'd)

.2 (Cont'd)
commemorative plaques, inscribed tables, and similar objects found on site shall remain the property of Parks Canada. Advise Departmental Representative and receive direction regarding protecting such resources, should any be discovered by archaeology or the contractor. The contractor may be directed to stop work on the area and redirect work elsewhere until the issue is resolved to the Departmental Representative's satisfaction.

.3 As such, all excavations beyond the immediate work area as outlined by the Departmental Representative, is strictly prohibited. Any deviation must be approved in advance. At least 3 weeks notice is required to allow appropriate review and approval of any such deviation or proposal.

.4 Archaeology staff from Parks Canada will monitor the project work and may require temporary stop of work to carry out site investigations.

.5 The contractor shall protect subsurface infrastructure, historic features, profiles and ground features, as directed by the Departmental Representative.

.6 Most of the landscapes are Cultural Resources. The historic buildings are classified or recognized by the Federal Heritage Building Review Office (FHBRO). Most of the Moveable Objects are also Cultural Resources. Great care is needed to ensure that these resources are not disturbed or damaged in any way during the construction and re-capitalization work. Whenever building or landscape interventions are to be changed beyond the details of the specifications provided, the interventions shall be approved by the Departmental Representative in advance of the work. The contractor shall identify the areas and level of expected intervention changes to the Departmental Representative in advance of any such work.

1.7 EXISTING SERVICES

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

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

.3 For temporary disconnections of services listed below, provide interim labelling on cables,store items as directed by Departmental Representative, and submit sketches of existing services to the satisfaction of the Departmental Representative to faclitate reinstallation.

.4 Electrical service: Existing service to Welding Shop and Workshop to remain active throughout construction period, unless otherwise approved by the Departmental Representative.

.1 Disconnect and relocate to temporarily panel, electrical works as required for construction.
.2 Reinstate electrical panels and works to original locations upon completion of work.

.3 Remove permanently, all existing electrical lighting, wiring and receptacles from building,as directed by Departmental Representative.
.4 Restore temporary surface mounted lighting to each of four rooms on first and second floors.
.5 Provide pricing for replacement surace mounted conduit electrical works as required to meet minimum ESA code requirements for the Stores Building. Refer to Section 01 21 00 Allowances.

.5 Boiler heating system: To remain functional

1.7 EXISTING SERVICES (Cont'd)

.5 Boiler heating system:(Cont'd)
throughout the project unless otherwise approved by the Departmental Representative.
.1 Install temporary piping as required where radiators and pipings are removed or relocated to facilitate construction. Submit detailed plans of original installation prior to removal.

.2 Note boiler system continues through Stores Building to heat Welding Shop and Workshop.
.3 Protect building from freezing. Provide and maintain additional heaters as required.
.4 Reinstall original piping and radiators upon completion of construction, where temporary piping has been installed as part of construction.
.5 Ensure system is reinstalled in similar loop configuration to original construction or as otherwise approved by Departmental Representative.

.6 Fiber optics cable: Protect from damage during the construction period. Temporarily disconnect and coil the cable at point of entry to building. Do not cut cable. Reinstate to original location upon completion of construction.

.7 Communications cables: Existing service to Welding Shop and Workshop to remain active throughout construction period, unless otherwise approved by the Departmental Representative. Temporarily disconnect as required to facilitate work. Reinstall to original location upon completion of work, where removed as part of construction.

.8 Fire Alarm: Provide continuous connectivity throughout the project for all systems wired

1.7 EXISTING SERVICES (Cont'd)

.8 Fire Alarm:(Cont'd)
and communicating through the building being rehabilitated.
.1 All instances of disconnection and reconnection are considered the contractors responsibility, and to be reported to the Departmental Representative in writing.
.2 At the expense of the contractor, the Fire Alarm is required to remain operational for the Zone, and only the building being rehabilitated can be taken in and out of the system to meet the contractors needs. Refer to appendix for Zone details.

.9 Telephone service: Temporarily disconnect at point of entry to building as required to facilitate work, and reinstate to location as directed by Departmental Representative upon completion of work. Maintain active service to Welding Shop and Workshop throughout construction period unless approved otherwise by the Departmental Representative.

.10 Copper water service: Ensure service does not freeze during cold weather. Provide thermal protection and cap as required.
.1 Reinstate existing service upon completion of work. Provide stub and cap in same general location as existing service, confirm location with Departmental Representative prior to installation.
.2 Provide pricing for extending water service to Welding Shop. Refer to Section 01 21 00 Allowances.

.11 Provide for personnel, pedestrian and vehicular traffic.

.12 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures upon receiving approval of Departmental Representative.

1.8 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.2 Submit shoring and bracing details in accordance with Section 01 41 00 Regulatory Requirements and section 31 04 31 Historic - Shoring and Bracing.

.3 Ensure that Contractor personnel and subcontractors employed on site become familiar with and obey regulations including health and safety, fire, traffic and security regulations.

.4 Keep within limits of work and avenues of ingress and egress as specified by Departmental Representative.

.5 Use safety precautions as required by the OHSA when working in confined spaces.

.6 Use safety precautions as required by the OHSA when working with lead based paint.

.7 Follow Fire Protection Standard from the Treasury Board of Canada when performing work.
.1 Provide 2 hour burn watch upon completion of the following procedures:
.1 welding
.2 burning
.3 cutting
.2 In accordance with 3.2 HOT WORK requirements in Section 01 35 29.06 - Health and Safety Requirements.

1.9 SECURITY CLEARANCES

.1 Personnel employed on this project will not be subject to security check.

1.10 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not allowed.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL .1 Follow work restrictions when on site.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

1.2 GENERAL

.1 Include in stipulated sum contract price, specified cash allowances.

.2 Contract Price, and not cash allowance, includes Contractor's overhead and profit in connection with such allowances.

.3 Contract Price will be adjusted by written order to provide for excess or deficit to the allowances.

1.2 GENERAL (Cont'd)

.4 Where costs under the allowance exceed amount of allowance, Contractor will be compensated for excess incurred, plus allowance for overhead and profit as set out in Contract Documents.

.5 Include progress payments on accounts of work authorized under cash allowances in monthly certificate for payment.

.6 Contractor to investigate and seek approval of Departmental Representative, early resolution of Allowance items to ensure coherent and timely implementation into overall contract. No claim will be allowed to Contractor for costs associated with quotation development.

.7 Allowance process and progress will be included in contractor's Project Schedule, and will form part of Construction Meeting Agenda until resolved.

.8 Submit plans, shop drawings and other submittals promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time or equitable adjustments. No claim will be allowed to Contractor for such delays.

1.3 INSPECTION AND TESTING ALLOWANCE

.1 Covers reimbursment to Contractor for costs of inspection and testing services in accordance with Section 01 29 83 Payment Procedures: Testing Laboratory Services.
.1 Includes compaction testing as detailed in Section 31 00 00.01 Earthwork, clause 3.7 Backfill.
.2 Includes concrete testing as detailed in Section 03 30 00.01 Cast in Place Concrete, clause 3.2 Inspection and Testing.
.3 Includes Petrographic mortar analysis of existing mortar, and mortar testing as detailed in Section 04 03 08 Historic - Mortaring.
.3 Includes grout testing as detailed in Section 04 03 09 Historic - Grouting.

1.3 INSPECTION AND TESTING ALLOWANCE (Cont'd)

.1 (Cont'd)
.3 Includes Steel inspections and testing as detailed in Section 31 04 31 Historic - Shoring and Bracing.
.2 Includes other Quality Assurance testing as requested by Departmental Representative.

.2 Include cash allowance of $ 50,000.00 in stipulated sum contract price.

1.4 UTILITIES AND SERVICES ALLOWANCE

.1 Proposed relocation of utilities and services.
.1 Submit cost estimates to relocate utilities and services as requested by Departmental Representative. Include engineering costs, and supply and installation of the required works.

.2 Include cash allowance of $ 60,000.00 in stipulated sum contract price.

1.5 DOORS, WINDOWS AND TRIM WORK ALLOWANCE

.1 Proposed restoration of doors, windows and trim work as approved by Departmental Representative.

.2 Include cash allowance of $ 10,000.00 in stipulated sum contract price.

1.6 MASONRY SILLS ALLOWANCE

.1 Covers supply cost of proposed replacement of stone door sills and window sills as approved by Departmental Representative.

.2 Masonry works for changes to rough openings and setting of sills is part of overall work as indicated on drawings and Sections 04 03 07 Historic - Masonry Repointing and Repair, 04 03 08 Historic - Mortaring, and 04 05 00 Common Work Results for Masonry accordingly.

.3 Include cash allowance of $ 6,000.00 in stipulated sum contract price.

PART 2 - PRODUCTS

2.1 - GENERAL .1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL .1 Submit copies of testing invoices and summary sheet to Departmental Representative for payment along with monthly progress payments.

.2 Submit cost estimates for proposed works as noted above.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 02 41 16.01 Structure Demolition

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 03 30 00.01 Cast in Place Concrete

.5 04 03 07 Historic - Masonry Repointing and Repair

.6 04 03 08 Historic - Mortaring

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.10 04 03 43 Historic - Dismantling Stone Masonry

.11 04 05 00 Common Work Results for Masonry

.12 06 08 99 Carpentry

.13 09 91 99 Painting for Minor Works

.14 31 00 00.01 Earthwork

.15 31 04 31 Historic - Shoring and Bracing

.16 31 36 00 Gabions

.17 31 63 00 Micropiles

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE (Cont'd)

.1 (Cont'd)
Representative are specified under various sections.

.2 Departmental Representative will engage independent inspection/testing agencies to supply Quality Assurance testing to satisfy the requirements of individual specification sections. Payment of these items are covered by the testing allowance.

1.3 APPOINTMENT AND PAYMENT

.1 Departmental Representative will appoint for services of testing laboratory except the following:
.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
.2 Inspection and testing performed exclusively for Contractor's convenience, such as Quality Control testing.
.3 Mill tests and certificates of compliance.
.4 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.4 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:

.1 Provide access to Work for inspection and testing.
.2 Facilitate inspections and tests.
.3 Make good Work disturbed by inspection and test.
.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

1.4 CONTRACTOR'S RESPONSIBILITIES (Cont'd)

.2 Notify sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Contractor to pay cost of approved testing, and submit invoices for payment under Section 01 21 00 Allowances.

.2 Unused portion of cash allowance for testing to be credited to contract by written order.

.3 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

.4 Departmental Representative will engage independent inspection/testing agencies to supply Quality Assurance testing to satisfy the requirements of individual specification sections. Payment of these items are covered by the testing allowance.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 02 41 16.01 Structure Demolition

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 03 30 00.01 Cast in Place Concrete

.5 04 03 07 Historic - Masonry Repointing and Repair

.6 04 03 08 Historic - Mortaring

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.10 04 03 43 Historic - Dismantling Stone Masonry

.11 04 05 00 Common Work Results for Masonry

.12 06 08 99 Carpentry

.13 09 91 99 Painting for Minor Works

.14 31 00 00.01 Earthwork

.15 31 04 31 Historic - Shoring and Bracing

.16 31 36 00 Gabions

.17 31 63 00 Micropiles

1.2 ADMINISTRATIVE

.1 Attend all project meetings throughout the progress of the work at the call of Departmental Representative. Anticipate weekly meetings at beginning of project and during critical construction periods.

1.2 ADMINISTRATIVE (Cont'd)

.2 Departmental Representative to chair meetings and prepare agenda.

.3 Written or e-mail notice of each meeting will be provided 7 days in advance of meeting date, from Departmental Representative.

.4 Departmental Representative will provide physical space and make arrangements for meetings.

.5 Departmental Representative to record the meeting minutes, include significant proceedings and decisions, identify actions by parties.

.6 Departmental Representative to reproduce and distribute copies of minutes within 4 days after meetings and transmit to meeting participants and, affected parties not in attendance.

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

1.3 PRECONSTRUCTION MEETING

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

.2 Departmental Representatives, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 7 days before meeting.

.4 Agenda to include:
.1 Appointment of official representative of participants in the Work.
.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart .

1.3 PRECONSTRUCTION MEETING (Cont'd)

.4 Agenda to include:(Cont'd)
.3 Schedule of submission of shop drawings, plans and other items. Submit in accordance with Section 01 33 00 - Submittal Procedures.
.4 Health and Safety requirements: confined space work, demolitions, temporary shoring and bracing, and lead on construction projects.
.5 Fire Protection Standard from the Treasury Board of Canada.
.6 Environmental regulations/conditions.
.7 Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
.8 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures
.9 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
.10 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
.12 Monthly progress claims, administrative procedures, photographs, hold backs.
.13 Appointment of inspection and testing agencies or firms. Inspections required, payment of testing costs in accordance with Section 01 21 00 Allowances, and Section 01 29 83 Payment Procedures: Testing Laboratory Services.
.14 Insurances, transcript of policies, WSIB certificate of good standing.

1.4 PROGRESS MEETINGS

.1 During course of Work from mobilization to project completion, attend scheduled progress meetings weekly or at the call of the Departmental Representative.

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

.3 Departmental Representative will notify parties minimum 7 days prior to meetings.

1.4 PROGRESS MEETINGS (Cont'd)

.4 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within 4 days after meeting.

.5 Agenda to include the following:
.1 Review, approval of minutes of previous meeting.
.2 Review of Work progress since previous meeting,using updated Project Schedule as base for discussion.
.3 Progress Table indicating:
.1 Progress of each Cash Allowance item.
.2 Progress of each Change Order.
.3 Progress of Health and Safety reporting and submittals.
.4 Progress of Submittals.
.5 Progress of As-Built records as work progresses.
.4 Field observations, problems, conflicts.
.5 Problems which impede construction schedule.
.6 Review of off-site fabrication delivery schedules.
.7 Corrective measures and procedures to regain projected schedule.
.8 Revision to construction schedule.
.9 Progress schedule, during succeeding work period.
.10 Review submittal schedules: expedite as required.
.11 Maintenance of quality standards.
.12 Review proposed changes for effect on construction schedule and on completion date.
.13 Other business.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Attend all project meetings throughout the progress of the work at the call of the Departmental Representative.

.2 Provide actions, submittals, plans and reports as requested in all sections.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 02 41 16.01 Structure Demolition

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 03 30 00.01 Cast in Place Concrete

.5 04 03 07 Historic - Masonry Repointing and Repair

.6 04 03 08 Historic - Mortaring

.7 04 03 09 Historic - Grouting

.8 04 03 41 Historic - Repair of Stone

.9 04 03 42 Historic - Replacement of Stone

.10 04 03 43 Historic - Dismantling Stone Masonry

.11 04 05 00 Common Work Results for Masonry

.12 06 08 99 Carpentry

.13 09 91 99 Painting for Minor Works

.14 31 00 00.01 Earthwork

.15 31 04 31 Historic - Shoring and Bracing

.16 31 36 00 Gabions

.17 31 63 00 Micropiles

1.2 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements

1.2 DEFINITIONS (Cont'd)

.2 Bar Chart (GANTT Chart):(Cont'd) are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to mimimum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.4 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures. Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

1.5 PROJECT MILESTONES

.1 Project milestones for interim targets for Project Schedule.

.1 Interior demolitions/removals
.2 Temporary relocation of utilities
.3 Lead-base paint abatement
.4 2nd floor carpentry - floor infilling
.5 Demolitions/concrete removals
.6 Shoring and bracing
.7 Micropiles installed
.8 Masonry grouting and repairs
.9 South end masonry dismantled and stored
.10 Masonry records submitted
.11 Resolution of Cash Allowance items
.12 Approval of samples
.13 Approval of mock-ups
.14 Dewatering system installed
.15 Excavations completed
.16 Foundations constructed
.17 South end masonry reinstalled
.18 Drainage and grading completed
.19 Interior concrete slabs constructed
.20 General masonry repointing and repairs
.21 Gabion wall constructed

1.5 PROJECT MILESTONES (Cont'd)

.1 (Cont'd)
.22 Interim Certificate of Substantial Performance.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
.1 Award.
.2 Shop Drawings/submittals/approvals
.3 Permits.
.4 Mobilization.
.5 Survey requirements
.6 Utility relocations
.7 Interior demolitions/salvage removals
.8 Lead-base paint abatement
.9 2nd floor carpentry - floor infilling
.10 Mortar - laboratory testing
.11 Mortar mix designs
.12 Mock-up approvals
.13 Samples submitted and approved
.14 Resolution of Cash Allowance items
.15 Pre-construction masonry grouting
.16 Shoring and bracing
.17 Micropiles installed
.18 South end masonry dismantled and stored
.19 Masonry records submitted
.20 Winter hoarding installed
.21 Dewatering system installed
.22 Ground floor concrete curb removals

1.7 PROJECT SCHEDULE (Cont'd)

.2 (Cont'd)
- .23 Sub-floor/buried utilities installed
- .24 Excavations completed
- .25 Foundations constructed
- .26 Window and door rehabilitations
- .27 South end masonry reconstructed
- .28 Membranes, drainage, grading, insulation
- .29 Interior concrete reinforcement/slabs
- .30 General masonry repointing and repairs
- .31 Cleanup and painting
- .32 Gabion wall constructed
- .33 Grounds rehabilitation
- .34 Landscaping
- .35 Substantial Performance/Completion

1.8 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.9 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Agenda will include Quality Assurance items, to monitor progress throughout the project.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 GENERAL .1 Maintain updated Construction Project Schedule and submit copies to Departmental Representative as requested.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 02 41 16.01 Structure Demolition

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 03 30 00.01 Cast in Place Concrete

.5 04 03 07 Historic - Masonry Repointing and Repair

.6 04 03 08 Historic - Mortaring

.7 04 03 09 Historic - Grouting

.8 04 03 41 Historic - Repair of Stone

.9 04 03 42 Historic - Replacement of Stone

.10 04 03 43 Historic - Dismantling Stone Masonry

.11 04 05 00 Common Work Results for Masonry

.12 06 08 99 Carpentry

.13 09 91 99 Painting for Minor Works

.14 31 00 00.01 Earthwork

.15 31 04 31 Historic - Shoring and Bracing

.16 31 36 00 Gabions

.17 31 63 00 Micropiles

1.2 REFERENCES

.1 Not Used

1.3 ADMINISTRATIVE

.1 Submit to Departmental Representative plans, shop drawings and other submittals as listed for review in each section. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not

1.3 ADMINISTRATIVE (Cont'd)

.1 (Cont'd)
considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

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

.3 Present shop drawings, product data in SI Metric units.

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

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

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

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

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

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

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

.11 All time sensitive submittals will be indicated on Project Schedule as a task, and

1.3 ADMINISTRATIVE (Cont'd)

.11 (Cont'd)
monitored for satisfactory progress to meet project requirements.

1.4 SHOP DRAWINGS AND PRODUCT DATA

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

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

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

.4 Allow 7 days for Departmental Representative's review of each submission.

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

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

.7 Accompany submissions with transmittal letter, in duplicate, containing:
.1 Date.
.2 Project title and number.
.3 Contractor's name and address.

1.4 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.7 (Cont'd)
.4 Identification and quantity of each shop drawing, product data and sample.
.5 Other pertinent data.

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

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

.10 Submit to Departmental Representative for review, PDF copies of each requirement requested in specification Sections and as Departmental Representative may reasonably request.
.1 For shop drawings in format larger than 11x17, submit 3 hard copies.

.11 If upon review by Departmental Representative, no errors or omissions are discovered, and only minor corrections are to be made, Departmental Representative will provide such comments and return PDF copies to Contractor stamped "Reviewed" or "Reviewed as Noted" and fabrication and installation of Work may proceed, incorporating comments.

1.4 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.12 If shop drawings are rejected, noted PDF copies will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

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

.14 Submit PDF copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.15 Submit PDF copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
.2 Certificates must be dated after award of project contract complete with project name.

.16 Submit PDF copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.17 Delete information not applicable to project.

1.4 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

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

.19 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit WSIB status, and proof of insurance.

.2 Submit WSIB status for subcontractors involved in Work.

1.6 SUBSTITUTIONS OR CHANGE OF MATERIALS

.1 Use only products as specified, that meet or exceed contract requirements.

.2 Proposed substitutions or change of materials are to be submitted in writing for review and approval by the Departmental Representative.

.3 The submittal shall include the following:
.1 shop drawings of the specified product, highlighted or marked up to indicate areas where product meets or exceeds required specifications.
.2 shop drawings of the proposed substitute, highlighted or marked up to indicate areas where product meets or exceeds required specifications.

1.6 SUBSTITUTIONS OR CHANGE OF MATERIALS (Cont'd)

.3 (Cont'd)

.2 (Cont'd)

.3 written summary detailing relevent differences between the products, and effect of the differences on the project.

.4 proposed change in contract price for use of the substitute Material,

.5 other information as the Departmental Representative may require.

.4 Final approval or rejection of a proposed substitution shall be at the discretion of the Departmental Representative.

PART 2 - PRODUCTS

2.1 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's site office.

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

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

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

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

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

2.2 MOCK-UPS

.1 Provide mock-ups in accordance with 02 83 12 Lead-Base Paint Abatement - Maximum Precautions.

.2 Erect mock-ups in accordance with 01 45 00 - Quality Control and 04 05 00 Common Work Results for Masonry.

PART 3 - EXECUTION

3.1 GENERAL

.1 Submit in accordance with this section, plans, shop drawings, reports and other items as requested in each section.

3.2 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit WSIB status.

.2 Submit transcription of insurance within 2 weeks after award of Contract.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

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

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

.3 Province of Ontario Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.

1.2 REFERENCES (Cont'd)

.4 Ontario Ministry of Labour - Occupational Health & Safety Act - Ont.Reg. 843 Designated Substance - Lead

.5 Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

.6 Fire Protection Standard from the Treasury Board of Canada.

1.3 SUBMITTALS

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

.2 Submit plans, shop drawings and other submittals promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time or equitable adjustments. No claim will be allowed to Contractor for such delays.

.3 Prior to deconstruction/disassembly of load bearing walls and foundations, submit drawings of jacking design and shoring and bracing, in accordance with Provincial (OHSA) regulations, and as noted in Sections 01 41 00 Regulatory Requirements, and 31 04 31 Historic - Shoring and Bracing.

.4 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
.1 Results of site specific safety hazard assessment.
.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
.3 Lead - Base Paint Abatement Plan, including detailed sketches of work areas, proposed enclosures and safety procedures and measures to be followed in each section.
.4 Hot Work Program meeting Fire Protection Standard from the Treasury Board of Canada requirements for welding, burning and cutting.

1.3 SUBMITTALS (Cont'd)

.5 Subcontractor requirements:
.1 Submit site-specific Health and Safety Plan for review and approval by Contractor.
.2 Submit signed attestation from Subcontractor confirming they have read the Contractor's site specific Health and Safety Plan and will comply with requirements of the plan when on site.
.3 Comply with the most stringent safety requirements when there is conflict between Contractor's and Subcontractor's Health and Safety Plans.
.4 Submit WSIB status report.

.6 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative whenever a reportable incident occurs.

.7 Submit copies of reports or directions issued by Federal or Provincial health and safety inspectors.

.8 Submit copies of incident and accident reports.

.9 Submit records/checklists/topics from all Tailgate Meetings.

.10 Submit WHMIS MSDS - Material Safety Data Sheets

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

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

.13 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance

1.3 SUBMITTALS (Cont'd)

.13 Medical Surveillance:(Cont'd)
for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

.14 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
.1 for demolition and removals.
.2 for lead abatement.
.3 for confined spaces.
.4 for hot work.
.5 for all other work.
.6 for dewatering system.
.7 for excavations.
.8 for foundation underpinning.
.9 for all other work.

1.4 FILING OF NOTICE

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

1.5 SAFETY ASSESSMENT

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

.2 Painted interior masonry walls tested positive for lead content.
.1 Lead based paint is to be removed prior to dismantling masonry of the south end walls to ensure masonry worker health and safety.

.3 Lead content is present in the original paint coatings on second storey wood door, all door frames, second storey wood floors, exterior roof trims, and on other construction works installed and painted prior to 1975. Assume surfaces with multiple layers of paint to include lead base paint in earlier coats.
.1 Ensure workers are aware of lead hazard and follow health and safety precautions and procedures.

.4 All window frames and trims are free of lead based paint with exception a sample strip of original paint on the upper window section remaining intact for historical purposes.

1.5 SAFETY ASSESSMENT (Cont'd)

.5 Ground floor doors and interior framed walls and finishes are free of lead based paint.

.6 A Potential Hazards Identification for the Stores Building is presented in the Appendix for Contractor reference.

.7 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.6 MEETINGS

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

1.7 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.8 PROJECT/SITE CONDITIONS

.1 Work at site may involve contact with:

.1 Demolitions and removals.
.2 Lead-base paint on existing structures.
.3 Excavations.
.4 Confined spaces.
.5 Dewatering.
.6 Shoring and support of structures.
.7 Foundation underpinning.
.8 Hot Work
.9 Silica in concrete.
.10 Concrete dust.
.11 Fresh concrete and cement mortars.
.12 Concrete admixtures and bonding agents.
.13 Hoisting equipment, material and debris.

1.9 GENERAL REQUIREMENTS

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

1.9 GENERAL REQUIREMENTS (Cont'd)

.1 (Cont'd) Safety Plan must address project specifications.

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

1.10 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 Ensure Subcontractor to submit signed attestation confirming they have read the Contractor's site specific Health and Safety Plan and will comply with requirements of the plan when on site, and Comply with the most stringent safety requirements when there is conflict between Contractor's and Subcontractor's Health and Safety Plans.

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

1.11 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 as amended.

.2 Comply with Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

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

1.11 COMPLIANCE REQUIREMENTS (Cont'd)

.4 Fire Protection Standard from the Treasury Board of Canada.

1.12 UNFORSEEN HAZARDS

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

1.13 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 lead abatement.

.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 hazardous work and report directly to and be under direction of site supervisor.

1.14 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 having jurisdiction, and in consultation with Departmental Representative.

1.15 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.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.16 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.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Work in compliance with applicable rules and regulations for construction projects and demolition works.

.2 Enforce compliance by employees and subcontractors 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 Submit Contractor and Subcontractor site-specific Health and Safety Plans.

3.1 GENERAL (Cont'd)

.4 Submit signed attestation from Subcontractor confirming they have read the Contractor's site specific Health and Safety Plan and will comply with requirements of the plan when on site.

3.2 HOT WORK

.1 Follow Fire Protection Standard from the Treasury Board of Canada when performing hot work:

.1 defined as operations such as welding, cutting, burning, heating, grinding, or similar spark, slag, or intense heat producing activities that are capable of igniting combustible materials or flammable atmospheres or providing a source of ignition for a fire. Also defined as cutting and welding operations for construction/demolition activities that involve the use of portable gas or arc welding equipment, open flame or spark-producing apparatus.

.2 Provide Hot Work Program in site specific Health and Safety Plan to address hot work activities during construction.

.3 Obtain approval from Departmental Representative prior to performing hot work activities on site.

.4 Ensure that fire protection and extinguishing equipment is available at the site at least 48 hours before starting the job;

.5 Post approved notices/signs indicating HOT WORK IN PROGRESS for the duration of the hot work.

.6 Provide a standard checklist to be completed and signed prior to each hot work activity. Departmental Representative to review and approve proposed checklist.

.7 Ensure that workers performing hot work are trained and know the procedures that apply to the specific work or task being performed; follow program for hot work as detailed in Health and Safety Plan.

.8 Provide 2 hour burn watch upon completion of the following procedures:

.1 welding
.2 burning
.3 cutting

3.2 HOT WORK (Cont'd)

.1 (Cont'd)

.9 Hot work should not be conducted in the presence of explosive mixtures of flammable gases, vapors, liquids, or dusts or where explosive mixtures could develop

3.3 SHORING/SUPPORT STRUCTURES

.1 Prior to deconstruction/disassembly of load bearing walls and foundations, provide details of jacking design, and drawings of shoring and bracing, in accordance with Provincial(OHSA)regulations and as noted in Sections 01 41 00 Regulatory Requirements and 31 04 31 Historic - Shoring and Bracing.

.2 Provide temporary supports for existing electrical and mechanical works that may be attached to or supported by masonry to be dismantled.

.3 Submit plans and details to Departmental Representative for approval prior to commencing this work.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 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

1.2 REFERENCES (Cont'd)

.1 Definitions:(Cont'd)
.2 Environmental Protection:(Cont'd) 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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by Departmental Representative.

.3 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.

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

.5 Include in Environmental Protection Plan:
.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
.3 Names and qualifications of persons responsible for training site personnel.
.4 Descriptions of environmental protection personnel training program.
.5 Erosion and sedment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan,

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 (Cont'd)

.5 (Cont'd)

Federal, Provincial, and Municipal laws and regulations.

.1 Coordinate with Dewatering Plan as specified in Section 31 00 00.01 Earthwork.

.6 Drawings showing locations of proposed temporary excavations, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

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

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

.9 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including demolition debris.

.10 Air pollution control plan detailing provisions to assure that exposure to exhaust fumes from lead abatement process is controlled on project site,and to assure dust, debris, materials, and trash, are contained on project site.

.11 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.12 Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities.

.13 Historical and cultural resources protection plan that defines procedures for

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 (Cont'd)
.13 (Cont'd)
identifying and protecting historical and cultural resources.
.14 Concrete cleanup: provide appropriate area on job site where grout, testing laboratory equipment, and other concrete works can be safely washed. Contractor is responsible for cleanup of this area once work is completed.

1.4 DRAINAGE

.1 Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes 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 Storm Water Pollution Prevention Plans to be included within erosion and sediment control plan.

.3 Provide temporary drainage and pumping required to keep excavations free from water.

.4 Provide dewatering system in accordance with section 31 00 00.01 Earthwork.

.5 Ensure discharge water into waterways, sewer or drainage systems is free of suspended materials.

.6 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
.1 dewatering systems
.2 excavations
.3 stockpiles

1.5 WORK ADJACENT TO WATERWAYS

.1 Ensure waterways are kept free of waste material or debris.

1.6 EQUIPMENT CONSIDERATIONS

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

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

.3 Leave machinery running only while in actual use.

.4 Conduct all equipment refueling over impermeable/absortive material situated at a designated site that is located at least 30 m away from the nearest water body. Obtain approval by Departmental Representative for proposed location.

.5 Conduct all vehicle/equipment maintenance at an off-site location.

1.7 HISTORICAL/ ARCHAEOLOGICAL CONTROL

.1 In accordance with section 01 14 00 Work Restrictions.

.2 Protect all surfaces of the Historical building/Structures/objects from damage due to construction activities.

.3 Provide outdoors protective measures to ensure mature plants and other landscape items are not damaged from construction activity.

.4 Protect subsurface infrastructure, historic features, profiles and ground features, as directed by the Departmental Representative.

.5 Receive approval of Departmental Representative prior to moving materials and equipment through the building.

.6 Accept liability for any damage caused to historic building or objects due to construction or moving of materials and equipment.

1.7 HISTORICAL/ ARCHAEOLOGICAL CONTROL (Cont'd)

.7 Inform Departmental Representative and assure protection of historical or archaeological resources not previously known to be on site or in area, if discovered during construction.

1.8 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with elements of Contractor's Environmental Protection Plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
.1 Do not take action until after receipt of written approval by Departmental Representative.

.3 Departmental Representative may issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

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

.2 Submit Environmental Protection Plan.

.3 Submit Erosion and Sediment Control Plan.

.4 Submit Dewatering Plan

3.1 GENERAL (Cont'd)

.5 Submit Traffic Control Plan

.6 Implement and maintain controls as noted in submitted environmental plans.

.7 Ensure public waterways and storm sewers remain free of waste and volatile materials disposal.

.8 Control public and personnel access to areas where air is exhausted outdoors from lead abatement process by use of fencing or barricades.

.9 Operate and maintain equipment as detailed in clause 1.6 Equipment Considerations.

.10 Conduct all equipment refueling over impermeable/absortive material situated at a designated refuelling site that is located at least 30 m away from the nearest water body.

.11 Concrete materials: provide appropriate area on job site where grout, testing laboratory equipment, and other concrete works can be safely washed. Contractor is responsible for cleanup of this area once work is completed.

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

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Province of Ontario, Occupational Health and Safety Act, R.S.O. 1990 as amended.

1.2 REFERENCES AND CODES (Cont'd)

.3 Health and Safety Requirements: in accordance with Section 01 35 29.06 Health and Safety Requirements.

.4 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.

1.3 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: Certified asbestos free building.
.2 Lead-based paint: In accordance with Section 01 35 29.06 Health and Safety Requirements.

1.4 SHORING

.1 Shoring and bracing to be in accordance with Provincial(OHSA)regulations, and with section 31 04 31 Historic - Shoring and Bracing.
.1 Submit drawings of shoring and bracing structures prior to fabrication.
.2 Submit proposed jacking design for foundation works.
.3 Submit Inspection Report - Engage service of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada to inspect and approve jacking, and shoring and bracing installations prior to use.

1.5 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

1.6 NATIONAL PARKS ACT

.1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.

.2 Also refer to the Historic Canals Regulation.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL .1 Follow applicable regulations.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 02 41 16.01 Structure Demolition

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 03 30 00.01 Cast in Place Concrete

.5 04 03 07 Historic - Masonry Repointing and Repair

.6 04 03 08 Historic - Mortaring

.7 04 03 09 Historic - Grouting

.8 04 03 41 Historic - Repair of Stone

.9 04 03 42 Historic - Replacement of Stone

.10 04 03 43 Historic - Dismantling Stone Masonry

.11 04 05 00 Common Work Results for Masonry

.12 06 08 99 Carpentry

.13 09 91 99 Painting for Minor Works

.14 31 00 00.01 Earthwork

.15 31 04 31 Historic - Shoring and Bracing

.16 31 36 00 Gabions

.17 31 63 00 Micropiles

1.2 INSPECTION

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

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental

1.2 INSPECTION (Cont'd)

.2 (Cont'd)
Representative instructions, or law of Place of Work.

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

.4 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, costs will be covered by testing allowance.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Departmental Representative will engage as required, independent inspection/testing agencies for purposes of Quality Assurance, that is to verify the Contractor's Quality Control process for timber, concrete, steel, environmental protection, waste disposal, etc.
.1 Inspection and/or testing of portions of the work as indicated in individual specification sections.
.2 Payment of these items are covered by the testing allowance.
.3 Costs for testing engaged by contractor for Quality Control are not covered by the testing allowance.

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

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

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to

1.3 INDEPENDENT INSPECTION AGENCIES (Cont'd)

.4 (Cont'd) ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to contract. Pay costs for retesting and reinspection.

1.4 ACCESS TO WORK

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

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

1.5 PROCEDURES

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

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

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

1.6 REJECTED WORK

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

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

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with

1.6 REJECTED WORK (Cont'd)

.3 (Cont'd)
Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.7 REPORTS

.1 Testing agency to issue jointly, inspection and test reports, to both Contractor and Departmental Representative at time of issue.

.2 Provide copies to subcontractor of work being inspected or tested.

.3 Submit copies of Quality Control test results to Departmental Representative as requested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish quality control test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.9 MOCK-UPS

.1 Provide mock-ups in accordance with 02 83 12 Lead-Base Paint Abatement - Maximum Precautions.

.2 Provide mock-ups in accordance with 04 05 00 Common Work Results for Masonry.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Contractor is responsible for quality control. Employment of independent inspection/testing agencies does not relax responsibility to perform work in accordance with contract documents.

.2 Provide notification to Departmental Representative when completed stages of work have been verified by contractor Quality Control process, as meeting contract specifications, and are ready for inspection or testing by Departmental Representative or independent inspection/testing agency.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 Fire Protection Standard from the Treasury Board of Canada

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

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

1.2 REFERENCES (Cont'd)

.4 Province of Ontario Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.

1.3 SUBMITTALS

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

.2 Request approvals for use of existing building utilities.

.3 Provide plans for approval of temporary heating, and ventilation systems.

1.4 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

.3 In accordance with clause 1.7 Existing Services requirements in Section 01 14 00 Work Restrictions.

1.5 WATER SUPPLY

.1 Departmental Representative will, upon approval, provide hose bib supply of potable water for construction use.

1.6 TEMPORARY HEATING AND VENTILATION

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

.2 Construction heaters used inside building must be vented to outside or be 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.

1.6 TEMPORARY HEATING AND VENTILATION (Cont'd)

.3 (Cont'd)
.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 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.5 Ventilating:
.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
.3 Ventilate storage spaces containing hazardous or volatile materials.
.4 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
.1 Conform with applicable codes and standards.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes.
.5 Vent direct-fired combustion units to outside.

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

1.7 TEMPORARY POWER AND LIGHT

.1 Departmental Representative will provide for contractor use, temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps. Contractor is to provide

1.7 TEMPORARY POWER AND LIGHT (Cont'd)

.1 (Cont'd)
connects and routing of power source from utility of the building being rehabilitated.

.2 Contractor is to provide at own cost, all other temporary power requirements, including installations, use, maintenance and removal.

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

.4 Provide and maintain temporary lighting throughout project.

.5 Electrical power and lighting systems used for construction purposes to receive prior approval of Departmental Representative. Make good damage to electrical system caused by use under this Contract.

1.8 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone and other communications as necessary for own use.

.2 Telephone point of connection is available at site for tie-in of new temporary phone services. Request approval from Departmental Representative prior to use.

1.9 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Refer to Fire Protection Standard from the Treasury Board of Canada

.3 Provide continuous Fire Alarm connectivity throughout the project for all systems wired and communicating through the building being rehabilitated.

1.9 FIRE PROTECTION (Cont'd)

.4 All instances of disconnection and reconnection are considered the contractors responsibility, and to be reporting to the Departmental Representative in writing.

.5 At the expense of the contractor, the Fire Alarm is required to remain operational for the Zone, and only the building being rehabilitated can be taken in and out of the system to meet the contractors needs.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Request approval from Departmental Representative prior to use of building electrical power and lighting systems for construction purposes. Make good damage to electrical system caused by use under this Contract.

.2 Provide temporary heat and ventilation in work areas as required to:
.1 Facilitate progress of Work.
.2 Provide adequate ventilation to meet health regulations for safe working environment.

.3 Perform work in accordance with clause 1.7 Existing Services in Section 01 14 00 Work Restrictions.

.4 Request approval from Departmental Representative for use of building potable water for construction use.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 Province of Ontario
.1 Occupational Health and Safety Act, R.S.O. 1990 as amended

.2 Canadian Standards Association (CSA International)
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
.2 CAN/CSA-S269.2 M1987(R2003) Access Scaffolding for Construction Purposes.

1.2 REFERENCES (Cont'd)

.3 Fire Protection Standard from the Treasury Board of Canada

1.3 SUBMITTALS

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

.2 Submit Site Plans for review and approval by Departmental Representative prior to commencing work.
.1 Site Plan to indicate proposed areas and locations to be cordoned off and used by Contractor.
.2 Identify supplemental areas for deliveries, temporary storage, staging or other uses.

1.4 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2 M1987(R2003).

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

1.6 HOISTING

.1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment.

.2 Hoists and cranes to be operated by qualified operator.

1.7 SITE STORAGE/LOADING

.1 Confine work and operations of employees to areas indicated on Contract Documents and as approved by Departmental Representative. Do not unreasonably encumber premises with

1.7 SITE STORAGE/LOADING (Cont'd)

.1 (Cont'd)
products or materials. Request approval from Departmental Representative for storage areas.

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

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site at locations designated by Departmental Representative.

.2 Provide and maintain adequate access to project site.

.3 Clean areas where used by Contractor's equipment.

1.9 SECURITY

.1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays if deemed necessary.

1.10 CONTRACTOR SITE OFFICE

.1 Provide and maintain a temporary office trailer heated/cooled to 22 degrees C, lighted, and ventilated, of sufficient size to accommodate site meetings for up to 10 persons, and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary.

.4 Locations for offices to be designated and approved by Departmental Representative.

1.11 DEPARTMENTAL REPRESENTATIVE SITE OFFICE

.1 Provide and maintain a fully operational temporary office for Departmental Representative.

.2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor minimum 0.3 m above grade, complete with an opening window and a lockable door.

.3 Insulated and provided with heating/cooling system to maintain 22 degrees C inside temperature.

.4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

.5 Install electrical lighting system using surface mounted, shielded commercial fluorescent fixtures.

.6 Equip office with new or in excellent used condition, 1 x 2 m table, 4 stackable office chairs, one 3 drawer legal size filing cabinet, one single pedestal office desk, 1 swivel office chair, plan rack and drafting stool, one coat rack and shelf, desk phone with speaker feature, combination printer/copier/scanner, internet service.

.7 Office provided shall be in very clean condition, and maintained in clean condition.

.8 Pay all costs including heating, lighting, telephone and internet services.

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

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE (Cont'd)	.3	Follow Fire Protection Standard from the Treasury Board of Canada as required.
1.13 SANITARY FACILITIES	.1	Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
	.2	Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
	.3	Refer to Section 01 14 00 Work Restrictions, clause 1.3.8.
1.14 CONSTRUCTION SIGNAGE	.1	No signs or advertisements, other than warning signs, are permitted on site.
1.15 PROTECTION AND MAINTENANCE OF TRAFFIC	.1	Provide access to building at all times. .1 Ensure access to Workshop and Welding Shop is maintained at all times for Parks Canada use.
	.2	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
	.3	Protect travelling public from damage to person and property.
	.4	Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
	.5	Dust control: as required, or at request of Departmental Representative. Contractor: responsible for repair of damage to roads caused by construction operations.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC (Cont'd)

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

1.16 SNOW REMOVAL

.1 Provide snow removal during period of Work.
.1 The defined work perimeter entry gate is the access point for the work site.
.2 Perform snow clearing, sanding/salting within the job site perimeter unless the job site is completely closed down.
.3 If there is a weather event that makes conditions icy, i.e. freezing rain or flash freezing, perform sanding/salting.
.4 Perform snow removal and sanding/salting of the worksite and parking lot of the job site in advance of the workday.
.5 Provide proof of Insurance for snow removal and sanding/salting operation if requested by Departmental Representative.
.6 Piling of cleared snow that may contain deleterious materials, will not occur within 30m of a waterbody.
.7 Provide snow removal contractor contact information on their letterhead containing company information and operator's name and phone numbers.

1.17 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.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Work in areas designated and approved by Departmental Representative.

.2 Construct as required all construction facilities necessary for compliance with OHSA and other applicable regulations.

.3 Provide all other required facilities as detailed in these specifications.

.4 Provide snow removal during period of Work.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA-O121-08(R2013), Douglas Fir Plywood.

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

.3 Province of Ontario Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.

1.2 REFERENCES (Cont'd)

.4 Ontario Ministry of Labour - Occupational Health & Safety Act - Ont.Reg. 843 Designated Substance - Lead

.5 Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

.6 Fire Protection Standard from the Treasury Board of Canada

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Ensure protection of all existing surfaces of Historical building/Structures/objects when providing barriers and enclosures. Request approval from Departmental Representative prior to installation.

.3 Accept liability for any damage caused to Historical building/Structures/objects due to construction or moving of materials and equipment.

.4 Remove from site all such work after use unless noted otherwise.

1.4 HOARDING

.1 Submit to Departmental Representative for approval, site plans with locations and construction details of all proposed enclosures.

.2 Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121.

.3 Apply plywood panels vertically flush and butt jointed.

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open stair wells, open edges of floors and other locations as required by governing authorities.

.2 Provide jobsite perimeter fencing at locations as noted on drawings.

1.6 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings exposed to weather.

.2 Close off floor and ceiling areas where not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Design enclosures to withstand wind pressure.

.4 In the event south masonry walls are dismantled during the winter months, protect open end of building from weather.
.1 Provide weather tight temporary enclosure, with moisture and thermal protection, to original lines of exterior walls.
.2 Coordinate access to building interior with micropile contractor as required. Provide suitable removable panel or doorway as required for access.

1.7 DUST TIGHT SCREENS

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

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

1.8 ACCESS TO SITE

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

1.9 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.10 FIRE ROUTES

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

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.12 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.13 TREE PROTECTION

.1 Provide outdoors protective measures to ensure mature plants and other landscape items are not damaged from construction activity.
.1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
.2 Erect temporary enclosures using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Maintain fence in good repair.

1.14 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Provide necessary barriers and enclosures as detailed in this specification and as required by applicable rules and regulations.

.2 Submit to Departmental Representative for approval, site plans with locations and construction details of all proposed enclosures.

.3 Ensure protection of all existing surfaces of Historical building/Structures/objects when providing barriers and enclosures. Request approval from Departmental Representative prior to installation.

.4 Accept liability for any damage caused to Historical building/Structures/objects due to construction or moving of materials and equipment.

.5 Maintain all barriers and enclosures in good condition.

.6 Remove from site all such work after use unless noted otherwise.

.7 Provide outdoors protective measures to ensure mature plants and other landscape items are not damaged from construction activity.
.1 Provide fencing around trees as designated by Departmental Representative.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or

1.2 REFERENCES (Cont'd)

.3 (Cont'd) systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by contract allowance in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with

1.4 STORAGE, HANDLING AND PROTECTION (Cont'd)

.2 (Cont'd) manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber and on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications

1.6 MANUFACTURER'S INSTRUCTIONS (Cont'd)

.2 (Cont'd) and manufacturer's instructions, so that Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

.1 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.10 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.12 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon A307 fasteners unless otherwise noted on drawings.

.3 Bolts may not project more than one diameter beyond nuts unless otherwise noted.

1.13 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.14 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

.3 Reconnect any temporarily disconnected utilities or services upon completion of work.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Follow requirements as noted in this specification.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 02 41 16.01 Structure Demolition

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 03 30 00.01 Cast in Place Concrete

.5 04 03 07 Historic - Masonry Repointing and Repair

.6 04 03 08 Historic - Mortaring

.7 04 03 09 Historic - Grouting

.8 04 03 41 Historic - Repair of Stone

.9 04 03 42 Historic - Replacement of Stone

.10 04 03 43 Historic - Dismantling Stone Masonry

.11 04 05 00 Common Work Results for Masonry

.12 06 08 99 Carpentry

.13 09 91 99 Painting for Minor Works

.14 31 00 00.01 Earthwork

.15 31 04 31 Historic - Shoring and Bracing

.16 31 36 00 Gabions

.17 31 63 00 Micropiles

1.2 REFERENCES

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

.2 True-View digital 3D Laser Survey and point cloud - building survey of original conditions.

1.2 REFERENCES (Cont'd)

.3 Internet reference guides as follows:
.1 Canada's Historic Places Standards and Guidelines for Conservation
.2 FHBRO Code of Practice
.3 FHBRO Heritage Character Sault Workshop
.4 Canada's Historic Places Sault Workshop
.5 Historic Canals Regulation

1.3 QUALIFICATIONS OF SURVEYOR

.1 Qualified to practice in Place of Work, and acceptable to Departmental Representative.

1.4 SURVEY REFERENCE POINTS

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

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

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

.4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. Require surveyor to replace control points in accordance with original survey control.

.5 Refer to True-View digital 3D Laser Survey and point cloud for building survey of original conditions.
.1 Copy will be provided to contractor upon request.

1.5 SURVEY REQUIREMENTS

.1 Provide control for grading and landscaping features.

.2 Establish pipe invert elevations.

.3 Establish foundation and floor elevations.

.4 Establish lines and levels for masonry work.

1.5 SURVEY REQUIREMENTS (Cont'd)

.5 Provide Total Station record of As-built conditions.

.6 Allow Departmental Representative to witness survey work when requested to verify elevations and site conditions.

1.6 EXISTING SERVICES

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

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

.3 Notify Departmental Representative in writing and on marked up reference drawing, the found conditions and the proposed remediation to meet specifications.

1.7 LOCATION OF EQUIPMENT AND FIXTURES

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

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

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

1.8 RECORDS

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

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

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

1.8 RECORDS (Cont'd)

.4 Provide records and/or information to Departmental Representative upon request.

1.9 SUBMITTALS

.1 Submit qualifications of Surveyor to Departmental Representative.

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

.3 Submit on request of Departmental Representative, certificate signed by surveyor certifying elevations and locations of completed Work that conform with Contract Documents.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Be responsible for field verification of existing conditions.

.2 Review True-View digital 3D Laser Survey and point cloud for building survey of original conditions.

.3 Review Internet Reference Guides as provided above in clause 1.2 References.

.4 Request approval for final location of installations based on field verification of existing conditions.

.5 Submit shop drawings and sketches to Departmental Representative for approvals.
.1 Include proposals for Cash Allowance items other than testing.

3.1 GENERAL (Cont'd)

.6 Keep records of existing conditions and installations.

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

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 02 41 16.01 Structure Demolition

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 03 30 00.01 Cast in Place Concrete

.5 04 03 07 Historic - Masonry Repointing and Repair

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.14 31 00 00.01 Earthwork

.15 31 04 31 Historic - Shoring and Bracing

.16 31 36 00 Gabions

.17 31 63 00 Micropiles

1.2 SUBMITTALS

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

.2 Submit written request in advance of cutting or alteration which affects:
.1 Structural integrity of elements of project.
.2 Integrity of weather-exposed or moisture-resistant elements.

1.2 SUBMITTALS (Cont'd)

.2 (Cont'd)
.3 Efficiency, maintenance, or safety of operational elements.
.4 Visual qualities of sight-exposed elements.

.3 Include in request:
.1 Identification of project.
.2 Location and description of affected Work.
.3 Statement on necessity for cutting or alteration.
.4 Description of proposed Work, and products to be used.
.5 Alternatives to cutting and patching.
.6 Date and time work will be executed.
.7 Proposed alterations to utilities and building, rough and finished openings, windows and doors.

1.3 MATERIALS

.1 Shown on contract drawings as required for installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

.3 Re-use of salvaged materials for patching and restoration as detailed on contract drawings.

1.4 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

1.4 PREPARATION (Cont'd)

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.5 EXECUTION

.1 The Stores Building is a Recognized Federal Heritage Building, and a Level 2 Cultural Resource, as per Parks Canada CRM policy.
.1 All aspects of the building exterior and interior must be protected and conserved.
.2 Maintain strict adherence to limits of remedial work as specified on the contract drawings.
.3 Removals to be limited to a minimum as required to perform the work or as otherwise specified by the Departmental Representative.
.4 Media (soda) blasting techniques to ensure integrity of base materials is not compromised. Provide mock-ups for approval as required.
.5 Surfaces adjacent to media blasting are to be protected from damage prior to commencing work.
.6 Use caution when performing all aspects of work to prevent damage to any building features.
.7 Provide outdoors protective measures to ensure mature plants and other landscape items are not damaged from construction activity.
.8 Provide indoors protective measures in all construction areas to ensure all character defining elements of the building remain intact.
.9 Cleanup to be performed using techniques and products that will leave cleaned surfaces intact and in original condition.
.10 Ornate windows, doors, metalwork, and landscape features adjacent to the work are to be protected prior to commencing work.
.11 Avoid damage to building features when dismantling and performing rehabilitative work.
.12 Advise Departmental Representative of any clues to original or previous features that may be discovered during repairs.

.2 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

1.5 EXECUTION (Cont'd)

.3 Fit several parts together, to integrate with other Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.8 Restore work with new products, or in accordance with requirements of Contract Documents.

.9 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.10 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.11 Restore work within limits as specified on contract drawings.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 GENERAL .1 Use products and materials as noted on contract drawings and specifications.

PART 3 - EXECUTION

3.1 GENERAL .1 Perform work in accordance with the specifications.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

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.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 Fire Protection Standard from the Treasury Board of Canada.

1.3 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

1.3 PROJECT CLEANLINESS (Cont'd)

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.3 Clear snow and ice from access to building if necessary.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.7 Dispose of waste materials and debris off site.

.8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

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

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

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

.4 Remove waste products and debris other than that caused by Owner or other Contractors.

.5 Restore cleanliness of site to original condition upon completion of work.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Perform work in accordance with this specification.

END

PART 1 - GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Departmental Representative's Waste Management Plan and Goals.

.2 Departmental Representative's Waste Management Goal is 75 percent of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

.3 Accomplish maximum control of solid construction waste.

.4 Preserve environment and prevent pollution and environment damage.

1.2 RELATED SECTIONS

.1 01 35 29.06 Health and Safety Requirements
.2 01 35 43 Environmental Procedures

.3 02 41 16.01 Structure Demolition

.4 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.5 03 30 00.01 Cast in Place Concrete

.6 04 03 07 Historic - Masonry Repointing and Repair

.7 04 03 08 Historic - Mortaring

.8 04 03 09 Historic - Grouting

.9 04 03 41 Historic - Repair of Stone

.10 04 03 42 Historic - Replacement of Stone

.11 04 03 43 Historic - Dismantling Stone Masonry

.12 04 05 00 Common Work Results for Masonry

1.2 RELATED SECTIONS (Cont'd)

.13 06 08 99 Carpentry

.14 09 91 99 Painting for Minor Works

.15 31 00 00.01 Earthwork

.16 31 04 31 Historic - Shoring and Bracing

.17 31 36 00 Gabions

.18 31 63 00 Micropiles

1.3 REFERENCES

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

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

.3 Province of Ontario Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.

.4 Ontario Ministry of Labour - Occupational Health & Safety Act - Ont.Reg. 843 Designated Substance - Lead

.5 Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

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

1.4 DEFINITIONS

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

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

.3 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

1.4 DEFINITIONS (Cont'd)

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

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

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

.7 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
.2 Returning reusable items including pallets or unused products to vendors.

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

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

.10 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.11 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.12 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials.

1.5 DOCUMENTS

.1 Maintain at job site, one copy of following documents:
.1 Waste Reduction Workplan.
.2 Materials Source Separation Program (MSSP)

1.6 SUBMITTALS

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

.2 Prepare and submit following prior to project start-up:
.1 Submit 2 copies of completed Waste Reduction Workplan (WRW), and
.2 Materials Source Separation Program (MSSP)

.3 Submit plans, shop drawings and other submittals promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time or equitable adjustments. No claim will be allowed to Contractor for such delays.

1.7 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not limited to:
.1 Destination of materials listed.
.2 Deconstruction/disassembly techniques and sequencing.
.3 Schedule for deconstruction/disassembly.
.4 Location.
.5 Security.
.6 Protection.
.7 Clear labelling of storage areas.
.8 Details on materials handling and removal procedures.
.9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.

1.7 WASTE REDUCTION WORKPLAN (WRW) (Cont'd)

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

.4 Describe management of waste.

.5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.

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

.7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

.8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.8 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

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

.4 Provide containers to deposit reusable and recyclable materials.

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

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, recyclable materials in separate condition.

.1 Transport to users of material for recycling.

1.9 WASTE PROCESSING SITES

.1 Metal - traders

.2 Lead - Hazardous Waste Recycling Depot.

.3 Landfill

.4 Province of Ontario.
.1 Ministry of the Environment, 135 St. Clair Avenue, West, Toronto, ON, M4V 1P5, Telephone: 800-565-4923, Fax: 416-353-3159

1.10 STORAGE, HANDLING AND PROTECTION

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

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

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

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

.5 Protect structural components not removed for demolition from movement or damage.

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

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

.8 Separate and store materials produced during dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
.1 On-site source separation is recommended.
.2 Remove co-mingled materials to off-site processing facility for separation.

1.11 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

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

.3 Keep records of construction waste including:
.1 Number and size of bins.
.2 Waste type of each bin.
.3 Total tonnage generated.
.4 Tonnage reused or recycled.
.5 Reused or recycled waste destination.

.4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

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

1.12 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility.

1.13 SCHEDULING

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

1.14 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with elements of Contractor's WRW.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and promptly take such action, or as otherwise directed to the satisfaction of the Departmental Representative.

1.14 NOTIFICATION (Cont'd)

.3 Departmental Representative may issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 SELECTIVE DEMOLITION

.1 Do not demolish building elements beyond what is indicated on Drawings without approval by Departmental Representative.

.2 Salvage building materials as specified for re-use.

3.2 APPLICATION

.1 Do Work in compliance with WRW.

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

.3 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

3.3 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Concrete materials: provide appropriate area on job site where concrete trucks, testing laboratory equipment, and other concrete works can be safely washed. Contractor is

3.3 CLEANING (Cont'd)

.2 Concrete materials:(Cont'd)
responsible for cleanup of this area once work is completed.

.3 Clean-up work area as work progresses.

.4 Source separate materials to be reused/recycled into specified sort areas.

3.4 DIVERSION OF MATERIALS

.1 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
.1 Mark containers or stockpile areas.
.2 Provide instruction on disposal practices.

.2 On-site sale of salvaged recovered reusable recyclable materials is not permitted.

.3 Dispose of waste materials as per WRW.

3.5 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Government Chief Responsibility for the Environment:
.1 Provincial Government - Ministry of the Environment, 135 St. Clair Avenue West Toronto, ON M4V 1P5 General Inquiries: (800)565-4923 Fax: (416)325-3159
.2 Federal Government - Environment Canada, Toronto, ON. (416) 734-4494

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

.8 04 03 42 Historic - Replacement of Stone

.9 04 03 43 Historic - Dismantling Stone Masonry

.10 04 05 00 Common Work Results for Masonry

.11 06 08 99 Carpentry

.12 09 91 99 Painting for Minor Works

.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 Not used

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection:

.1 Conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

.2 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.3 Request Departmental Representative inspection.

.2 Departmental Representative Inspection:

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

.2 Contractor to correct Work as directed.

.3 Final Inspection:

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

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

1.4 FINAL CLEANING

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

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

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Follow closeout procedures as detailed in this specification.

.2 Provide quality control of work.

.3 Request inspections from Departmental Representative as work progresses.

.4 Submit items as required.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 08 Historic - Mortaring

.6 04 03 09 Historic - Grouting

.7 04 03 41 Historic - Repair of Stone

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.13 31 00 00.01 Earthwork

.14 31 04 31 Historic - Shoring and Bracing

.15 31 36 00 Gabions

.16 31 63 00 Micropiles

1.2 REFERENCES

.1 Not used.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with Departmental

1.3 ADMINISTRATIVE REQUIREMENTS (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review warranty requirements.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, final copies of As-constructed drawings, approved shop drawings, masonry records.

.3 Provide spare parts and salvaged materials.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, at site for Departmental Representative one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

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

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

1.5 AS -BUILT DOCUMENTS AND SAMPLES (Cont'd)

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

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

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

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

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

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

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

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

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
.1 Measured depths of elements of foundation in relation to finish first floor datum.
.2 Field changes of dimension and detail.
.3 Changes made by change orders.
.4 Details not on original Contract Drawings.
.5 References to related shop drawings and modifications.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS (Cont'd)

.5 Specifications: mark each item to record actual construction, including:
.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, Total Station digital survey record, waste disposal records, as required by individual specifications sections.

1.7 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
.1 Provide information for re-ordering products.

.2 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Additional requirements: as specified in individual specifications sections.

1.8 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.

.3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

1.8 WARRANTIES AND BONDS (Cont'd)

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

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

.6 Conduct joint 11 month warranty inspection, measured from time of acceptance, with Departmental Representative.

.7 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Location where installed.

.3 Name and phone numbers of manufacturers or suppliers.

.4 Names, addresses and telephone numbers of sources of materials.

.5 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.6 Starting point and duration of warranty period.

.7 Organization, names and phone numbers of persons to call for warranty service.

.8 Typical response time and repair time expected for various warranted equipment.

.3 Contractor's plans for attendance at 11 month post-construction warranty inspection.

.8 Respond in timely manner to oral or written notification of required construction warranty repair work.

1.8 WARRANTIES AND BONDS (Cont'd)

.9 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

.1 Attend Pre-Warranty Meeting.

.2 Submit items as detailed in this specification.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.2 03 30 00.01 Cast in Place Concrete

.3 04 03 07 Historic - Masonry Repointing and Repair

.4 04 03 08 Historic - Mortaring

.5 04 03 09 Historic - Grouting

.6 04 03 41 Historic - Repair of Stone

.7 04 03 42 Historic - Replacement of Stone

.8 04 03 43 Historic - Dismantling Stone Masonry

.9 04 05 00 Common Work Results for Masonry

.10 06 08 99 Carpentry

.11 09 91 99 Painting for Minor Works

.12 31 00 00.01 Earthwork

.13 31 04 31 Historic - Shoring and Bracing

.14 31 36 00 Gabions

.15 31 63 00 Micropiles

1.2 REFERENCES

.1 Reference Standards:
.1 Canadian Standards Association (CSA International). CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
.2 National Building Code 2010, Part 8 - Safety Measures at Construction and Demolition Sites
.3 Fire Protection Standard from the Treasury Board of Canada.

1.2 REFERENCES (Cont'd)

.1 (Cont'd)

.4 Ontario Ministry of Labour - Occupational Health & Safety Act - Ont.Reg. 843 Designated Substance - Lead

.5 Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

1.3 PERFORMANCE REQUIREMENTS

.1 Perform demolition and removal of main floor and second floor non structural elements as detailed on drawings and as directed by Departmental Representative. Historic doors and windows to remain.

.2 Second storey stairwell infill work as detailed on drawings and in Section 06 08 99 Carpentry must be completed prior to removal of load bearing wall.

.3 Building Services:
Temporarily disconnect or re-route existing building services as required for removals in accordance with Section 01 14 00 Work Restrictions.

.1 Electrical
.2 Communications
.3 Fiber optics
.4 Telephone
.5 Boiler heating system
.6 Copper water service

.4 Separate materials from waste stream to obtain maximum percentages of diversion in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.5 The Stores Building is a Recognized Federal Heritage Building, and a Level 2 Cultural Resource, as per Parks Canada CRM policy.

.1 All aspects of the building exterior and interior must be protected and conserved.

.2 Maintain strict adherence to limits of removals as specified on the contract drawings, and as directed by the Departmental Representative.

.3 Use caution when performing all aspects of work to prevent damage to any remaining

1.3 PERFORMANCE REQUIREMENTS (Cont'd)

.5 (Cont'd)

.3 (Cont'd)
building features, including masonry, windows and doors, joists, rafters and flooring.

.4 Provide indoors protective measures in all construction areas to ensure all character defining elements of the building remain intact.

.5 Cleanup to be performed using techniques and products that will leave cleaned surfaces intact and in original condition.

.6 Ornate windows, doors, metalwork, and landscape features adjacent to the work are to be protected prior to commencing work.

.7 Avoid damage to masonry work when dismantling and performing rehabilitative work.

.8 Advise Departmental Representative of any clues to original or previous features that may be discovered during repairs.

1.4 SUBMITTALS

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

.2 Provide deconstruction/disassembly plan prior to starting work in accordance with Section 01 33 00 - Submittals.

.3 Prior to demolition of interior finishes, submit itemized demolition schedule for review and approval by Departmental Representative.

.4 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal, and indicate:

.1 Descriptions of materials to be salvaged reused, recycled and landfilled.

.2 Schedule of selective demolition.

.3 Name and address of haulers waste facilities waste receiving organizations.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with applicable provincial regulations.

.2 Site Meetings:
.1 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.
.2 Attend project meetings as requested.
.3 Ensure key personnel attend.

.3 Health and Safety:
.1 Provide occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Protect Historical building/structures/ objects from damage from construction activity. Deliver, store and handle materials and equipment with care when in vicinity of historic building.

1.7 ENVIRONMENTAL REQUIREMENTS

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

.2 Refer to 01 74 21 Construction Demolition/ Waste Management and Disposal

1.8 SITE CONDITIONS

.1 Interior demolition work consists of newer framed walls, partitions, drywall and finishes free of lead based paint.

.2 Asbestos: Certified asbestos free building.

.3 A Potential Hazards Identification for the Stores Building is presented in the Appendix for Contractor reference.

.4 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or

1.8 SITE CONDITIONS (Cont'd)

.4 (Cont'd)
report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.9 PROTECTION

.1 Prevent damage to adjacent structures or services during demolition. Repair damage caused by demolition as directed by Departmental Representative.
.1 Protect building mechanical and electrical systems. Prevent debris from entering or damaging the systems.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used

PART 3 - EXECUTION

3.1 PREPARATION

.1 Post warning signs on electrical lines and equipment which must remain energized to serve other products during period of demolition.

.2 Temporarily disconnect services as required for removals.

3.2 REMOVAL OF WASTE

.1 Remove waste materials from site and dispose of at designated disposal facilities in safe manner and in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

3.3 DISASSEMBLY

.1 Waste materials removed from designated structure are property of Contractor.

.2 Employ workmanship procedures which minimize damage to materials and equipment.

3.3 DISASSEMBLY (Cont'd)

.3 Ensure workers and subcontractors are briefed to carry out work in accordance with appropriate demolition techniques.

.4 Project supervisor with previous deconstruction experience must be present on site throughout work.

.5 Deconstruct in accordance with CSA S350 and other applicable safety standards.

.6 Workers must utilize adequate fall protection where necessary.

.7 Maintain structural integrity of structure.

.8 Systematically and carefully remove finishes, furnishings,fasteners, masonry and building materials when required for salvage. Record sufficient construction details for reinstallation.

.9 Wherever possible, transfer material assemblies from heights to ground level for easier disassembly. Take appropriate measures to ensure safety.

.10 Separate from waste stream, material in condition suitable for reuse and/or recycling.

.11 Remove and store materials to be salvaged, in manner to prevent damage.
.1 Store and protect in accordance with requirements for maximum preservation of material.
.2 Handle salvaged materials as new materials.

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

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

.14 Where existing materials are to be re-used in Work, use special care in removal, handling,

3.3 DISASSEMBLY (Cont'd)

.14 (Cont'd)
storage and re-installation to assure proper function in completed work.

3.4 PROCESSING STOCKPILING AND REMOVAL FROM SITE

.1 In accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

3.5 CLEANING AND RESTORATION

.1 Keep site clean and organized throughout deconstruction.

.2 Upon completion of project, remove debris, trim surfaces and leave work site clean.

.3 Upon completion of project, reinstate areas affected by Work to condition which existed prior to beginning of Work.

.4 Provide records as required for future reconnection of all building services that have been temporarily disconnected for removals.

END

PART 1 - GENERAL

1.1 GENERAL

.1 Includes all costs for lead based paint removal from the following:
.1 interior masonry walls - by media (soda) blasting,
.2 second storey historic wood flooring, second storey historic double door, and all existing wood door frames - by chemical removal. Follow with application of slow-drying sealer. Ceiling areas/floor joists not included in chemical removals.

.2 Mock-ups are mandatory throughout the paint removal process, to demonstrate acceptable results for lead paint removal.
.1 Provide mock-up areas for review and approval by Departmental Representative, to determine effect of erosion on mortar and stone. Adjust technique until acceptable method is approved. Perform work using approved technique. Provide additional mock-up areas for review and approval by Departmental Representative as required, to adjust for changes in substrate conditions or to correct unacceptable erosion effects.

.3 Proposed alternative removal methods: Bidders are advised to submit along with the bid, any proposed alternative methods of lead paint removal that meet specification parameters. Include any proposed cost adjustments.
.1 The bidders submitted alternative removal process will be reviewed by a multi - disciplinary team. The team will either accept the proposed method or advise the contractor of adjustments on the process.
.2 Throughout the removal process, the performance will be monitored and contractor advised to alter methods if required. Mock-ups are required as described above. Cost issues will be managed through the prevailing change management process.
.3 The bidders cost breakdown, submitted with the bid will be the basis for determining the change in price for this portion of the work.

1.2 RELATED SECTIONS

.1 01 35 29.06 Health and Safety Requirements

.2 02 41 16.01 Structure Demolition

.3 04 03 08 Historic - Mortaring

.4 04 03 09 Historic - Grouting

.5 04 03 43 Historic - Dismantling Stone Masonry

.6 04 05 00 Common Work Results for Masonry

.7 06 08 99 Carpentry

1.3 REFERENCES

.1 Ontario Ministry of Labour - Occupational Health & Safety Act - Ont.Reg. 843 Designated Substance - Lead

.2 Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

.3 Department of Justice Canada
.1 Canadian Environmental Protection Act, 1999 (CEPA).

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

.5 Human Resources and Social Development Canada (HRSDC)
.1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.

.6 Transport Canada (TC)
.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.7 U.S. Environmental Protection Agency (EPA)
.1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.

.8 Fire Protection Standard from the Treasury Board of Canada.

1.4 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Authorized Visitors: Departmental Representative or designated representatives of regulatory agencies.

.3 Occupied Area: area of building or work site outside Work Area.

.4 Dioctyl Phthalate (DOP) Test: testing method used to evaluate particle penetration and air flow resistance properties of filtration materials - HEPA filter leak test.

.5 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Appropriate capacity for scope of work.

.6 Airlock: ingress or egress system without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.

.7 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:
.1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.
.2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.
.3 Overlap each polyethylene sheet at openings 1.5 m on each side.

.8 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic metre of air calculated as an 8-hour

1.4 DEFINITIONS (Cont'd)

.8 Action level:(Cont'd)
time-weighted average (TWA). Maximum precautions for lead abatement are based on airborne lead concentrations greater than 1.25 milligrams per cubic meter of air within Work Area.

.9 Competent person: individuals capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.

.10 Lead in Dust: wipe sampling on the vertical and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

.11 Negative Air Pressure Machine: extracts air directly from work area and filters extracted air through a HEPA filter, discharge air to exterior of building.
.1 Maintain pressure differential of 5 to 7 Pa relative to adjacent areas outside of work areas. Machine to be equipped with alarm to warn of system breakdown, and equipped with instrument to continuously monitor and automatically record pressure differences.

1.5 SUBMITTALS

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

.2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.

.3 Provide: Provincial requirements for Notice of Project Form.

.4 Provide proof of Contractor's General and Environmental Liability Insurance.

.5 Quality Control:
.1 Provide Departmental Representative necessary permits for transportation and

1.5 SUBMITTALS (Cont'd)

.5 Quality Control:(Cont'd)
.1 (Cont'd)
disposal of lead based paint waste and proof it has been received and properly disposed.
.2 Provide proof satisfactory to Departmental Representative that employees had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.
.3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by Departmental Representative.

.6 Product data:
.1 Provide documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials.
.1 Slow drying sealer.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead, in case of conflict among those requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.

.2 Health and Safety:

Require construction work to be in compliance with the occupational health and safety regulations in 01 35 29.06 - Health and Safety Requirements
Safety Requirements: worker and visitor protection - Protective equipment and clothing to be worn by workers while in Lead Work Area includes:
.1 Abrasive blasting of lead paint: NIOSH approved and equipped with filter cartridges with assigned protection factor of 100 or acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Respirator to be equivalent Type CE abrasive blast supplied air respirator operated in a pressure demand

1.6 QUALITY ASSURANCE (Cont'd)

.2 Health and Safety:(Cont'd)

.1 (Cont'd)

or positive pressure mode with a tight-fitting face-piece. Compressed air used to supply supplied air respirators to meet breathing air purity requirements of CAN/C SA-Z180.1. Where an oil- lubricated compressor is used to supply breathing air, a continuous carbon monoxide monitor/alarm to be provided.

.2 Lead removal using power tool with an effective dust control system equipped with a HEPA filter,or leads removal by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted plaster walls or building components by striking wall with sledgehammer or similar tool : respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.

.3 Welding or high temperature cutting or burning of lead containing coatings or materials indoors or in a confined space is not permitted, except where unavoidable, and only with the approval of the Departmental Representative: respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Full enclosure with mechanical ventilation to remove contaminated air from the enclosure through a HEPA filter, and filtered air provided to replace the exhausted air.

.4 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.1 Requirements for workers: Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and

1.6 QUALITY ASSURANCE (Cont'd)

.2 Health and Safety:(Cont'd)

.4 (Cont'd)

.1 Requirements for workers:(Cont'd)

Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.

.2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.

.3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not use this system as means to leave or enter Work Area.

.5 Eating, drinking, chewing, and smoking are not permitted in Work Area.

.6 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.

.7 Ensure workers wash hands and face when leaving Lead Work Area. Facilities for washing are to be provided by contractor.

.1 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.

.2 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.

.8 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.

1.6 QUALITY ASSURANCE (Cont'd)

.2 Health and Safety:(Cont'd)

.8 Visitor Protection:(Cont'd)

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

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

.3 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, and Municipal regulations. Dispose of lead waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.

.4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 EXISTING CONDITIONS

.1 Painted interior masonry walls tested positive for lead content.

.1 Lead based paint is to be removed prior to dismantling masonry of the south end walls to ensure masonry worker health and safety.

.2 Lead content is present in the original paint coatings on original second storey wood door, all door frames, second storey wood floors, and on other construction works installed and painted prior to 1975. Assume surfaces with multiple layers of paint to include lead base paint in earlier coats.

.1 Ensure workers are aware of lead hazard and follow health and safety precautions and procedures.

.3 All window frames and trims are free of lead based paint with exception a sample strip of

1.8 EXISTING CONDITIONS (Cont'd)

.3 (Cont'd)
original paint on the upper window section remaining intact for historical purposes. Ground floor doors are free of lead based paint.

.4 A Potential Hazards Identification for the Stores Building is presented in the Appendix for Contractor reference.

.5 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.
.1 Main floor ceiling unknown until interior demolitions completed. Do not include floor joists/ceiling area in chemical removals.

1.9 SCHEDULING

.1 Not later than two days before beginning Work on this Project notify the following in writing; where appropriate.
.1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
.2 Provincial Ministry of Labour.
.3 Disposal Authority.

.2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions. Ensure workers follow Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011 for health and safety procedures.

.3 Provide Departmental Representative copy of notifications prior to start of Work.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Polyethylene 0.15 mm unless otherwise specified; in sheet size to minimize joints.

.2 FR polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.

.3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.

.4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for trapping residual lead paint residue.
.1 ECO BOND Lead Based Paint Sealant, or equivalent latex primer.

.5 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.
.1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 GENERAL

.1 Use level of precautions as required based on method of removal. Refer to Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

.2 Perform the following lead abatement Work:
.1 Painted interior face of masonry walls by media(soda)blasting, following removals of interior works, and prior to dismantle procedure of south end masonry. Provide mock-ups and follow approved procedure.

3.1 GENERAL (Cont'd)

.2 (Cont'd)

.2 Second storey historic wood flooring/ second storey historic double door, all door frames interior and exterior surfaces- by chemical removal,followed by application of slow-drying sealer. Ceiling areas/floor joists not included in chemical removals.

3.2 SUPERVISION

.1 Approved Supervisor must remain within Work Area during disturbance, removal, or handling of lead based paints.

3.3 PREPARATION

.1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by Departmental Representative.

.2 Work Area:

.1 Shut off and isolate HVAC system to prevent lead dust and particulate dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.

.2 Pre-clean fixed items, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.

.3 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.

.4 Install negative pressure machine system and operate con tinuously from installation of polyethylene sheeting until completion of final cleanup. Provide automatic continuous monitoring and recording instrument of pressure difference.

.5 Seal off walls, openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

.6 Cover floor surfaces in work area from wall to wall with FR polyethylene drop sheets to protect existing floor during removal.

.7 Build airlocks at entrances and exits from work areas to ensure work areas are

3.3 PREPARATION (Cont'd)

.2 Work Area:(Cont'd)

.7 (Cont'd)
always closed off by one curtained doorway when workers enter or exit.

.8 At point of access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used:

.1 CAUTION LEAD HAZARD AREA (25 mm).

.2 NO UNAUTHORIZED ENTRY (19 mm)

.3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).

.4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).

.9 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.

.10 Where water application is required for wetting lead containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.

.11 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.

.3 Worker Decontamination Enclosure System: includes Equipment and Access Room and Clean Room, as follows:

.1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of the suite, and one to work area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.

.2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing

3.3 PREPARATION (Cont'd)

.3 (Cont'd)
.2 Clean Room:(Cont'd)
and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
.3 Shower room in decontamination facility to be provided with the following:
.4 Hot and cold water or water of constant temperature not less than 40 degrees Celsius or more than 50 degrees Celsius.
.5 Individual controls inside to regulate water flow and temperature.
.6 Prior to each shift in which a decontamination facility is being used, a competent person should inspect the facility to ensure that there are no defects that would allow lead-containing dust to escape. Defects should be repaired before the facility is used. The decontamination facility should be maintained in a clean and sanitary condition.

.4 Separation of Work Areas from Occupied Areas: Barriers between Work Area and occupied area to be constructed as follows:
.1 Construct floor to ceiling lumber metal stud framing, cover with polyethylene sheeting and seal with duct tape. Apply 9 plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.
.2 Cover plywood with polyethylene sheeting and sealed with duct tape.

.5 Maintenance of Enclosures:
.1 Maintain enclosures in tidy condition.
.2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
.3 Visually inspect enclosures at beginning of each working day.
.4 Use smoke test method to test effectiveness of barriers as directed by Departmental Representative.

3.4 LEAD - BASE PAINT ABATEMENT

.1 Fully remove by media (soda) blasting or other method approved as outlined in Clause 1.1.3 above, paint from all interior masonry surfaces. Lead based paint is to be removed prior to dismantling masonry of the south end walls to ensure masonry worker health and safety. Follow Ontario Ministry of Labour - Occupational Health and Safety Branch Guideline - Lead on Construction Projects April 2011 for procedures. Use level of precautions as required based on contractors method of removal.

.1 Provide mock-up areas for review and approval by Departmental Representative, to determine effect of erosion on mortar and stone. Adjust technique until acceptable method is approved. Perform work using approved technique. Provide additional mock-up areas for review and approval by Departmental Representative as required, to adjust for changes in substrate conditions or to correct unacceptable erosion effects.

.2 Fully remove painted surfaces from historic second storey wood flooring, second storey wood double door, and from all door frames, by chemical removal or other method approved as outlined in Clause 1.1.3 above, followed by application of slow-drying sealer.

.3 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.

.4 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove immediately from working area to staging area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

.5 After completion of stripping work, wet sponge surface to remove visible material.

3.4 LEAD - BASE PAINT ABATEMENT (Cont'd)

.5 (Cont'd)
During this work keep surfaces wet. After wet sponging, wet clean and HEPA vacuum entire work area including Equipment and Access Room. Compressed air or dry sweeping not be used to clean up lead-containing dust or waste. After inspection and approval by Departmental Representative apply continuous coat of slow drying sealer to wood surfaces. Do not disturb work area for 8 hours, no entry, activity, or ventilation other than operation of negative air machine during this period.

.6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

3.5 INSPECTION

.1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from requirements not been approved in writing by Departmental Representative will result in Work shutdown, at no cost to Owner.

.2 Departmental Representative will inspect work for:
.1 Adherence to specific procedures and materials.
.2 Final cleanliness and completion.
.3 No additional costs will be allowed for additional labour or materials required to provide specified performance level.

.3 When lead dust leakage from Work Area occurs Departmental Representative will order Work shutdown.
.1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.4 Do not proceed with work until approval is provided by Departmental Representative.

3.6 LEAD SURFACE SAMPLING - WORK AREAS

.1 Final lead surface sampling conducted in presence of Departmental Representative as follows:

.1 After Work Area has passed a visual inspection for cleanliness approved by Departmental Representative and acceptable coat of lock-down agent has been applied to wood surfaces within enclosure, and appropriate setting period of 8 hours has passed, perform lead wipe sampling in Work Area.

.1 Final lead wipe sampling results from horizontal and vertical surfaces must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples collected and analyzed in accordance with EPA 747-R-95-007.

.2 If wipe sampling results show levels of lead dust in excess of 40 micrograms per square foot, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.

.3 Repeat as necessary until lead dust levels are less than 40 micrograms per square foot.

.4 Absence of lead or less than 40 micrograms per square foot on bare surfaces prior to approval to commence work.

3.7 FINAL CLEANUP

.1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.

.3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.

.4 Clean up Work areas, Equipment and Access Room, and other contaminated enclosures.

3.7 FINAL CLEANUP (Cont'd)

.5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.

.6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

3.8 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

.2 Reconnect systems and utilities that have been temporarily disconnected once work is completed.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 03 20 00 Concrete Reinforcing

.2 03 30 00.01 Cast in Place Concrete

.3 04 03 07 Historic - Masonry Repointing and Repair

.4 04 03 43 Historic - Dismantling Stone Masonry

.5 04 05 00 Common Work Results for Masonry

.6 31 00 00.01 Earthwork

.7 31 04 31 Historic - Shoring and Bracing

.8 31 36 00 Gabions

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-A23.1-09/A23.2-09(R2014), Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA Standard 0121-08, Douglas Fir Plywood

.3 CAN/CSA-S269.3 M92(R2013) Concrete Formwork

1.3 SUBMITTALS

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

.2 Shop drawings of formwork or falsework are not required for this project

1.4 MEASUREMENT AND PAYMENT

.1 There will be no measurement of this item. All costs to be included in the stipulated sum price.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Formwork materials:

.1 Use formwork materials which are new at start of Work except that, for locations not exposed to view in the completed Work, used serviceable materials may be substituted.

.2 Form Boards: Matched pine or spruce, dressed on three sides, in uniform widths.

.3 Plywood: medium density overlay Douglas Fir to CSA O121, or other form materials as described in CAN/CSA A23.1-09, as required to produce smooth form finish suitable for specified surfaces.

.2 Chamfers: Wood, 45 deg. cut from 50mm x 50mm nominal material, or plastic type.

.3 Form Ties: Ties to be removed or cut back a minimum of 25mm from exposed surfaces.

.4 Joint Tape: Non staining, water impermeable, self release type

.5 Form release agent: Provide commercial formulation form-coating compound that will not bond with, stain nor adverely affect the concrete surfaces and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds. Nor shall it contain any non drying ingredients such as mineral oil.

2.2 DESIGN CRITERIA

.1 Be responsible for the structural design of formwork and its construction in accordance with CSA A23.1-09 Clause 11, including shoring and bracing, to ensure its stability and to support safely the vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure. Carry vertical and lateral loads to the ground by formwork system and in-place construction that has attained adequate strength for the purpose.

.2 Design formwork and falsework to resist safely lateral and vertical loads imposed by the weight of forms, wet concrete, moving equipment and workmen, wind, fluid pressure of concrete, ambient temperature, foundation pressure and other pertinent factors.

.3 Design formwork and falsework to support construction loads and fluid pressures without overstressing the material and without excessive deflection. Facing materials for architectural concrete and their supports shall not deflect more than 1/400th of the span.

.4 Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

.5 Co-ordinate this Section with Section 01 35 29.06 - Health and Safety Requirements.

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 Construction in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 The installer must examine the substrate and the conditions under which concrete formwork is to be performed and notify the Contractor

3.1 FABRICATION AND ERECTION (Cont'd)

.3 (Cont'd)
in writing of any unsatisfactory conditions. Do not proceed with the work until the unsatisfactory conditions have been corrected in a manner acceptable to the installer.

.4 Obtain Departmental Representative's approval for use of earth forms.

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

.6 Install wood forms where earth form sides have collapsed.

.7 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-A23.1-09/A23.2-09.

.8 Provide formwork/falsework sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup materials at joints as required to prevent leakage and fins.

.9 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.

.10 Build into formwork, inserts, recesses for base plates, miscellaneous frames , holes, sleeves, and items otherwise specified as supplied and located under the work of other Sections. Use setting drawings, diagrams, instructions, and directions provided by suppliers of the times to be attached thereto. Embed no wood in concrete for purposes of anchorage.

.11 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Engineer before placing of concrete.

3.1 FABRICATION AND ERECTION (Cont'd)

.12 Anchor bolts:
.1 Place anchor bolts to templates under supervision of trade supplying anchors prior to placing concrete.
.2 Anchor bolts shall be located to conform to the dimensions shown on the drawings and rigidly secured to prevent movement.
.3 Anchor bolts shall be free of all mud oil, grease, laitance or other coatings that adversely affect bond strength.
.4 After concrete finishing is complete, grease exposed threads of bolt and replace washers and nut.

.13 Clean formwork in accordance with CSA-A23.1-09/A23.2-09, before placing concrete.

3.2 INSPECTIONS

.1 Inform Departmental Representative when formwork is completed and has been verified by contractor quality control to meet contract specifications.

.2 Provide access to formwork at appropriate stages of the work for Departmental Representative to verify dimensions and features are installed or constructed as specified in contract documents.

3.3 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum periods of time after placing concrete.
.1 3 days for walls.
.2 3 days for columns.
.3 1 days for foundations.

.2 Remove formwork and falsework for suspended works when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later.

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

3.3 REMOVAL AND RESHORING (Cont'd)

.4 Take care in removing plywood forms. Do not jerk them loose or use metal pinch bars, but use wood wedges and gradually force the panels loose. Leave plywood forms in place as long as possible and until other adjacent formwork is stripped to permit maximum shrinkage away from concrete and to protect concrete surfaces. Take particular care to prevent damage to external corners of concrete.

3.4 ADJUSTMENTS

.1 Replacement of Defective Work:

.1 Movement and displacement of formwork during construction, variations in excess of specified tolerances, and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.

.2 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 03 10 00 Concrete Forming and Accessories

.2 03 30 00.01 Cast in Place Concrete

.3 04 03 07 Historic - Masonry Repointing and Repair

.4 04 03 43 Historic - Dismantling Stone Masonry

.5 04 05 00 Common Work Results for Masonry

.6 31 00 00.01 Earthwork

.7 31 04 31 Historic - Shoring and Bracing

.8 31 36 00 Gabions

1.2 MEASUREMENT AND PAYMENT

.1 There will be no measurement of this item. All costs to be included in the stipulated sum price.

1.3 REFERENCES

.1 American Concrete Institute (ACI)
.1 ACI Detailing Manual 2004.

.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-A23.3-09, Design of Concrete Structures.
.3 CAN/CSA-G30.18-M92(R2009), Billet-Steel Bars for Concrete Reinforcement, A National Standard of Canada.

.3 Reinforcing Steel Institute of Canada (RSIC)
.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.4 SUBMITTALS

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

.2 Prepare shop drawings showing the size, spacing, location, quantities and details of reinforcing steel in accordance with the drawings and specifications. Use the Reinforcing Steel Manual of Standard Practice - by the Reinforcing Steel Institute of Ontario as a guide only. Drawings shall be prepared by detailers having a minimum of two years experience in this type of work. All drawings and bar lists prepared under this section shall be checked and initialled by the checker of the firm procuring the drawings before submission to the Departmental Representative.

.3 Include all necessary plans and elevations of walls and beams on the diagrams, down to a scale of not less than 1:100 metric. Section shall be drawn to a scale of not less than 1:50 metric. Placing drawings shall include sufficient details, dimensions and field instruction to permit complete setting of all reinforcement without reference to the design drawings and shall show location and lengths of lap splices. Detailer is to ensure that reinforcements will not be displaced or fouled by other reinforcement.

.4 Indicate supports for reinforcement and cover.

.5 Submit to Departmental Representative for review, a digital copy in PDF format of each fabrication and placement drawing. For formats larger than 11x17, submit 3 hard copies and a PDF file of each drawing for review. Departmental Representative will provide comments and return to Contractor, stamped "Reviewed" or "Reviewed as Noted" or otherwise marked up to show required modifications. Rejected shop drawings are to be corrected and resubmitted.

.6 Review of shop drawings by the Departmental Representative is a precaution against

1.4 SUBMITTALS (Cont'd)

.6 (Cont'd)
oversight or error. It is not a detailed check and must not be construed to be relieving the Contractor of responsibility for making their work accurate and in conformity with the construction documents. Design for which the Contractor is responsible under the Contract will not be reviewed. Work done prior to receipt of the reviewed drawings will be at the risk of the contractor. Review comments are not authorization for changes to the Contract price.

.7 Do not release for fabrication reinforcing bars whose length may be affected by field conditions, such as the final elevations of footings, until the governing field dimensions have been ascertained.

.8 Make corrections required by previous review before resubmitting drawings. Indicate all revisions to previous submission. Do not add new details to drawings which have been reviewed.

1.5 DELIVERY, STORAGE AND HANDLING

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

.2 Handle and store reinforcement and accessories to ensure that contamination by bond reducing or foreign matter, and damage to its fabricated form does not occur.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Reinforcing Steel: To meet specified requirements of CSA Standards as referenced in CAN/CSA A23.1-09; marked with grade identification by permanent rolled indentations in bars; Canadian produced; of types indicated on Drawings; billet steel; deformed. Grade 400 unless noted.

.2 Tie Wires: #16 U.S.S.G. or heavier annealed wire or proprietary system as approved by Departmental Representative

.3 Chairs: Plastic where concrete surfaces at base of chairs are exposed to view, concrete or plastic for slabs on grade, and steel otherwise.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1-09

.2 Bend reinforcement only in a permanent fabricating shop unless approved by Departmental Representative on request of Contractor.

.3 Bend only in accordance with Drawings.

.4 Tag or otherwise identify reinforcement to indicate its placement in accordance with shop drawings.

.5 Provide splices only at locations indicated on Drawings.

.6 Fabricating tolerances:
.1 sheared length plus or minus 25 mm
.2 stirrups and ties plus or minus 12 mm
.3 all other bends plus or minus 25 mm

.7 Clear distance between reinforcing steel and surface of concrete (cover) is as follows:

2.2 FABRICATION (Cont'd)

.7 (Cont'd)

a)cast against & permanently exposed to earth: Walls, piers or exposed footings (35M or smaller) 75 +/- 25 mm

b) Formed and exposed to weather, earth or fresh water: wall, slab, beam, column, pier with least dimension
200 mm or less (20M or smaller) 40 +/- 5mm
200mm to 600mm (25M and smaller)50 +/- 10mm
greater than 600mm (35M or smaller) 70 +/-20mm

Aggregate size shall not exceed requirements of CSA A23.1-09

.8 Rebar spacing shown on drawings shall be considered maximum design values. Spacing may be adjusted downward as required to produce equal spacing across the width, considering edge distance requirements

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Examine formwork to ensure that it has been completed and adequately braced in place before commencing to place reinforcement.

3.2 PLACING REINFORCEMENT

.1 Place reinforcement as specified in CAN/CSA-A23.1-09; and of sizes, at spacing, and in locations as shown on placing drawings.

.2 Place reinforcement in accordance with CRSI Placing Reinforcing Bars.

.3 Support reinforcement by positive means which shall provide cover for steel in accordance with CAN/CSA-A23.1-09, or as otherwise shown on Drawings. Supports at exposed concrete surfaces shall be non marring, and as approved by Departmental Representative.

.4 Do not cut reinforcement, either before or after concrete is placed, to permit incorporation of other Work.

.5 Relocate or rebend bars only with approval of Consultant, and then only by the application of slow and steady pressure.

.6 Tie reinforcement in place. Do not weld bars in place. Tie the intersection of all reinforcing bars. Maintain supports in position by wiring to the reinforcements or by other positive means.

.7 Remove and replace reinforcement apparently reduced in section, cracked or split.

.8 Place bars to the tolerances permitted in CSA A23.1-09 Clause 12.

3.3 INSPECTIONS

.1 Notify Departmental Representative when each stage of work is completed and has been verified by contractor quality control to meet contract specifications.

.2 Provide access to work at appropriate stages for Departmental Representative inspection, to verify dimensions and features are installed or constructed as specified in contract documents.

3.4 ADJUSTMENTS AND CLEANING

.1 Adjust reinforcement immediately before concrete is placed to ensure that bars are in correct position and are securely tied to maintain position.

.2 Remove materials from surfaces of reinforcement and accessories that would reduce their bond.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 01 29 83 Payment Procedures:Testing Laboratory Services

.3 03 10 00 Concrete Forming and Accessories

.4 03 20 00 Concrete Reinforcing

.5 04 03 07 Historic - Masonry Repointing and Repair

.6 04 03 43 Historic - Dismantling Stone Masonry

.7 04 05 00 Common Work Results for Masonry

.8 31 00 00.01 Earthwork

.9 31 04 31 Historic - Shoring and Bracing

.10 31 36 00 Gabions

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-A23.1-09/A23.2-09(R2014), Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CAN/CSA-G30.18-M92(R2009), Billet-Steel Bars for Concrete Reinforcement.

.3 CSA A283-06 (R2011) Qualification Code for Concrete Testing Laboratories

1.3 MEASUREMENT AND PAYMENT

.1 There will be no measurement of this item. All costs are to be included in the stipulated sum price.

1.4 SUBMITTALS

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

1.4 SUBMITTALS (Cont'd)

.2 Submit certification that plant supplying ready-mix concrete complies with CAN/CSA A23.1-09.

.3 Submit to Departmental Representative, proposed quality control procedures for approval, including proposed methods for protection of concrete during placing and curing

.4 Submit certification that mix proportions selected class of concrete will produce concrete of specified quality and yield. Verify that the air entrainment percentage, and amount of water reducing or superplasticizer admixture to be used will achieve the desired slump and strength properties. Verify that mix design is adjusted to prevent alkali aggregate reactivity problems. Verify that mix design accounts for variability between trial mixes and actual batch and site conditions.

.5 Submit records of concrete deliveries in accordance with CAN/CSA A23.1-09.

.6 Concrete hauling time: submit for review by Departmental Representative plans for mixing and delivery of concrete to the work site, indicating deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.5 QUALITY ASSURANCE

.1 General reviews during construction by independent inspection and testing agencies are undertaken so that the Departmental Representative may be informed in writing as to the quality of the Contractor's performance. They will be carried out by examination of representative samples of the Work.

.2 Quality Assurance testing will be as specified in clause 3.2 INSPECTION AND TESTING of this section, or as otherwise determined by the Departmental Representative.

1.5 QUALITY ASSURANCE (Cont'd)

.3 The Contractor will receive copies of the construction review reports and the results of material tests, and will thereby be informed of any defects of deficiencies found. The provision of this information does not relieve the Contractor of responsibility for the performance of the Contract.

.4 Contractor shall implement their own supervisory and Quality Control procedures.
.1 Ensure concrete supplier meets performance criteria of concrete as established in PART 2 - PRODUCTS.
.2 Submit written report, to Departmental Representative verifying compliance that concrete in place meets performance requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Concrete hauling time: maximum allowable time limit for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
.1 Modifications to maximum time limit must be agreed to by the Departmental Representative and concrete producer as described in CSA A23.1-09/A23.2-09.
.2 Deviations to be submitted for review by the Departmental Representative.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2-09.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Use of excess concrete: to be discussed with Departmental Representative for recommended uses on site.

.2 Dispose of waste material off site. Divert from landfill site where possible.

.3 Provide appropriate area on job site where concrete trucks can be safely washed. Contractor is responsible for cleanup of this area once work is completed.

1.7 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

.4 Divert admixtures and additive materials from landfill to approved official hazardous material collections site as reviewed by Departmental Representative.

.5 Unused admixtures and additive materials must not be disposed of into sewer systems, into waterbody, onto ground or in other location where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Cement: to CAN/CSA-A23.1/A23.2-09 Standard A5, Type 10 Normal

.2 Water: to CSA-A23.1/A23.2-09.

.3 Aggregates to CAN/CSA-A23.1-09

.4 Other concrete materials: to CSA-A23.1/A23.2-09.

2.2 MIXES

.1 Performance Method for specifying concrete: to meet Departmental Representative performance criteria in accordance with CAN/CSA-A23.1/A23.2-09.

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

.3 Provide concrete mixes to meet following plastic state requirements:
.1 Uniformity: +/-0.20.
.2 Workability: free of surface blemishes or segregation.

.4 Provide foundation concrete mix to meet the following hard state requirements:
.1 Durability and class of exposure: C-1
.2 Minimum 35 MPa compressive strength at 28 days, and 25 MPa at 7 days.

2.2 MIXES (Cont'd)

.4 (Cont'd)
.3 Slump 80 +/- 30mm at discharge prior to addition of admixtures

.5 Provide slab concrete mix to meet the following hard state requirements:
.1 Durability and class of exposure: N
.2 Minimum 25 MPa compressive strength at 28 days.
.3 Slump 80 +/- 30mm at discharge prior to addition of admixtures

PART 3 - EXECUTION

3.1 PREPARATION

.1 Provide Departmental Representative 24 hours notice before each concrete pour.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 Coordinate pour schedule with availability of testing personnel. Placement of concrete in absence of testing personnel permitted only with approval of Department Representative.

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

.5 Protect previous Work from staining.

.6 Ensure that no water is present on foundation beds where footings and other concrete work is to be placed. Place concrete only on frost free ground. Remove previously frozen bearing surfaces.

.7 Ensure that foundations bear on undisturbed soil. No extra payment will be made for adjustments made necessary because of damage to bearing surfaces caused by weather, traffic, or removal of frozen material, or by presence of adjacent construction or services incorporated in the work.

3.1 PREPARATION (Cont'd)

.8 Ensure that compacted fill has been placed to meet specified requirements

.9 Ensure that forms are clean and free from all foreign materials and properly prepared for concreting

.10 Ensure that embedded items are to be firmly secured so as not to be displaced by concreting.

.11 Ensure that formwork, embedded items and reinforcing steel are accurately aligned in conformance with the drawings.

3.2 INSPECTION AND TESTING

.1 The Departmental Representative will appoint an independent inspection and testing laboratory to conduct the concrete tests in accordance with CAN/CSA A23.2-09 and CSA A283-06 Qualification Code for Concrete Testing Laboratories.

.2 Contractor to arrange and pay for Quality Assurance testing as detailed in this section, and submit invoices to Departmental Representative for payment under ALLOWANCES.

.3 Provide facilities for testing and storing of cylinders at site. Store cylinders at required temperature and where they will be free from vibration and injury.

.4 Notify inspection and testing laboratory of schedule for work in ample time so that specified samples may be obtained.

.5 Air entraining test in accordance with CAN/CSA A23.2-09 for each delivery of air-entrained concrete or portion thereof placed each day that is specified to contain an air entraining agent.

.6 Slump tests on each batch tested in accordance with CAN/CSA A23.2-09.

.7 Strength - take three 6"x12" standard control cylinders of concrete from each pour. Make, handle, and store cylinders in accordance with

3.2 INSPECTION AND TESTING (Cont'd)

.7 (Cont'd) the "Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field" of CAN/CSA A23.2-09.

.8 The inspection laboratory is to take the concrete samples on the construction site at the point of discharge from the delivery trucks. If pour is less than 5 cu.m. Departmental Representative may omit test.

.9 Make strength test of one cylinder from each sampling at 7 days and of other two cylinders from same sampling at 28 days.

.10 Frequency and extent of testing will be as directed by Departmental Representative.

.11 Testing agency to issue jointly, inspection and test reports, to both Contractor and Departmental Representative at time of issue.

.12 Payment for retesting and reinspection of work replacing that found defective following initial inspection made under Contract Work, or as otherwise made evident, is the responsibility of the Contractor and will not be considered as additional work of the Contract.

3.3 REJECTED WORK

.1 Immediately cease further concrete placing on advise that concrete already in place has been disapproved by Consultant or testing personnel, or that it has failed tests to which it was subjected.

.2 The Departmental Representative shall have the authority to order further testing, obtain core samples, survey work in place, obtain structural analysis and conduct load tests of structure in place and other work as directed by the Departmental Representative and at the Contractor's expense to determine if work is acceptable. All expenses incurred shall be chargeable to the Contractor regardless of the result.

3.3 REJECTED WORK (Cont'd)

.3 Work located out of place, exceeding specified tolerance, improperly placed, exhibiting excessive honeycombing, or not otherwise meeting specified requirements shall be disapproved.

.4 Do not permit disapproved or rejected materials on the site.

.5 Replace disapproved work to meet requirements of structural design intent and qualities described in this Specification in a manner approved by Departmental Representative.

3.4 CONSTRUCTION AND PLACEMENT

.1 Perform cast-in-place concrete work in accordance with CSA-A23.1/A23.2-09.

.2 Obtain Departmental Representative approval prior to placing of concrete.

.3 Cold Weather Concreting: When the air temperature is at or below 5C, or when there is a probability of its falling below 5C within 24 hours of placing (as forecast by the nearest official meteorological office) and during the freezing season between 01 October and 15 May following, all materials and equipment needed for adequate protection and curing shall be on hand and ready for use before concrete placement is started. The extent of such preparation shall be in accordance with the requirements of CAN/CSA A23.1-09 clause 21.2.3.

.4 Hot Weather Concreting: When the air temperature is at or above 27C, or when there is a probability of its rising to 27C during the placing period (as forecast by the nearest official meteorological office) follow the provisions of CAN/CSA A23.1-09 clause 21.2.2.

.5 Place concrete as specified in CAN/CSA A23.1-09, Clause 19 under the supervision of a competent foreman at all times.

.6 Do not place concrete when it is raining or likely to rain. If rain begins after concrete

3.4 CONSTRUCTION AND PLACEMENT (Cont'd)

.6 (Cont'd) is placed, and before it is set, protect with waterproof covers until set.

.7 Place concrete in approximately horizontal layers of 450 mm to 600 mm as near as possible to its final position. It should not be allowed to drop freely more that 1.5m or through a cage of reinforcing steel.

.8 For exposed concrete, take special precautions when placing to prevent segregation of concrete, and to avoid cold joints, honeycombing and voids. Do not allow vibrator to touch formwork.

.9 Employ a sufficient number of vibrators to ensure complete consolidation of concrete throughout entire volume of each layer of concrete. Provide at least one extra vibrator on hand for emergency use. Do not use external form vibrator.

.10 Use general purpose vibrators, with a speed range of 7000 to 9000 rpm, equipped with a 50 mm diameter head and shaft of sufficient length to suit the field conditions. Engage experienced workmen to operate. Commence vibration of each left as soon as its depth reaches 300 mm. Do not alow vibrator to touch formwork. Apply systematically and at such spacing intervals that zones of influence overlap and the vibrator penetrates the previous lift.

.11 Cast pile caps, footings, beams and slabs their full design depth in one operation.In upset beams, stepped footings and similar details cast the upper portion as soon as stiffening of the lower portion will permit. The consistency of the lower portion shall be of lower slump than generally specified for the class of work. Remove any free water or laitance from the lower portion before the subsequent layer of concrete is placed.

.12 When concrete is being placed in deep members vibrators shall be inserted and withdrawn vertically, and shall not be used to flow concrete into final position. They shall be

3.4 CONSTRUCTION AND PLACEMENT (Cont'd)

.12 (Cont'd) lowered through the full lift of concrete into the lift below, so as to ensure blending of the concrete in the two lifts.

.13 Work concrete around reinforcement and embedded items, into corners of forms, eliminating all air and stone pockets. Ensure reinforcement and inserts are not disturbed during concrete placement.

3.5 INSERTS

.1 Cast in sleeves, anchors, reinforcement, frames, bolts, and other inserts required to be built-in.

3.6 FINISHES

.1 Formed surfaces exposed to view: in accordance with CSA-A23.1-09/A23.2-09.

.2 Surface texture: smooth trowel finish for all visible surfaces.

.3 Tie holes and surface imperfections to be patched with finishing cement mortar, colour to match surrounding concrete areas for minimal visibility.

.4 In locations where the repair of honeycomb is acceptable to the Departmental Representative cut our defective areas and fill the space with a cement mortar of the same materials as the surrounding concrete. Incorporate a liquid latex bonding agent into the mix. Apply in layers not exceeding 25 mm in thickness.

.5 Patching of exposed concrete is not permitted without the acceptance of the Departmental Representative . Patching prior to acceptance shall be grounds for rejection of the concrete. Where patching is accepted, the exposed patch shall be indistinguishable from the surrounding finish after both are dry. Determine patching mixes by trial batches. Perimeter of cut-out areas shall have edges which are perpendicular to the surface. Incorporate a liquid latex bonding agent into the mix. Just prior to application, coat the

3.6 FINISHES (Cont'd)

.5 (Cont'd)
base surface with the bonding agent. Cure patches by keeping continuously moist for seven days.

3.7 CONSTRUCTION JOINTS

.1 Construction joints locations to be as shown on drawings.

.2 Leave surfaces intentionally roughened between construction joints.

.3 Immediately before next pour, clean construction joint of all laitance, saturate with water, leave damp then, brush with grout of neat cement.

3.8 CURING

.1 Cure concrete as specified in CAN/CSA A23.1-09. For Class C-1 exposure concrete, curing time of 7 days is permitted.
.1 Use absorptive mat or fabric kept continuously wet, or other methods as approved by Departmental Representative.

.2 Ensure that freshly placed concrete including exposed sides is protected against loss of moisture, rapid temperature change, mechanical shock and contact with injurious substances.

.3 The Contractor shall have the material and equipment needed for adequate curing on hand and ready to install before actual concrete placement begins. If the curing medium requires the use of water, the curing operation shall have prior rights to all water supply.

.4 Do not use curing compounds that would have a detrimental effect on bonding, adhesion, curing, appearance, or similar qualities of material applied to concrete surfaces. Only moisture cure surfaces where finishes are incompatible with curing compound, as at chemical composition flooring.

3.9 SITE TOLERANCES

.1 As detailed in CSA-A23.1-09

.2 Plumbness to be the minimum of 1:400 of entire height of structure, or maximum 25mm

.3 Cross section variations within 12mm

.4 Level of tops of structures shall be within 6 mm of a 3 metre long straight edge at any location and within 6 mm of indicated elevation.

3.10 FIELD QUALITY CONTROL

.1 Contractor shall implement their own supervisory and Quality Control procedures.
.1 Ensure concrete supplier meets performance criteria of concrete as established in PART 2 - PRODUCTS.
.2 Submit written report, to Departmental Representative verifying compliance that concrete in place meets performance requirements.

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

.3 Costs for testing engaged by contractor as required for Quality Control are not covered by the testing allowance. Refer to Section 01 45 00 Quality Control.

.4 Contractor may include test results from Quality Assurance testing to supplement their Quality Control system.

.5 Bring to the attention of the Departmental Representative any defects or deficiencies in the work which may occur during construction together with a proposal for remedy. The Departmental Representative will decide what corrective action may be taken and issue the necessary instructions.

3.11 JOB RECORDS

.1 Record the time, date, delivery slip serial number, and location of each concrete pour, and identify the related test cylinders. Keep these records at the site until Project is completed.

.2 File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, Contractor, Project, concrete class, yardage in load, and time of first mixing of aggregate, cement and water.

.3 Record on a set of drawings: time and date of each pour, high and low temperatures during each pour, date of removal of forms in each area.

.4 Record on a set of Drawings the founding elevations of all footings or structures, and variations of foundation work from that indicated on Drawings.

.5 Make these records available for inspection by Departmental Representative at all times.

3.12 VERIFICATION

.1 Quality Control Plan: Ensure concrete supplier meets performance criteria of concrete as established in PART 2 - PRODUCTS.

.2 Submit written report to Departmental Representative verifying compliance that concrete in place meets performance requirements. Include test results where applicable.

3.13 CLEANING

.1 Use trigger operated spray nozzles for water hoses.

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

3.13 CLEANING (Cont'd)

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

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 08 Historic - Mortaring

.5 04 03 09 Historic - Grouting

.6 04 03 41 Historic - Repair of Stone

.7 04 03 42 Historic - Replacement of Stone

.8 04 03 43 Historic - Dismantling Stone Masonry

.9 04 05 00 Common Work Results for Masonry

.10 06 08 99 Carpentry

.11 31 00 00.01 Earthwork

.12 31 04 31 Historic - Shoring and Bracing

1.2 MEASUREMENT PROCEDURES

.1 Work of this section will be paid for by lump sum price.

.2 Repair locations as determined and approved by Departmental Representative.

.3 Estimated quantities included in lump sum price for inspecting and testing to identify unsound joints, grouting of voids behind joints and repointing:

.1 exterior 10m of mortar joints

.2 interior 20m of mortar joints

.4 Estimated quantities included in lump sum price for stone repairs and replacement of stones, existing in damaged condition:

.1 exterior ashlar wall 2.0 m2

.2 interior rubble wall 2.0 m2

1.2 MEASUREMENT PROCEDURES (Cont'd)

.5 Include in lump sum price, cost of stone repairs and replacement of stones damaged during dismantling and installation procedures, by handling, by construction such as jacking, shoring, excavations etc.

.6 Stone repairs in accordance with Section 04 03 41 Historic - Repair of Stone.

.7 Stone Replacement in accordance with Section 04 03 42 Historic - Replacement of Stone.

.8 Grouting in accordance with Section 04 03 09 Historic - Grouting.

.9 Repairs to other existing damage as approved by Departmental Representative, at unit prices submitted with bid documents.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CAN/CSA A179-04, Mortar and Grout for Unit Masonry.
.3 CSA-A371-04, Masonry Construction for Buildings.

1.4 DEFINITIONS

.1 Raking: the removal of loose/deteriorated mortar until sound mortar or 2x the joint thickness is reached, but not less than 20mm.

.2 Repointing: filling and finishing of masonry joints from which mortar is missing,or has been raked out.

.3 Tooling: finishing of masonry joints using tool to provide final contour.

1.4 DEFINITIONS (Cont'd)

.4 Repair: using adhesives to rebond sections of fractured masonry.

.5 Consolidation: strengthening masonry units to prevent deterioration (spalling).

.6 Descaling: the removal of loose portions of the masonry (usually spalled area) through impact with a bush hammer or similar device.

1.5 SYSTEM DESCRIPTION

.1 Work of this Section includes but is not limited to:
.1 Visually inspecting for obvious signs of deteriorated masonry and testing/verification of masonry joints.
.2 Raking identified unsound joints.
.3 Preparation of masonry surface including joints surface cleaning, flushing of voids and open joints, and masonry wetting.
.4 Repointing of identified masonry joints.
.5 Removal of loose portions on stone surface.
.6 Resetting of dislodged masonry units.
.7 Ensuring cure of mortar.
.8 Grouting by hand, small voids.
.9 Grouting of voids and crack repairs.
.10 Consolidation of fractured masonry units or spalled units.
.11 Replacement of deteriorated or missing units.

1.6 SUBMITTALS

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

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
.2 Store cementitious materials and aggregates in accordance with CAN/CSA A23.1.
.3 Store lime putty in plastic lined sealed drums.

1.7 DELIVERY, STORAGE AND HANDLING (Cont'd)

.1 (Cont'd)
.4 Keep material dry. Protect from weather, freezing and contamination.
.5 Ensure that manufacturer's labels and seals are intact upon delivery.
.6 Remove rejected or contaminated material from site.

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

1.8 EXISTING CONDITIONS

.1 Review existing conditions of interior and exterior masonry with Departmental Representative at onset of contract. All existing damaged and deteriorated areas to be documented. Contractor and Departmental Representative to sign documents indicating agreement on existing conditions.
.1 Be responsible for repair of damages caused by construction.

.2 Prior to removal, review with Departmental Representative on a daily basis, section of masonry to be removed that day, for signs of deterioration or damaged masonry in need of repair.

.3 Report in writing, to Departmental Representative areas of deteriorated masonry revealed during work. Obtain Departmental Representative's approval and instructions of repair and replacement of masonry units before proceeding with repair work.
.1 Repair existing damage as approved by Departmental Representative, at unit prices submitted with bid documents when actual repair quantity exceeds estimated quantities.

1.9 AMBIENT CONDITIONS

.1 In accordance with Section 04 05 00 - Common Work Results for Masonry.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Mortar: in accordance with CAN/CSA A179 and Section 04 03 08 - Historic - Mortaring.

.2 Grout: in accordance with Section 04 03 09 Historic - Grouting

PART 3 - EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

.1 As noted in clause 1.8 Existing Conditions above.

3.2 EXAMINATION/ TESTING

.1 Procedure of testing: examine joints visually for obvious signs of deteriorated masonry.

.2 Test joints not visually deteriorated as follows:
.1 Test for voids and weakness by using hammers or other approved means.
.2 Perform testing in co-operation with Departmental Representative so that unsound joints can be marked and recorded.

3.3 REPAIR

.1 Match existing historic mortar and masonry techniques and methods.

.2 Perform work in accordance with CSA-A371 and Section 04 03 41 Historic- Repair of Stone.

.3 Perform pressure grouting repairs where required, in accordance with Section 04 03 09 Historic - Grouting.

.4 Protection and installation requirements as specified in Section 04 05 00 - Common Work

3.3 REPAIR (Cont'd)

.4 (Cont'd)
Results for Masonry and Section 04 03 08 Historic - Mortaring.

.5 Replace stones not suitable for repair, as directed by Departmental Representative, in accordance with Section 04 03 42 Historic - Replacement of Stone.

3.4 RAKING JOINTS

.1 Use manual raking tool to remove deteriorated mortar to depth of sound mortar or 2x the joint thickness, but in no case less than 20 mm, leaving square corners and a flat surface at back of cut. Clean out voids and cavities encountered. Use of power tools is not permitted.

.2 Ensure that no masonry units are chipped, altered or damaged by work to remove mortar.

.3 Clean by compressed air, with non-ferrous brush or by moderate water wash surfaces of joints without damaging texture of exposed joints or masonry units.

.4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.

.5 Leave no standing water.

3.5 REPOINTING:

.1 Dampen masonry to prevent premature drying of mortar. Surfaces should be cool and damp but not wet or holding water. On highly porous substrate surfeces, dampening should begin on the day previous to application. Control dampening by using fine mist spray.

.2 Keep masonry damp while pointing is being performed.

.3 Completely fill joint with mortar. If surface of masonry units has worn rounded edges keep

3.5 REPOINTING: (Cont'd)

.3 (Cont'd)
pointing back from surface to keep same width of joint. Avoid feather edges. Pack mortar solidly into voids and joints.

.4 Tool and compact using jointing tool to force mortar into joint.

.5 Build-up pointing in layers not exceeding 12 mm in depth. Allow each layer to set before applying subsequent layers. Maintain joint width.

.6 Tool joints to match existing profile or as directed by Departmental Representative.

.7 Remove excess mortar from masonry face before it sets.

.8 Damp cure:
.1 Provide damp cure for pointing mortars.
.2 Install and maintain wetted burlap protection during the curing process for minimum of 3 days.
.3 Wet mist burlap only. Endure no direct spray reaches surface of curing mortar.
.4 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

.9 Protect from drying winds. Pay particular attention at corners of structure.

3.6 RESETTING

.1 Fix dislodged masonry units in correct location with water soaked hardwood or softwood wedges,or firm mortar.

.2 Insert and compress firm mortar to within 50 mm of pointing surface. Allow mortar to set 24 hours.

.3 Pull out wood wedges when dried and shrunken.

.4 Point to surface in two layers.

3.7 CLEANING	.1	In accordance with Section 04 05 00 - Common Work Results for Masonry.
3.8 PROTECTION OF COMPLETED WORK	.1	In accordance with Section 04 05 00 - Common Work Results for Masonry.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 03 30 00.01 Cast in Place Concrete

.4 04 03 07 Historic - Masonry Repointing and Repair

.5 04 03 09 Historic - Grouting

.6 04 03 41 Historic - Repair of Stone

.7 04 03 42 Historic - Replacement of Stone

.8 04 03 43 Historic - Dismantling Stone Masonry

.9 04 05 00 Common Work Results for Masonry

.10 31 04 31 Historic - Shoring and Bracing

1.2 ALTERNATES

.1 Obtain Departmental Representative's approval before changing manufacturer's brands or sources of supply of mortar materials during entire contract or other methods of mixing mortar specified elsewhere in this specification.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM C 144-11, Standard Specification for Aggregate for Masonry Mortar.
.2 ASTM C 207-06, Standard Specification for Quickime for Structural Purposes.
.3 ASTM C 5-10, Standard Specification for Hydrated Lime for Masonry Purposes.
.4 ASTM C270-12a, Standard Specification for Mortar for unit Masonry.
.5 ASTM C1324-10, Thin- section Microscopy.

1.3 REFERENCES (Cont'd)

.1 (Cont'd)
.6 ASTM C1072-13e1, Standard Test Methods for Measurement of Masonry Flexural Bond Strength
.7 ASTM C 780-14, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry

.2 Canadian Standards Association (CSA International)
.1 CAN/CSA-A179-04, Mortar and Grout for Unit Masonry.
.2 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.4 LABORATORY TESTING

.1 Original Mortar Laboratory Analysis (Bedding and Pointing Mortars):

.2 Provide Comprehensive Petrographic Analysis for bedding and pointing mortars, from independent 3rd party testing laboratory, including:
.1 Binder components identification in accordance with ASTM C1324-10 Thin- section Microscopy.
.2 Mortar component proportions by weight and volume in accordance with ASTM C856 Chemical Analyses.
.3 Sand particle size distribution.
.4 Compressive strength to ASTM C270 and bond strength to ASTM C1072.

.3 Test results to be utilized as basis for preparation of replacement mortar mixes to match original mortars.

.4 Cost of mortar analysis is included in Section 01 21 00 Allowances.

1.5 SUBMITTALS

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

.2 Submit results from original mortar testing performed in clause 1.4 Laboratory Testing above.

.3 Submit proposed mortar mix design for review and approval by Departmental Representative (Note: original building specifications indicate lime mortar mix.) including:
- .1 Binder type
- .2 Mortar component proportions by weight and volume.
- .3 Minimum and maximum compressive strength at 7 and 28 days.
- .4 Minimum bond strength at 28 days.
- .5 Colour matching
- .6 Aggregate gradation and characteristics.

.4 Provide test samples of proposed mortar for approval of Departmental Representative.

.5 Product Data:
.1 Submit manufacturer's instructions, printed literature and data sheets for mortar and include product characteristics, performance criteria and limitations.
.2 Prior to mixing or preparation of mortars, submit for review to Departmental Representative confirmation of source or product data sheet of:
- .1 Aggregate
- .2 Cement
- .3 Lime
- .4 Premixed products
- .5 Pigments

.6 Samples:
.1 Provide samples in quantity and size in accordance with CAN/CSA-A179.

.7 Test Results:
.1 Submit test results during site work as directed by Departmental Representative:
- .1 Sieve analysis: sand
- .2 Bulking analysis: sand
- .3 Air content: mortar mix in plastic state.

1.5 SUBMITTALS (Cont'd)

.7 Test Results:(Cont'd)
.1 (Cont'd)
.4 Vicat cone penetration: mortar mix.
.5 Mortar compressive strength: at 7 and 28 days or as otherwise required.

.8 Proposed masonry practices to be implemented for construction with lime mortar mixes.

1.6 TESTING STANDARDS

.1 Flow and cube strength: to ASTM C 270.

.2 Vicat cone test: to ASTM C 780.

.3 Flexural bond strength: to ASTM C 1072.

1.7 AMBIENT CONDITIONS

.1 In accordance with Section 04 05 00 Common Work Results for Masonry.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Water: potable, clean and free from contaminants.

.2 Sand: to ASTM C 144.

Sieve Size	% By Weight Passing Each Sieve	% By Weight Retained on Each Sieve
No. 4 (4.75 mm)	100	0
No. 8	90	5
No. 16	70	25
No. 30 (600 micron)	50	20
No. 50 (300 micron)	30	20
No. 100 (150 micron)	15	15
No. 200 (75 micron)	0	15

.1 Sharp, screened and washed pit sand, free of organic material, with final grading

2.1 MATERIALS (Cont'd)

.2 Sand:(Cont'd)
.1 (Cont'd)
and colour to approval of Departmental Representative.
.2 Custom blend sands where necessary to provide appropriate colour match and gradation to approval of Departmental Representative.
.3 Select and blend sands to match colour, texture and grain size of existing sand.

.3 Portland cement: to CAN/CSA-A3000, grey or white as required to achieve acceptable match with existing mortar.

.4 Masonry cement: to CAN/CSA-A3000 grey or white as required to achieve acceptable match with existing mortar.

.5 Processed Lime (Quicklime): to ASTM C 5, fresh, finely ground and crushed, high calcium, 3/16" fines, dry bagged.

.6 Hydrated lime: Dolomitic finishing lime, Type to be determined, to ASTM C207.

.7 Colour:
.1 Ground coloured natural aggregates, and/or coloured sand to match existing. Use minimum amount necessary.
.2 Maximum colour: 2% of total volume of aggregate.
.3 Match core of freshly broken sample of original mortar.

.8 Additives:
.1 Obtain written approval of Departmental Representative before using additives.

.9 Air entrainment:
.1 Vinsol resin type: to ASTM C 260

2.2 MORTAR MIXES

.1 Proposed mortar mix designs to be submitted:
.1 For normal exterior (ashlar wythe) pointing and bedding, colours to match existing.
.2 For interior (rubble wythe)pointing and bedding, colours to match existing. Include

2.2 MORTAR MIXES (Cont'd)

.1 (Cont'd)
.2 (Cont'd)
slaistering mortar mix to match existing if different than pointing mortar.

.2 Make minor adjustments to proportions for each mock-up to achieve match with existing mortar. Approved mock-ups will establish final mixes.

.3 Obtain written approval of Departmental Representative before changing mix proportions. Change mix proportions only as directed by Departmental Representative.

2.3 ACCESSORIES

.1 Prepare mortars in:
.1 A mortar mill comprising mortar pan with adjustable cast iron sprung rollers on cranked roller shaft, steel scrapers and blades.
.2 A spiral paddle mill comprising a mechanically driven rotating barrel with integral internal paddles.
.1 To each batch add up to 6 big beach stones to tumble and pound mortar during mixing process.
.3 Plasterer's metal troughs.
.4 As recommended by manufacturer for lime mortars.

2.4 ALLOWABLE TOLERANCES

.1 Using approved mortar design mixes,provide minimum and maximum compression strength within the allowable range recommended by the tests, cured for 7 and 28 days.

.2 If mortar fails to meet the 7 day compressive strength requirements, but meets the 28 day compressive strength requirement, it is acceptable. If mortar fails to meet the 7 day compressive strength requirement, but its strength at 7 days exceeds two thirds of the value required for the 7 day strength, contractor may elect to continue work at his own risk while awaiting the results of the 28 day tests, or to take down the work affected.

PART 3 - EXECUTION

3.1 GENERAL PREPARATIONS

.1 Special Techniques:

.1 Examine horizontal and vertical joints to determine which were struck first and whether they are same style, as well as aspects of workmanship which establish authenticity of original work.

.2 Prepare measuring boxes to ensure accurate proportioning of materials.

.3 Maintain separate measuring boxes for each component.

.4 Ensure sand is tested and volume corrected for bulking.

.5 Ensure air entraining agent is available together with a graduated container for accurate volume measurements.

.6 Ensure testing equipment is ready and in working order.

.7 Apply Vicat cone test to ensure desireable performance of the mortar and record results.

3.2 PREPARATION OF HYDRATED LIME PUTTY

.1 Lime putty preparation:

.1 Estimate project requirements, and prepare sufficient lime putty for entire project by slaking hydrated lime in plaster's metal troughs as follows:

.1 Fill trough with minimum 300 mm of hot water of specified temperature.

.2 Add bagged dry hydrated lime to water. (CAUTION: DO NOT ADD WATER TO HYDRATED LIME).

.3 Mix material with hoe or shovel until mixture forms a thick cream.

.4 Run through 3 mm mesh screen into plastic-lined drums to cool.

.5 Store under 100 mm of water.

.6 Seal containers.

3.2 PREPARATION OF HYDRATED LIME PUTTY (Cont'd)

.1 (Cont'd)
.1 (Cont'd)
.7 Allow to cure for minimum of 48 hours before use.

.2 Label and date all containers.

.3 Keep prepared material from freezing. Discard frozen material.

3.3 BULKING OF SAND

.1 Test sand for bulking:
.1 At start of work;
.2 After each new delivery of sand;
.3 After an excessive change in weather.

.2 Test and adjust sand quantities for bulking.
.1 Obtain sample of sand which accurately reflects average condition of pile of damp sand, by the following method:
.1 Take 4 shovels full of sand, each from a different level of the pile, and mix thoroughly.
.2 Place this sand in a conical pile and divide into 4 quarters with a board. Remove 2 opposite quarters from the pile, and combine the 2 remaining quarters and mix thoroughly.
.3 Repeat this quartering and mixing procedure until a sample of the size required for testing remains.
.2 Fill a 1-litre capacity jar, about two-thirds full with the damp sand to be tested. Drop sand in loosely. Do not pack it in. Level off surface, then measure depth of damp sand (D).
.1 Carefully empty sand into another container, and half fill first container with water.
.2 Pour back about half of the test sample of sand slowly into the water so that it is entirely saturated. Rod it thoroughly to remove air.
.3 Add rest of sand, rodding again to remove air and level off surface. Measure depth of saturated sand (S), which will be less than depth of damp sand.
.4 Calculate the percentage bulking using formula: (D-S) x 100%/S =

3.3 BULKING OF SAND (Cont'd)

.2 (Cont'd)

.2 (Cont'd)

percentage bulking; where D = depth of damp sand, and S = depth of saturated sand.

.3 Increase volume of sand by percentage bulking shown in test.

3.4 PREPARATION OF LIME-SAND ROUGHAGE (COARSE STUFF)

.1 Prepare measuring boxes to ensure accurate proportioning of lime putty and sand.

.2 Take lime putty from bins, siphon off water by screening lime through muslin, or cheesecloth, to remove excess water. Rework lime without adding water until it regains its plasticity by beating, ramming and chopping.

.3 Adjust sand for bulking as described in section 3.3.

.4 Mix lime and sand thoroughly in mortar mill, or spiral- blade mechanical mixer for minimum 3 maximum 10 minutes. Add no water. No spots or streaks of lime to remain upon completion of mixing.

.5 Store lime sand roughage in air-tight plastic bins.

.6 Keep prepared material from freezing. Discard frozen material.

.7 Maintain measuring containers for correct quantity of materials for use in batches.

.8 Thoroughly clean mortar boards, measuring boxes and mixers between batches.

3.5 MIXING

.1 General:
.1 Use batching box
.2 Follow proper batching procedure
.3 Monitor mixing time

3.5 MIXING (Cont'd)

.2 Mortar:

.1 Mix characteristics:

.1 Pointing mortar: slightly stiffer than bedding mortar with a consistency such that the mortar can be hand formed into a stiff ball.

.2 Record amounts of water required to reach this consistency and use for subsequent mixes.

.2 Prepare only enough mortar to be used within 2 hours. Do not retemper mortar beyond this time.

.3 Follow manufacturer's instructions when premixed mortar is used.

.4 Appoint one individual to mix mortar for duration of the project. If this individual must be changed, mortar mixing must cease until a new individuaal is trained, and mortar mix is tested.

3.6 CONSTRUCTION

.1 In accordance with Section 04 05 00 Common Work Results for Masonry.

.2 In accordance with manufacturer recommendations for lime mortar mixes.

.3 In accordance with proposed masonry practices submitted for construction with historic lime mortar mixes, upon approval by Departmental Representative.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 04 03 07 Historic - Masonry Repointing and Repair

.2 04 03 08 Historic - Mortaring

.3 04 03 41 Historic - Repair of Stone

.4 04 03 42 Historic - Replacement of Stone

.5 04 03 43 Historic - Dismantling Stone Masonry

.6 04 05 00 Common Work Results for Masonry

.7 31 04 31 Historic - Shoring and Bracing

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CAN/CSA-A179-04, Mortar and Grout for Unit Masonry.
.3 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.3 DEFINITIONS

.1 Grout: cementitious mixture of liquid consistency suitable for pouring or pumping, to fill voids between masonry elements.

.2 Raking: the removal of loose/deteriorated mortar until sound mortar or 2x the joint thickness is reached, but not less than 20mm.

1.4 MEASUREMENT PROCEDURES

.1 Work of this section will be paid for by stipulated sum.
.1 Repair locations as determined and approved by Departmental Representative.

1.4 MEASUREMENT PROCEDURES (Cont'd)

.1 (Cont'd)
.2 Estimated quantities included in stipulated sum price:
.1 exterior 10m of mortar joints
.2 interior 20m of mortar joints
.3 Includes inspecting and testing to identify unsound joints, raking of joints and grouting of voids behind joints.

1.5 SUBMITTALS

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

.2 Provide cementitious grout samples to CAN/CSA A179.

.3 Provide upon request of Departmental Representative purchase orders, invoices, supplier's test certificates and documents to prove materials used in contract meet requirements of specification. Allow free access to source where materials procured.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
.2 Store materials in dry area and support free of ground.
.3 Deliver materials in sealed containers with labels legible and intact.
.4 Handle materials in safe manner in accordance with manufacturer's instructions. Avoid breaking container seals.
.5 Store materials at temperatures between 5 degrees C to 38 degrees C unless otherwise stated by manufacturer.

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

1.7 AMBIENT CONDITIONS

.1 In accordance with Section 04 05 00 - Common Work Results for Masonry.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Premixed hydraulic lime injection grout:
.1 Daubois Grout F-20 or equivalent.

2.2 EQUIPMENT

.1 Mechanical mixer: size compatible with volume of mortar grout prepared.

.2 Mechanical regulator to prevent segregation of ingredients after mixing and ensure injection continuity.

PART 3 - EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

.1 Review with Departmental Representative before start of work, areas with structural masonry problems and conditions including existing voids or possible openings which risk being compromised when grout will flow.

3.2 EXAMINATION/ TESTING

.1 Examine joints visually for obvious signs of deteriorated masonry.

.2 Test joints in suspect areas as follows:
.1 Test for voids and weakness by using hammers or other approved means.
.2 Perform testing in co-operation with Departmental Representative so that unsound joints can be marked and recorded.

3.3 RAKING JOINTS

.1 Use manual raking tool to remove deteriorated mortar to depth of sound mortar or 2x the joint thickness, but in no case less than 20 mm, leaving square corners and a flat surface at back of cut. Clean out voids and cavities

3.3 RAKING JOINTS (Cont'd)

.1 (Cont'd)
encountered. Use of power tools is not permitted.

.2 Ensure that no masonry units are chipped, altered or damaged by work to remove mortar.

.3 Clean by compressed air, with non-ferrous brush or by moderate water wash, surfaces of joints without damaging texture of exposed joints or masonry units.

.4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.

.5 Leave no standing water.

3.4 PREPARATION

.1 Review condition of mortar cracks and wall cavities with Departmental Representative following mortar removal. Grout mortar cracks and voids as instructed by Departmental Representative.
.1 The intent is to consolidate the masonry assembly to restore the structural integrity of the wall. The grouting should develop a bond between the face stones, existing mortar and the core of the wall.

.2 Clean exposed cavity of loose surrounding material.

3.5 INSTALLATION OF INJECTION PORTS

.1 Drill additional holes through mortar joints to facilitate passage of grout into cavities.
.1 Rotary non-vibratory drills are acceptable.
.2 Percussion drilling is not acceptable.

.2 Position ports as required to fill voids in wall:
.1 Maximum hole size 10mm diameter.
.2 Maximum port spacing 400mm horizontally and each masonry course vertically.

3.5 INSTALLATION OF INJECTION PORTS (Cont'd)

.3 Drill holes in mortar joints, not through masonry stones. Do not damage faces of masonry units.

.4 Force tubing into voids to ensure good spread of grout.

3.6 MEASUREMENT AND MIXING

.1 Make volume measurement using suitably gauged hopper of size compatible with volume of grout prepared.

.2 Keep volume measures clean and free from crusting.

.3 Mix cementitious grout in mechanical mixer for period of not less than 5 minutes with specified amount of water.

3.7 GROUT PROCEDURE

.1 Obtain review and approval of grout port loactions by Departmental Representative.

.2 Grout from bottom upwards.

.3 Commence grouting at base of cavity through lowest range ports.

.4 Induce grout flow at not more than 20-35 kPa (3-5 psi). Allow grout to flow into cavity until grout rises to next range of ports. When grout flows from port rows above injection level, stop grouting. Plug leakage holes as required.

.5 Use plastic tube to facilitate injection and to close off injection ports.

.6 Proceed with grouting generally upwards.
.1 Injection may continue from a port until connection to maximum of 4 adjacent ports. At this point, move to another injection port.
.2 As a minimum, inject grout at alternate ports horizontally along masonry face. Where grout does not flow from a port directly above the level of injection, grout every port.

3.7 GROUT PROCEDURE (Cont'd)

.7 Where water or grout flows from holes in masonry work, plug holes with temporary joint filler before proceeding with grouting.

.8 Remove grout stains as grouting progresses.
.1 Grout stains that have set will be removed by others, and costs will be charged back to the grouting contractor.

.9 Repeat injection procedure at next range of holes until one meter vertical height of cavity has been filled. Stop grouting and allow grout to take initial set before proceeding to next higher lift.

.10 Remove grout port tubes at time of initial grout set.
.1 Cut tubes back minimum 50 mm from face of masonry, or flush with backpointing.
.2 Coordinate removal of grout tubes with masonry trade to permit timely backpointing of grout tubes when ready.

3.8 FIELD QUALITY CONTROL

.1 Take samples of grout and submit for testing.
.1 One sample per day or as requested by Departmental Representative.

.2 Grout testing:
.1 Compressive Strength at 7 and 28 days to ASTM C-109.
.2 Pull-off adhesion to CSA 23.2-6B.
.3 Shrinkage to ASTM C-596.
.4 Flow to ASTM C-939

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 04 03 07 Historic - Masonry Repointing and Repair

.2 04 03 08 Historic - Mortaring

.3 04 03 09 Historic - Grouting

.4 04 03 42 Historic - Replacement of Stone

.5 04 03 43 Historic - Dismantling Stone Masonry

.6 04 05 00 Common Work Results for Masonry

.7 06 08 99 Carpentry

.8 31 04 31 Historic - Shoring and Bracing

1.2 ALTERNATIVES

.1 Obtain Departmental Representative's approval before changing manufacturer's brands, sources of supply of materials.

.2 Obtain Departmental Representative's approval for alternative repair methodology before commencing work.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM C 144-11, Standard Specification for Aggregate for Masonry Mortar.

.2 Canadian Standards Association (CSA International)
.1 CAN/CSA-A3000-13(R2006), Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.4 DEFINITIONS

.1 Repair of Stone: mechanical or plastic repair, done to restore original appearance and function of cracked or broken stones.

1.4 DEFINITIONS (Cont'd)

.2 Adhesive: material used to fasten broken/fractured stone elements by direct application at fracture interface and/or by application to added reinforcing elements such as dowels.

1.5 SUBMITTALS

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

.2 Provide adhesive product data sheets.

.3 Submit sample of steel rods.

1.6 MOCK-UPS

.1 Provide sample mock-up repair for approval by Departmental Representative prior to commencing repairs.

.2 When accepted by Departmental Representative, mock-up will demonstrate minimum standard for this work.

1.7 MEASUREMENT PROCEDURES

.1 Cost of this item is included in stipulated sum price for masonry work.

.2 Refer to section 04 03 07 Historic - Masonry Repointing and Repair for details.

1.8 AMBIENT CONDITIONS

.1 In accordance with Section 04 05 00 - Common Work Results for Masonry.

.2 Ensure epoxy resin is compatible with humidity condition of stone as specified by manufacturer.

.3 Provide temporary enclosures and heating equipment to maintain specified temperatures. Take precautions to avoid overheating masonry.

1.8 AMBIENT CONDITIONS (Cont'd)

.4 Refer to manufacturer's instructions for environmental requirements of products.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Epoxy mixture for adhesive: Submit manufacturer literature to Departmental representative for approval.
.1 Use Bonstone Fast-Set Extreme epoxy, pre-coloured to match, or equivalent.

.2 Water: clean and free of deleterious materials such as acid, alkali and organic material in accordance to CAN/CSA A179.

.3 Dowels: stainless steel, 3mm diameter,or 5mm threaded rod, as approved by Departmental Representative.

.4 Stone slabs: to have similar mechanical and aesthetic properties to existing.

PART 3 - EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

.1 In accordance with Clause 1.8 Existing Conditions in Section 04 03 07 Historic - Masonry Repointing and Repair.

3.2 REPAIR OF A FRACTURED STONE

.1 Remove stones which require repairs. Do not damage existing Work. Ensure stone marking is complete for dismantling records.

.2 Fasten broken stone elements with epoxy adhesive at fracture interface, and application of steel reinforcement dowels.

.3 Dowels: Drill 4mm diameter holes,minimum 50mm long in each section at fracture.
.1 Insert 3mm diameter dowels,75mm long, and apply specified adhesive to holes and interface.

3.2 REPAIR OF A FRACTURED STONE (Cont'd)

.4 Let adhesive cure for minimum requirements as per manufacturers recommendations.

.5 Receive approval of repair from Departmental Representative upon completion.

.6 Reinstate consolidated element into charting system and storage. Record repair on charting system.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 04 03 07 Historic - Masonry Repointing and Repair

.2 04 03 08 Historic - Mortaring

.3 04 03 09 Historic - Grouting

.4 04 03 41 Historic - Repair of Stone

.5 04 03 43 Historic - Dismantling Stone Masonry

.6 04 05 00 Common Work Results for Masonry

.7 06 08 99 Carpentry

.8 31 04 31 Historic - Shoring and Bracing

1.2 DEFINITIONS

.1 Lewis: instrument inserted at top of stone as means of attachment in raising and lowering. Holds stone by means of keys or wedges fitted to dovetailed recess.

.2 Dogs: metal appliance for securing parts or members together by means of one or more projecting teeth or bent portions, lug, cramp.

1.3 MEASUREMENT PROCEDURES

.1 Cost of this item is included in stipulated sum price for masonry work.

.2 Refer to Section 04 03 07 Historic - Masonry Repointing and Repair for details.

1.4 SUBMITTALS

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

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

1.4 SUBMITTALS (Cont'd)

.3 Provide samples of replacement stones for approval by Departmental Representative prior to use.

.4 Samples from on-site stockpile or substitute quarry: submit sample of replacement stones having similar characteristics as original quarry. Submit stones as follows:
.1 Stones sized and dressed to match existing stone units.

.5 Samples of used or previously quarried stone: Submit stones as follows:
.1 Stones sized and dressed to match existing stone units. Make supply of stone accessible to Departmental Representative.

1.5 QUALITY ASSURANCE

.1 Allow Departmental Representative access to mason's workshop for inspection of current work-in-progress.

.2 Completed stones to be inspected and approved by Departmental Representative prior to use.

.3 Qualifications for masons in accordance with Section 04 05 05 - Common Work Results for Masonry.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Sandstone: to ASTM C 616-10 Standard Specification for Quartz-Based Dimension Stone class I - Sandstone, colour and texture to match.

.2 Use available stones from stockpile on site, as provided by Departmental Representative, or alternative material from outside source upon approval by Departmental Representative.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Move and lift stone units using means to prevent damage. Submit stone units dropped or impacted to Departmental Representative for inspection and approval. Do not make holes or indentations for Lewises or dogs on face of stone. Use of Lewises to be approved by Departmental Representative.

.2 Indicate bedding planes of stone units. Duplicate bedding marks on usable pieces of cut stone.

3.2 STONE REMOVAL

.1 Removal and handling of stones in accordance with Section 04 03 43 Historic - Dismantling Stone Masonry.

3.3 CUTTING/SIZING OF STONE

.1 Use calipers, squares and levels to measure hole for new stone. Allow for mortar joints to match existing conditions.

.2 Provide 1:10 slope on top face of stone unit, sloping down to front face, or to match existing conditions.

3.4 INSTALLATION OF REPLACEMENT STONE

.1 Install replacement stone in accordance with Section 04 05 00 Common Work Results for Masonry.

3.5 FILLING JOINTS/POINTING

.1 Fill joints and point in accordance with Section 04 05 00 Common Work Results for Masonry.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 02 41 16.01 Structure Demolition

.2 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.3 04 03 07 Historic - Masonry Repointing and Repair

.4 04 03 08 Historic - Mortaring

.5 04 03 09 Historic - Grouting

.6 04 03 41 Historic - Repair of Stone

.7 04 03 42 Historic - Replacement of Stone

.8 04 05 00 Common Work Results for Masonry

.9 06 08 99 Carpentry

.10 31 00 00.01 Earthwork

.11 31 04 31 Historic - Shoring and Bracing

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Conduct a pre-dismantling meeting with Departmental Representative to verify project requirements, equipment, procedures and assigned storage areas.

.2 Inform workers of presence of lead paint and ensure health and safety procedures and practices are followed.
.1 Interior of masonry walls are coated with lead based paint, to be removed in accordance with Section 02 83 12 Lead-Base Paint Abatement - Maximum Precautions prior to dismantling.
.2 Second storey historic door, wood floors and trims, wood door frames, exterior roof trims are coated with lead based paint. Windows frames and trim and ground floor doors are free of lead based paint. Removals in accordance with Section 06 08 99 Carpentry.

.3 Coordinate masonry with lead removal work.

1.3 SUBMITTALS

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

.2 Shop Drawings:
.1 Provide shop drawings of existing construction of masonry walls and foundations, including overall and specific dimensions, elevations, plumbness, openings, inserts, tie-ins to existing roof, floor joists and framing, and other details required for reconstruction.
.2 Temporary supports for existing utilities, services, mechanical works or other items that may be attached to or supported by masonry to be dismantled.
.3 Shoring and cradling, and other temporary framing work.

.3 Site Quality Control Submittals:
.1 Submit proposed recording chart or card index system, record drawings of existing conditions, photographic record keeping, and storage system for masonry, to Departmental Representative for approval prior to deconstruction. See sample indexing system provided in Appendix E for reference. Modify as requested by Departmental Representative and resubmit for approval.
.2 Exterior ashlar wythe:
.1 All masonry to be marked and controlled by minimum procedures as per clause 3.5 Special Techniques below.
.3 Interior rubble wythe:
.1 Mark stone, on face, before removal using marking product which can be completely erased when required without damaging masonry unit:
.2 Control rubble by location, in lifts not exceeding 500mm, to facilitate reinstallation with same face and in same area of removal. Provide photographic record of each lift removed. Provide individual recording of rubble units for fitted locations such as around window and door openings, bonding stones or other building features. Provide full photographic records to complement recording system.
.4 Provide up to date copies of stone location recording system chart or card index,

1.3 SUBMITTALS (Cont'd)

.3 Site Quality Control Submittals:(Cont'd)

.4 (Cont'd)
as well as chronological information concerning each numbered unit (individual cards of units), when requested.

.5 Submit date stamped photographic records of masonry to be dismantled and rebuilt.

.1 Coordinate photographs with removal and storage records.

.2 Coloured hard copy of each area dismantled to be attached to each corresponding palate in storage, indicating numbered stones on the photographs.

.3 Duplicate hard copies of photographs as detailed above to be to be submitted to the Departmental Representative as work progresses.

.6 Drawings showing layout of masonry in storage.

1.4 QUALIFICATIONS

.1 In accordance with Section 04 05 00 Common Work Results for Masonry.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Include in the dismantling process, all doors, windows, floor joists, trims, building features and appurtenances located within the area of reconstruction. Coordinate with Section 06 08 99 Carpentry.

.3 Protect and store stones to facilitate their resetting. Organize in manner acceptable to Departmental Representative, that can be readily accessed at all times.

.1 Store dismantled masonry units in a secure facility, on wood platforms or pallets, protected from exposure to water, elements, and potential mechanical damage, within a shed or trailer, and fully covered under polyethylene. Units are not to sit directly on the ground. Protect asphalt surfaces and repair any damages.

1.5 DELIVERY, STORAGE AND HANDLING (Cont'd)

.3 (Cont'd)
.2 Submit storage and identification system to Departmental Representative for approval.

.4 Protect all existing historic doors, windows, floor joists, building features and appurtenances during removal process. Store in area protected from damage and weather. Identify with sufficient detail as required for resetting.

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

1.6 AMBIENT CONDITIONS

.1 Loosen wet masonry only when temperature is above 5 degrees C.

.2 In temperatures 5 degrees C and below:
.1 Keep stones dry.
.2 Protect wet stones from freezing.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Report in writing, to Departmental Representative any conditions detrimental to acceptable and timely completion of the work. Proceed when unacceptable conditions have been remedied.

3.2 SITE VERIFICATION OF CONDITIONS

.1 In accordance with Clause 1.8 Existing Conditions in Section 04 03 07 Historic - Masonry Repointing and Repair.

.2 Include inspection of all doors, windows, floor joists, building features and appurtenances located within the area of reconstruction.

.3 Stop work in that area and report immediately to Departmental Representative, evidence of hazardous materials.

3.3 PREPARATION

.1 Review condition of masonry with Departmental Representative before commencing work.

.2 Obtain Departmental Representative's approval for methodology and tools to be employed before commencing the work.

.3 Prepare shop drawings of existing construction of masonry walls, including overall and specific dimensions, elevations, plumbness, openings, inserts, tie-ins to existing roof, floor joists and framing, and other details required to replicate existing construction.

.4 Carefully record all doors, windows, building features and appurtenances located within the area of reconstruction without damage as masonry is dismantled. Record locations and positioning in sufficient detail for resetting.

.5 Receive approval from Departmental Representative prior to commencing work.

3.4 PROTECTION

.1 Prevent damage to existing building features, fencing, trees, landscaping, natural features, bench marks, pavement, utility lines, electrical and mechanical works which are to remain. Make good any damage.

.2 Protect all doors, windows, building features and appurtenances located within the area of

3.4 PROTECTION (Cont'd)

.2 (Cont'd) reconstruction. Store in area protected from damage and weather.

.3 Protect surrounding components from damage during work.

.4 Make good damage to historic fabric.

.5 Obtain Departmental Representative's approval for repair methodology.

3.5 SPECIAL TECHNIQUES

.1 Number and indentify stones and other elements on a photographic record.

.2 Before dismantling stones, indicate dimensions of each numbered stone in removal area on a drawing, chart or index cards.

.3 Temporary Marking and Recording:
.1 Mark stone, on face, before removal using marking product which can be completely erased when required without damaging masonry unit:
.2 Ball-point pen on diachylon, attached to stone.
.3 Waxless chalk directly on stone.
.4 Tracking relocated stones and other items:
.1 Use numbering, marking, and positioning system as shown on sample drawing. Coordinate marking and numbering system with matching photographic records. Attach coloured photographs showing original conditions for each grouping of stones in storage.
.5 Mark/Identify:
.1 Stones and other elements or components to show identity and position.
.2 Wood platforms or other equipment used to transport and store stones.
.3 Work and storage areas.
.4 Locations from which stones were removed,on drawings, charts or index cards.
.6 Stone location recording system:

3.5 SPECIAL TECHNIQUES (Cont'd)

.3 Temporary Marking and Recording:(Cont'd)

.6 (Cont'd)

.1 Prepare chart or index cards to:

.1 Help locate stones or elements when necessary.

.2 Manage availability on platforms.

.3 Manage work and storage areas.

.2 Keep chart or card-index up-to-date and if required produce copy every day.

.3 Chart or card-index to contain relevant information as indicated on sample drawing and charts.

.4 Submit up-to-date copies of chart or card-index, as well as chronological information concerning each numbered unit (individual cards of units), when requested.

.7 Ensure that temporary marking will remain in use resistant to weather, handling and cleaning until final marking of stones.

.8 Ensure that markings and adhesive are removed without damaging units by brushing with vegetable fibre brush used either dry or with water. Use no solvent, acid or other chemical product.

.9 Include all doors, windows, floor joists, building features and appurtenances located within the area of reconstruction.

3.6 TEMPORARY SHORING

.1 Shoring and bracing in accordance with Section 31 04 31 Historic - Shoring and Bracing.

.2 Provide temporary supports for existing utilities, services, mechanical works or other items that may be attached to or supported by masonry to be dismantled.

.3 Construct shoring and cradling, and other temporary framing work needed to support structure, or parts of it, during removal process,and in anticipation of resetting, according to approved shop drawings.

3.7 LOOSENING STONES

.1 Use approved methods to loosen stones which will cause no damage either to stones or to other architectural elements.

.2 Prior to removing a stone approved for replacement or reinstallation, rout out existing mortar joints around the stone.

.3 Remove mortar from top, bottom and side joints, with the back surface of the joint square and of even depth.

.4 Use only hand tools with mallet, or pneumatic driven percussion at low stroke speed.

.5 Use of power tools is not allowed.

.6 Ensure that adjacent stones are not used as lever points in removal of stone.

.7 Loosen wet masonry when temperature is above freezing.

3.8 DISMANTLING AND MOVING STONES

.1 Avoid damaging arris of stone when removing mortar and freeing up.

.2 Use wood wedges where required to remove or dislocate stone.
.1 Use flat pry bars protected with impact absorbing protection (burlap, cardboard).

.3 Use nylon hoisting belts. Use at least 2 belts per stone.

.4 Avoid damaging edges of stone by protecting when hoisting and lifting from position. Use separators or wood shims to isolate units from hoisting belts.
.1 Where damage occurs, repair stone in accordance with Section 04 03 41 - Historic - Repair of Stone.

.5 Make good damage incurred at no additional cost to contract.

.6 Obtain approval from Departmental Representative of repaired damage. Replace

3.8 DISMANTLING AND MOVING STONES (Cont'd)

.6 (Cont'd)
stone when directed by Departmental Representative.

.7 Protect all doors, windows, building features and appurtenances located within the area of reconstruction during the removal process.

3.9 HANDLING

.1 Place detached stones on wood surfaces during handling. Prevent contact with metal.

.2 When stones are lowered to ground, place directly on wooden platform that will be used for transport or storage.

.3 Transport and keep stones on wooden platforms.

.4 Ensure that sharp edges of stones do not come into contact with any hard object.

.5 Use of Lewises for handling stones is permitted upon written approval by Departmental Representative.

3.10 TEMPORARY STORAGE STAGING AREA

.1 Place stones in designated area of site for cleaning, detailed inspection and for final marking, before storage.

.2 Stones to be organized in manner accessible and retrievable when required.

3.11 CLEANING

.1 Do cleaning operations at above freezing temperature. After cleaning, protect wet stones against freezing until dry.

.2 Clean stones by wet scrubbing with vegetable fibre brush unless otherwise instructed by Departmental Representative.
.1 Do not use high pressure water jet.
.2 Use chemical cleaning methods only when approved by Departmental Representative.

.3 Remove excess mortar by using hand tools.

3.12 FINAL MARKING

.1 Do final marking after cleaning, on surface that supports good adhesion and legibility and will not be visible after resetting.

.2 Do marking in colour and dimensions to be legible from distance of 2 m.

.3 Ensure that product used will not affect mortar to stone adhesion when resetting.

.4 Ensure that product used for marking will survive storage until resetting of stone.

3.13 FINAL STORAGE

.1 Provide shelters for temporary storage of masonry units and building appurtenances, adequately ventilated and designed to keep condensation from forming on the internal surfaces of shelter.
.1 Shelters for storage must be secure trailers, storage containers, or suitable temporary facility able to withstand environmental loads, to be approved by Departmental Representative.

.2 Area for storage trailers or temporary facility will be provided by Departmental Representative adjacent to work site, as noted on drawings.

.3 Layout storage so that each stone will have numbered faces visible, and be accessible or removable without having to move adjacent stones.

.4 Store rubble stone in wooden boxes.

.5 Store building appurtenances in accessible manner, easily located and removable without having to move adjacent items.

.6 Show layout of masonry stones and building appurtenances to be stored on record drawing. Record in sufficient detail for retrieval and reconstruction. Revise as necessary for approval of the Departmental Representative.

.7 Provide final copies of stone location recording system chart or card index, as well

3.13 FINAL STORAGE (Cont'd)

.7 (Cont'd)
as chronological information concerning each numbered unit (individual cards of units), when requested.
.1 Submit photographic records coordinated with removal and storage records.
.2 Attach coloured hard copy of original conditions of each area of masonry dismantled to each corresponding palate in storage, indicating numbered stones on the photographs.
.1 Duplicate hard copies of these photographs to be to be submitted to the Departmental Representative.

.8 Submit record drawings showing layout of stored masonry.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 02 41 16.01 Structure Demolition

.2 04 03 07 Historic - Masonry Repointing and Repair

.3 04 03 08 Historic - Mortaring

.4 04 03 09 Historic - Grouting

.5 04 03 41 Historic - Repair of Stone

.6 04 03 42 Historic - Replacement of Stone

.7 04 03 43 Historic - Dismantling Stone Masonry

.8 06 08 99 Carpentry

.9 31 04 31 Historic - Shoring and Bracing

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA-A165 Series-04, Standards on Concrete Masonry Units.
.2 CSA A179-04, Mortar and Grout for Unit Masonry.
.3 CSA-A371-04, Masonry Construction for Buildings.

.2 International Masonry Industry All-Weather Council (IMIAC)
.1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation meetings: comply with Section 01 31 19 - Project Meetings. Conduct pre-installation meeting one week prior to commencing work of this Section to:
.1 Verify project requirements, including mock-up requirements.
.2 Verify substrate conditions.
.3 Co-ordinate products, installation methods and techniques.

1.3 ADMINISTRATIVE REQUIREMENTS (Cont'd)

.1 (Cont'd)
.4 Sequence work of related sections.
.5 Co-ordinate with other building subtrades.
.6 Review manufacturer's installation instructions.
.7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
.8 Review warranty requirements.

.2 Sequence with other work in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

1.4 ACTION SUBMITTALS

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

.2 Product Data:
.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, limitations and colours.
.2 Provide two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Mortar Samples:
.1 In accordance with Section 04 03 08 Historic - Mortaring.

1.5 INFORMATION SUBMITTALS

.1 Provide manufacturer's product certificates certifying materials comply with specified requirements.

.2 Test and Evaluation Reports:
.1 Provide certified test reports in accordance with Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
.2 Test reports to certify compliance of mortar and grout with specified performance characteristics and physical properties.

1.5 INFORMATION SUBMITTALS (Cont'd)

.3 Installation Instructions: provide proposed methods for reinstallation of existing windows, doors, appurtenances, including storage, handling, safety and cleaning. Coordinate with Section 06 08 99 Carpentry.

.4 Experience Records: provide complete resume of experience and references for work completed on historic masonry structures in the past 10 years for:
.1 masonry contractor,
.2 supervising stone mason(s),

.5 Submit proposed lime mortar masonry instructions and best practices to be used prior to installations with lime mortar.

1.6 QUALITY ASSURANCE

.1 Masonry Contractor:
.1 Use single Masonry Contractor for all masonry work.
.2 Masonry contractor to have 10 years experience minimum in historic stone masonry work.
.3 Masonry contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves dismantling, and replacing or repairing stones which are part of structural masonry work.
.4 Provide the name(s) of the supervising stone mason, complete with a full resume of experience and references for work completed on historic masonry structures in the past 10 years.
.5 All masonry work shall be executed under the continuous supervision and direction of the identified supervising stone mason.

.2 Masons:
.1 Mason to have certificate of qualification with 5 years minimum experience in historic stone masonry work.
.2 Masons to have proof of license certification for propriety restoration mortars.

.3 Departmental Representative has right to reject masons who do not demonstrate appropriate abilities or experience. Refer to

1.6 QUALITY ASSURANCE (Cont'd)

.3 (Cont'd)
Section 01 61 00 - Common Product Requirements.

.4 Masons employed on this project throughout course of project must meet above requirements. Where, during course of project, masons leave work force, replacement masons must also meet requirements.

.5 Obtain approval from Departmental Representative for changes to qualified personnel.

.6 Mock-ups:
.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
.2 Construct mock-up panels of typical mass wall, with typical exterior ashlar and interior rubble wythes of masonry construction, 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, ties, pointing, jointing, coursing, mortar and workmanship to match existing.
.3 Mock-up used to judge workmanship, substrate preparation, operation of equipment and material application.
.4 Construct mock-up where directed by Departmental Representative.
.5 Allow 5 business days for inspection of mock-up by Departmental Representative and multi-disciplinary team before proceeding with work.
.6 When accepted by Departmental Representative, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
.7 Start work only upon receipt of written approval of mock-up by Departmental Representative.

.7 The following are considered deficient items,and are in addition to other requirements of the work:
.1 Mortar shrinkage cracks between units,
.2 Unfilled joints,
.3 Poor colour or texture of joints or masonry units.
.4 Dusting or efflorescence of joints or masonry units.

1.6 QUALITY ASSURANCE (Cont'd)

.7 (Cont'd)
.5 Surface discolouration, colour variance or crumbling of mortar.
.6 Failure of anchors.
.7 Sloppy fitting, bedding,jointing, poor levelling of masonry units.
.8 Failure to match adjacent work.
.9 Failure to match approved mock-up.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials in accordance with Section 01 61 00 - Common Product Requirements.

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

.3 Storage and Handling Protection:
.1 Keep materials dry until use except where wetting of stone is specified.
.2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
.3 Packaging Waste Management: Remove for reuse and return of pallets, crates, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.4 Removal and handling of stones in accordance with Section 04 03 43 Historic - Dismantling Stone Masonry.

1.8 AMBIENT CONDITIONS

.1 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of work.

.2 When ambient temperature below 10 degrees C:
.1 Store cements and sands for immediate use in heated enclosure to Section 01 56 00 Temporary Barriers and Enclosures. Allow cement and sands to reach minimum temperature of 10 degrees C.
.2 Heat and maintain water to minimum of 20 degrees C and maximum of 30 degrees C:

1.8 AMBIENT CONDITIONS (Cont'd)

.2 (Cont'd)

.2 (Cont'd)

.1 At time of use temperature of mortar to be minimum of 15 degrees C and maximum of 30 degrees C.

.2 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30 degrees C.

.3 Maintain aggregate temperature between 10 degrees C and 30 degrees.

.4 Maintain mortar mix between 10 degrees and 40 degrees.

.5 Provide hot water to a maximum 90 degrees C on site during cold weather.

.3 Maintain temperature of masonry above 10 degrees C for minimum of 28 days after mortar is installed, or minimum of 12 weeks prior to freezing temperatures when using lime mortar.

1.9 WARRANTY

.1 For Work in this Section 04 05 00 - Common Work Results for Masonry, 12 months warranty period is extended to 24 months.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Masonry materials are specified elsewhere in related Sections:

.1 Section 04 03 08 Historic - Mortaring,

.2 Section 04 03 41 Historic - Repair of Stone,

.3 Section 04 03 42 Historic - Replacement of Stone.

.4 Section 04 03 09 Historic - Grouting

PART 3 - EXECUTION

3.1 INSTALLERS

.1 Experienced and qualified masons to carry out dismantling, cleaning, erection, assembly and installation of masonry, building features and appurtenances. Coordinate with Section 06 08 99 Carpentry and other trades as required.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, installation instructions and data sheets.

3.3 EXAMINATION

.1 Examine conditions, substrates and work to receive work of this Section.
.1 Co-ordinate with Section 01 71 00 - Examination and Preparation.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation after unacceptable conditions have been remedied.

.2 Verification of Conditions:
.1 Verify that:
.1 Substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation prior to installation.
.2 Field conditions are acceptable and are ready to receive work.
.3 Built-in items are in proper location, and ready for roughing into masonry work.
.2 Commencing installation means acceptance of existing substrates.

3.4 PREPARATION

.1 Surface Preparation: prepare surfaces in accordance with manufacturer's written recommendations and co-ordinate with Section 01 71 00 - Examination and Preparation.
.1 Dampen masonry to prevent premature drying of mortar. Surfaces should be cool and damp but not wet or holding water. On highly porous substrate surfaces, dampening should begin on the day previous to application. Control dampening by using fine mist spray.

.2 Establish and protect lines, levels, coursing, and openings.

.3 Allow for Departmental Representative to perform restorations of building features and appurtenances prior to reinstallation.

.4 Protect adjacent materials from damage and disfiguration.

3.5 INSTALLATION

.1 Do masonry work in accordance with CSA-A371 except where specified otherwise. Coordinate with Section 06 08 99 Carpentry and other trades as required.

.2 Follow instructions and best practices for lime mortar masonry as submitted and reviewed by Departmental Representative.

.3 Build masonry plumb, level, and true to line, respecting construction tolerances permitted by CSA-A371.
.1 Using records of existing conditions compiled during dismantling of stone wall Section 04 03 43 Historic - Dismantling Stone Masonry, reconstruct masonry walls and foundations, including overall and specific dimensions, elevations, plumbness, openings, inserts, tie-in to existing roof and floor framing, and other details of construction as required, to replicate original construction.

.4 Where requested in writing, and approved by Departmental Representative, adjust masonry plumb, level, and line to blend masonry into existing conditions.

3.5 INSTALLATION (Cont'd)

.5 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, without cutting.

.6 Removal and handling of stones in accordance with Section 04 03 43 Historic - Dismantling Stone Masonry.

3.6 CONSTRUCTION

.1 Foundations:

.1 Review condition of concrete foundation with Departmental Representative. Correct as required with concrete fill or mortar. Receive written approval of acceptable conditions prior to commencing this work.

.2 Plinth Stones:

.1 Reconstruct existing plinth stones in original locations as documented during removals, using numbering, marking and positioning system detailS in Section 04 03 43 Historic - Dismantling Stone Masonry.

.2 Reconstruct to elevation and line as required to blend into existing construction.

.3 Exposed exterior masonry:

.1 Reconstruct original masonry units in original locations, using numbering, marking and positioning system as detailed in Section 04 03 43 Historic - Dismantling Stone Masonry.

.2 Chipped, cracked and otherwise damaged units to be repaired as specified in Section 04 03 41 Historic - Repair of Stone, or replaced with undamaged units as specified in Section 04 03 42 Historic - Replacement of Stone, as directed by the Departmental Representative, where stones are beyond reasonable repair.

.3 Ensure all embedded items are installed in original locations.

.4 Reconstruct openings for historic windows and doors in original locations and positions.

.5 Coordinate with trades to reattach all previously removed interior and exterior fixtures and utilities to masonry walls when completed.

.6 Keep bedding mortar back 20mm from face of masonry, for pointing with coloured mortar.

3.6 CONSTRUCTION (Cont'd)

.3 Exposed exterior masonry:(Cont'd)

.7 Point joints to match existing existing using coloured pointing mortar.

.4 Interior wythe masonry:

.1 Reconstruct interior wythe masonry to match existing, in original locations, using numbering, marking and positioning system as detailed in Section 04 03 43 Historic - Dismantling Stone Masonry.

.2 Ensure fully compressed mortar bedding to underside of floor joists and rafters where embedded into interior walls. Leave minimum 25 mm air gap at ends of floor joists and rafters.

.3 Reset existing wood bearing plates into side walls and gable end, embedded fully into new mortar. Use similar mechanical fasteners to original type where additional fasteners are required.

.4 Coordinate with trades to reattach all previously removed interior and interior fixtures, trims and utilities to masonry walls when completed.

.5 Jointing:

.1 Plinth Stone: Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth joints, true to line, compressed, uniformly concave, or as directed by Departmental Representative.

.2 Exposed Exterior Masonry: Allow joints to set just enough to remove excess water, then tool. Keep bedding mortar back 20mm from face of masonry, point joints to match existing, using coloured pointing mortar. Provide joints, constructed true to line, compressed and uniform to match original conditions. Confirm jointing style with Departmental Representative prior to commencing work.

.3 Interior masonry: Strike joints flush or match existing conditions. Confirm jointing style with Departmental Representative prior to commencing work. (Note: Harl pointing also known as slaistering technique may have been used.)

.4 Jointing to be performed as a separate task following completion of all masonry

3.6 CONSTRUCTION (Cont'd)

.5 Jointing:(Cont'd)
.4 (Cont'd)
reconstruction work, unless approved otherwise by Departmental Representative.

.6 Cutting:
.1 Only where instructed by Departmental Representative, cut out recessed or built-in objects.
.2 Make cuts straight, clean, and free from uneven edges.

.7 Building-In:
.1 Build in items required to be built into masonry.
.2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
.3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
.4 Reinstall built in items removed during deconstruction process.
.5 Confirm location of built in items with Departmental Representative prior to commencing work.

.8 Lintels:
.1 Install lintels centred over opening width.

.9 Lateral Support and Anchorage:
.1 Supply and install lateral support and anchorage for gable end and second floor framing as indicated.
.2 Tie in masonry to existing roof and floor joists as indicated.

.10 Interface with other work:
.1 Provide openings in existing work as indicated.
.2 Openings in walls: to be approved by Departmental Representative.
.3 Make good existing work. Use materials to match existing.

3.7 SITE TOLERANCES

.1 Tolerances in notes to CSA-A371 apply.

3.8 FIELD QUALITY CONTROL

.1 Site Tests, Inspection:

.1 Perform field inspection and testing in accordance with Section 01 45 00 - Quality Control.
.2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.
.3 Schedule site visits to review work at stages listed:
.1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
.2 Twice during progress of work at 25% and 60% complete.
.3 Upon completion of work, after cleaning is carried out.
.4 Obtain reports within three days of review and submit immediately to Departmental Representative.

.2 Ensure minimum standard for masonry work is representative of approved mock-up.

3.9 CLEANING

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

.2 Progress Cleaning: in accordance with related masonry sections.
.1 Remove droppings and splashings using clean sponge and water.
.2 Clean masonry with low pressure clean water and soft natural bristle brush.
.3 Obtain approval of Departmental Representative prior to using other cleaning methods for persistent stains.
.4 Concrete materials: provide appropriate area on job site where testing laboratory equipment, and other concrete equipment can be safely washed. Contractor is responsible for cleanup of this area once work is completed.

3.9 CLEANING (Cont'd)

.3 Final Cleaning:
.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
.2 Upon completion of installation and verification of performance of installation, remove surplus materials, rubbish, tools and equipment barriers.

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

3.10 PROTECTION

.1 Temporary Bracing:
.1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
.2 Bracing to be approved by Departmental Representative.
.3 Brace masonry walls as necessary to resist environmental forces (eg.dead,wind, live,snow,construction,etc.) during dismantling and installation, in accordance with Section 31 04 31 Historic - Shoring and Bracing.

.2 Moisture Protection:
.1 Keep masonry dry using waterproof, nonstaining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.
.2 At end of each working day, cover unprotected work with waterproof membranes. Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly. Anchor securely in position.
.3 Protect adjacent finished work against damage which may be caused by on-going work.

.3 Air Temperature Protection: protect completed masonry as detailed in 1.8 Ambient Conditions.

3.10 PROTECTION (Cont'd)

.4 Temporary Shoring:
.1 Provide shoring in accordance with Section 31 04 31 Historic - Shoring and Bracing.
.2 Keep shoring of second storey floor and roof framing in place for minimum of 28 days following completion of structural masonry work.
.3 Obtain written approval from Departmental Representative prior to removal of shoring.

.5 Backfill:
.1 Allow minimum of 14 days following completion of foundation walls or below grade work prior to backfilling.
.2 Obtain written approval from Departmental Representative prior to backfilling.
.3 Coordinate with installation of drainage systems.

3.11 PROTECTION OF COMPLETED WORK

.1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
.1 Membranes should be extended to 0.5m over surface area of work and be tightly installed to prevent finished work from drying out too quickly.
.2 Maintain tarps in place for minimum of 2 week,
.3 Ensure bottoms of tarps permit airflow to reach mortar in joints.
.4 Anchor coverings securely in position.

.2 Damp cure:
.1 Provide damp cure for pointing mortars.
.2 Install and maintain wetted burlap protection during the curing process for minimum of 3 days.
.3 Wet mist burlap only. Endure no direct spray reaches surface of curing mortar.
.4 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

.3 Protect from drying winds. Pay particular attention at corners of structure.

3.11 PROTECTION OF COMPLETED WORK (Cont'd)

.4 Maintain ambient temperature of 10 degrees C for:
.1 mimimum 7 days in summer,
.2 mimimum 28 days in cold weather conditions using dry heated enclosures.
.3 minimum 12 weeks prior to freezing temperatures when using lime mortar.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 01 35 29.06 Health and Safety Requirements

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 04 03 43 Historic - Dismantling Stone Masonry

.5 04 05 00 Common Work Results for Masonry

.6 09 91 99 Painting for Minor Works

.7 31 04 31 Historic - Shoring and Bracing

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Review work with Departmental Representative to verify project requirements.
.1 Removal and reinstallation of historic windows, doors, trims etc.
.2 Temporary wood blocking in openings,
.3 Infill stairwell to second storey as indicated on drawings. Use historic lumber to match existing.
.4 Restoration work as approved by cash allowance.

.2 Inform workers of presence of lead based paint and ensure health and safety procedures and practices are followed.
.1 Lead content is present in the original paint coatings on original second storey wood door, all door frames, second storey wood floors, and on other construction works installed and painted prior to 1975. Assume surfaces with multiple layers of paint to include lead base paint in earlier coats.
.2 All window frames and trims are free of lead based paint with exception a sample strip of original paint on the upper window section remaining intact for historical purposes. Ground floor doors are free of lead based paint.
.3 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or

1.2 ADMINISTRATIVE REQUIREMENTS (Cont'd)

.2 (Cont'd)
.3 (Cont'd)
report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
.2 CAN/CSA-O141-05(R2009), Softwood Lumber.

.2 National Lumber Grades Authority (NLGA)
.1 Standard Grading Rules for Canadian Lumber 2000.

.3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
.1 Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 2003.

.4 Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

1.4 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

1.5 SUBMITTALS

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

.2 Submit shop drawings for approval by Departmental Representative:
.1 proposed marking and recording system for windows, doors, trims etc. to be carefully removed, stored and reinstalled.
.2 stairwell infill work existing conditions and proposed works.

1.5 SUBMITTALS (Cont'd)

.3 Indicate details of construction, profiles, jointing, fastening and other related details.
.1 Indicate suppliers, materials, thicknesses, finishes and hardware.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
.1 Protect materials against dampness during and after delivery.
.2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

.2 Removals: Coordinate removals and storage with Section 04 03 43 Historic - Dismantling Stone Masonry.

.3 Protect all historic woodwork, building features and appurtenances during removal process. Store in area protected from damage and weather. Identify with sufficient detail as required for resetting in original conditions.

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

PART 2 - PRODUCTS

2.1 LUMBER MATERIAL

.1 Historic details for stairwell infill: Refer to Appendix C for historic drawings and specifications.
.1 Match existing materials, dimensions and finish as noted following interior demolitions.
.2 Use lumber mill specializing in historic lumber replication. Provide supplier contact information for Record Drawings.
.3 Potential suppliers of historic lumber:
.1 Thayer Lumber - Sault Ste. Marie
.2 Oliver Lumber - Etobicoke

2.1 LUMBER MATERIAL (Cont'd)

.1 (Cont'd)

.3 (Cont'd)

.3 Pine Island Wood Products - Desbarats

.4 Provide adequate samples to lumber mill for identification and preparation of samples.

.5 Submit samples to Departmental Representative for review and approval prior to use.

.1 floor joists,

.2 cross bracing,

.3 plank flooring,

.4 all other sized lumber as required to perform the infill work.

.2 Lumber: unless specified otherwise, softwood, moisture content 19% or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

.1 Board sizes: "Standard" or better grade.

.2 Dimension sizes: "Standard" light framing or better grade.

2.2 ACCESSORIES

.1 Nails, spikes and staples: to CSA B111,as approved by Departmental Representative.

.2 Bolts: match existing or as approved by Departmental Representative.

PART 3 - EXECUTION

3.1 GENERAL

.1 Provide structural and finishing work as required to infill existing stairwell opening as detailed on drawings. Coordinate with masons where required to set floor joists into masonry wall.

.2 Provide careful removal and reinstallation of historic windows, doors, trim etc. as required. Repair damage caused during removals to satisfaction of Departmental Representative.

.3 Provide pricing for restoration work as identified in Section 01 21 00 Allowances.

3.2 REMOVALS

.1 Carefully remove existing historic windows, doors, trims, woodwork, flooring and bracing as required to perform work. Protect, salvage and store historic items for reinstallation. Clean and repair as required prior to storage. Identify with sufficient detail as required for resetting to original conditions.

.2 Review existing conditions with Departmental Representative prior to commencing work.

.3 Coordinate removals and storage with Section 04 03 43 Historic - Dismantling Stone Masonry.

.4 Protect and store salvaged materials to facilitate their resetting. Organize and store in manner that can be readily accessed.

3.3 INSTALLATION

.1 Comply with requirements of NBC, supplemented by the following paragraphs.

.2 Match historic construction techniques.

.3 Install floor joists, planking, wood cants, backing, nailers, curbs and other wood supports as required.

3.3 INSTALLATION (Cont'd)

.4 Reinstall to original conditions all windows, doors, trim, etc.

.5 Stagger joints when blending new flooring.

3.4 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Match existing materials and construction. Refer to historical construction drawings and specifications. Receive approvals from Departmental Representative prior to commencing work.

3.5 FINISHING CARPENTRY

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
.1 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
.2 Form joints to conceal shrinkage.

.2 Fastening:
.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
.2 Design and select fasteners to suit size and nature of components being joined.
.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.3 Standing and running trim:
.1 Butt and cope internal joints of trims to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.

3.5 FINISHING CARPENTRY (Cont'd)

.3 Standing and running trim:(Cont'd)
.2 Install trim in single lengths without splicing.

.4 Interior and exterior frames:
.1 Set frames with plumb sides and level heads and sills and secure.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 01 21 00 Allowances.

.2 01 35 29.06 - Health and Safety Requirements

.3 02 83 12 Lead-Base Paint Abatement - Maximum Precautions

.4 06 08 99 Carpentry

1.2 REFERENCES

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

.2 The Master Painters Institute (MPI) Architectural Painting Specification Manual.
.1 Maintenance Repainting Manual - current edition.

.3 Ontario Ministry of Labour - Occupational Health and Safety Branch - Guideline - Lead on Construction Projects April 2011.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Review work with Departmental Representative to verify project requirements.

.2 Inform workers of presence of lead paint where applicable and ensure health and safety procedures and practices are followed.
.1 Lead content is present in the original paint coatings on second storey wood door, all door frames, second storey wood floors, exterior roof trims, and on other construction works installed and painted prior to 1975. Assume surfaces with multiple layers of paint to include lead base paint in earlier coats.
.2 All window frames and trims are free of lead based paint with exception a sample strip of original paint on the upper window section remaining intact for historical purposes. Ground floor doors are free of lead paint.
.3 Lead-base paint removals in accordance with Section 02 83 12 Lead-Base Paint Abatement - Maximum Precautions.

1.3 ADMINISTRATIVE REQUIREMENTS (Cont'd)

.2 (Cont'd)
.4 Lead based paint to remain on roof trims, and encapsulated with fresh paint following reinstallations.
.5 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.
.1 Main floor ceiling conditions unknown until interior demolitions completed. Floor joists/ceiling areas excluded from encapsulation work.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for paint and coating products and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
.3 Submit recommendations for each paint type and colour for review and acceptance by Departmental Representative.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Waste disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 SITE CONDITIONS

.1 Heating, Ventilation:
.1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

1.6 SITE CONDITIONS (Cont'd)

.2 Temperature, Humidity and Substrate Moisture Content Levels:
.1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within paint manufacturer's prescribed limits.
.2 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.3 Additional application requirements:
.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

1.7 RECOMMENDED COATING SYSTEMS

.1 Wood or metal surfaces:

.1 Over previously unpainted surfaces, use one coat of undercoat, and two applications of topcoat.
.2 Over previously painted surfaces, use two applications of topcoat. No primer nor undercoat is needed unless surface is absorbent or porous.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Supply paint materials for paint systems from single manufacturer.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual "Approved Product" listing.

.4 Colours:

2.1 MATERIALS (Cont'd)

.4 Colours:(Cont'd)
.2 (Cont'd)
.1 Submit proposed Colour Schedule to Departmental Representative for review.
.2 Match to existing finishes.

.5 Exterior painting:
.1 All exterior doors and windows, casings, soffit, fascia and trims, frieze boards etc.
.2 Match to existing finishes.
.1 RIN 6.3A Latex finish
.2 RIN 6.3B Alkyd finish
.3 Semi-gloss or as determined by Departmental Representative.

.6 Interior painting:
.1 Interior doors and windows, frames and trims, wood flooring.
.2 Match to existing finishes.
.1 RIN 6.3A Latex finish
.2 RIN 6.3B Alkyd finish
.3 Semi-gloss or as determined by Departmental Representative.

PART 3 - EXECUTION

3.1 GENERAL

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

.2 Paint all exterior wood surfaces: doors and windows, casings, soffit, fascia and trims, frieze boards etc, to match existing finishes.

.3 Paint all interior wood doors and windows, frames and trims, wood floors. Floor joists and ground floor ceiling areas are excluded from this work.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

.1 Protection of in-place conditions:
.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
.2 Protect items that are permanently attached such as Fire Labels on doors and frames.
.3 Protect factory finished products and equipment.

.2 Surface Preparation:
.1 Remove surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
.2 Ensure health and safety procedures and practices are followed when preparing surfaces with lead paint.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.

.4 Clean and prepare surfaces in accordance with specific requirements and coating manufacturer's recommendations.

.5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before

3.3 PREPARATION (Cont'd)

.5 (Cont'd)
prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.6 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
.1 Apply sealer over knots, pitch, sap and resinous areas.
.2 Apply wood filler to nail holes and cracks.

.7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.8 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances.

3.4 APPLICATION

.1 Painting to commence following completion of all construction work.

.2 Surface clean-up and preparation to be accepted by Departmental Representative prior to work.

.3 Use method of application approved by Departmental Representative.
.1 Conform to manufacturer's application recommendations.

.4 Apply coats of paint in continuous film of uniform thickness.
.1 Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

3.4 APPLICATION (Cont'd)

.6 Sand and dust between coats to remove visible defects.

3.5 QUALITY CONTROL

.1 Carry out field inspections as often as necessary during painting process to ensure proper application.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

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

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.4 Place paint defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 01 21 00 Allowances

.2 01 29 83 Payment Procedures:Testing Laboratory Services

.3 03 10 00 Concrete Forming and Accessories

.4 03 20 00 Concrete Reinforcing

.5 03 30 00.01 Cast in Place Concrete

.6 04 03 43 Historic - Dismantling Stone Masonry

.7 04 05 00 Common Work Results for Masonry

.8 31 04 31 Historic - Shoring and Bracing

.9 31 36 00 Gabions

.10 31 63 00 Micropiles

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM D 698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.2 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation
.1 OPSS-1010 April 2013.
.2 OPSS-1004 November 2012.

.3 U.S. Environmental Protection Agency (EPA)/Office of Water
.1 EPA 832R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

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

.2 Rock : solid material in excess of 1.00 m^3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 bucket. Frozen material not classified as rock.

.3 Topsoil:
.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

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

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

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:
.1 Weak, chemically unstable, and compressible materials.
.2 Frost susceptible materials

.8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 SUBMITTALS

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

1.4 SUBMITTALS (Cont'd)

.2 Shoring and bracing to be in accordance with Provincial(OHSA)regulations.
.1 When excavation requires an engineered support system, submit design.

.3 Quality Control: in accordance with Section 01 45 00 - Quality Control:
.1 Submit sieve analysis of Granular A and Granular B materials for review and approval from Departmental Representative prior to delivery of material to the site.
.2 Submit recent lab report specifying maximum dry densities of proposed aggregates.
.3 If requested by Departmental Representative, submit to designated testing agency,one 25 kg Granular A sample, two 25 kg Granular B samples, and 25 kg sample of any other fill material proposed for use, no later than one week before backfilling or filling work.
.4 Submit to Departmental Representative written notice when bottom of excavation is reached.
.5 Inform Departmental Representative at least 2 weeks prior to beginning Work, of proposed source of fill materials.
.6 Submit delivery tickets from aggregate supplier to Departmental Representative as requested.

.4 Erosion and Sediment Control Plan: Submit to Departmental Representative for review and approval prior to implementation:
.1 Temporary erosion and sediment control measures to prevent soil erosion and discharge of soil-bearing water, runoff or airborne dust to adjacent areas and waterways.
.2 Inspection, repair, and maintenance of erosion and sediment control measures during construction or until permanent vegetation has been established.
.3 Removal of erosion and sediment controls and restoring areas disturbed during removal.
.4 Control of sediment in discharge water from dewatering operations.

.5 Dewatering Plan: Submit to Departmental Representative for review and approval, minimum three weeks prior to commencing the

1.4 SUBMITTALS (Cont'd)

.5 Dewatering Plan:(Cont'd)
dewatering operation: Proposed Dewatering Plan, including:
.1 Written overview of the system,
.2 Drawings or sketches showing system layout,
.3 locations, depths and size of well points, discharge lines, pumps and capacities, settling basins,and other system components, such as sheet pile cut-offs as may be required.
.4 Design calculations showing adequacy of system, using professional methods of engineering design.
.5 Include deepwells, wellpoints, sheet pile, and other techniques as required to perform the required dewatering.
.6 Monitoring and contingency plans including standby power, backup pumps and redundant settling basins, maintenance system.

.6 Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 REGULATORY REQUIREMENTS

.1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial(OHSA)regulations.
.1 When excavation requires an engineered support system, submitted design to bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.
.2 Engage service of qualified professional Engineer to inspect installation of support system prior to use.

.2 Health and Safety Requirements:
.1 Provide construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

.2 Divert unused or excess aggregate materials from landfill to local storage area for use by Departmental Representative as requested.

1.7 EXISTING CONDITIONS

.1 Examine geotechnical report attached in Appendix A.

.2 Buried services:
.1 Before commencing work verify location of buried services on and adjacent to site.
.2 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
.3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
.4 Prior to beginning excavation work, notify Departmental Representative. Establish locations and state of use of buried utilities and infrastructures.
.5 Confirm locations of buried utilities by careful test excavations.
.6 Maintain and protect from damage, water, sewer, electric, telephone and other utilities and infrastructures encountered.
.7 Where utility lines or infrastructures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.
.8 Record location of maintained, re-routed and abandoned underground lines.

.3 Existing buildings and surface features:
.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey control points and monuments which may be affected by Work.
.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make

1.7 EXISTING CONDITIONS (Cont'd)

.3 (Cont'd)
.2 (Cont'd)
repair as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular A, Granular B Type I, Select Subgrade to OPSS1010. Sand to OPSS1004.

.2 Unshrinkable fill: proportioned and mixed to provide:
.1 Maximum compressive strength of 0.4 MPa at 28 days.
.2 Maximum Portland cement content of 25 kg/m^3.
.3 Minimum strength of 0.07 MPa at 24 h.
.4 Concrete aggregates: to CAN/CSA-A23.1/A23.2.
.5 Cement: to CAN/CSA-A3001, Type GU.
.6 Slump: 160 to 200 mm.

.3 Drainage, insulation and geotextile products as specified on contract drawings.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENT CONTROL

.1 Provide temporary erosion and sediment control measures to prevent soil erosion and discharge of soil-bearing water, runoff or airborne dust to adjacent areas and waterways, according to submitted and approved Erosion and Sediment Control Plan.

.2 Inspect, repair, and maintain erosion and sediment control measures during construction or until permanent vegetation has been established.

.3 Remove erosion and sediment controls and restore and stabilize areas disturbed during removal.

.4 Include control of sediment in discharge water from dewatering operations.

3.1 TEMPORARY EROSION AND SEDIMENT CONTROL (Cont'd)

.5 Obtain written approval from Departmental Representative prior to removal of environmental controls.

.6 Immediately address any environmental control issues upon notification by Departmental Representative.

3.2 PREPARATION/ PROTECTION

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

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

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

.5 Cut concrete pavement neatly along limits of proposed excavation, and where attached to building foundation with reinforcement steel, in order that edges may break evenly and cleanly, without damage to building foundation and adjacent surfaces.

.6 Protect buried services that are required to remain undisturbed.

.7 Review west embankment for shoring and stabilization requirements for installation of gabion wall and foundation works.

.8 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

3.3 STOCKPILING

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

3.3 STOCKPILING (Cont'd)

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries or into water bodies.

3.4 EXCAVATION

.1 Excavation work to commence following written approval by Departmental Representative of acceptable installation of erosion and sediment control methods.

.2 Strip topsoil from areas of new construction.
.1 Stockpile topsoil on site for later use.

.3 Excavate as required to carry out work.
.1 Remove concrete slabs, curbs and other common excavation materials and obstructions encountered during excavation, without damage to building foundation and adjacent surfaces.
.1 Carefully separate concrete from masonry walls where required.
.2 Do not disturb soil or rock below bearing surfaces.
.3 Notify Departmental Representative when excavations are complete.
.4 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
.5 Excavation taken below depths shown without Departmental Representative's written authorization to be corrected as directed by Departmental Representative at Contractor's expense.

.4 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of bedding material on solid and undisturbed ground.

.5 Excavate for slabs to subgrade levels.
.1 In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

3.5 SHORING/BRACING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Act for the Province of Ontario.

.2 During backfill operation:
.1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
.2 Do not remove bracing until backfilling has reached respective levels of such bracing.
.3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.

.3 Upon completion of substructure construction:
.1 Remove shoring and bracing.
.2 Remove excess materials from site and restore area as directed by Departmental Representative.

3.6 DEWATERING AND HEAVE PREVENTION

.1 Provide a continuous dewatering operation to keep excavations stable and free of water,
.1 with the ground water table lowered and maintained at minimum 300 mm below elevation of the lowest subgrade below the excavation, and as required to maintain slope stability. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
.2 from the onset of excavations until foundation work is completed and backfilled.

.2 Provide Ministry of Environment Permit to Take Water for the dewatering operation.

.3 Erosion and Sediment Control.
.1 Excavation work may commence upon written approval by Departmental Representative of installation of control methods.

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

3.6 DEWATERING AND HEAVE PREVENTION (Cont'd)

.5 Include contingencies to protect open excavations against flooding and damage due to surface run-off.

.6 Discharge clean ground water to surface area approved by Departmental Representative. Route runoff to storm sewer, ditching or catchbasin where available, or to approved vegetated area for percolation into soil.

.7 Clean up discharge area to satisfaction of Departmental Representative upon completion of work.

.8 Provide standby equipment ready for immediate use in the event of system inadequacy or failure.

.9 In events of inadequacy or failure of dewatering system, perform work necessary to correct damages to foundations, soils, bank stability and structures, at no additional cost to contract.

.10 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved collection or runoff areas, and in manner not detrimental to public,property, Work completed or under construction.
.1 Provide settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.
.2 Discharge of water to meet regulatory requirements.

.11 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.12 Immediately address any dewatering and environmental issues upon notification by Departmental Representative.

.13 Remove dewatering system and environmental controls following written approval from Departmental Representative.

3.7 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:
.1 Departmental Representative has inspected and approved installations.
.2 Departmental Representative has inspected and approved of construction below finish grade.
.3 Inspection, testing, approval, and recording location of underground utilities.
.4 Removal of concrete formwork.
.5 Removal of shoring and bracing,
.6 Backfilling of voids with satisfactory soil material.

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

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

.4 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.

.5 Placing:
.1 Place backfill, fill and basecourse material in 150 mm lifts: add water as required to achieve specified density.
.2 Place unshrinkable fill in areas as indicated: consolidate and level unshrinkable fill with internal vibrators.

.6 Compaction:
.1 Compact each layer of material to following maximum dry densities for material to ASTM D 698:
.1 Sub-base: 95%.
.2 Base: 100%.
.3 Elsewhere: 90%.
.2 Compaction tolerances:
.1 Average of any ten consecutive density tests shall be equal to or greater than specified density.
.2 No more than one in any 10 consecutive density tests may be less than specified density.
.3 Average of any ten moisture content tests shall lie within specified moisture content limits.

3.7 BACKFILLING (Cont'd)

.6 Compaction:(Cont'd)
.2 Compaction tolerances:(Cont'd)
.4 No more than two in any 10 consecutive moisture content tests may be less than specified moisture content limits.
.3 Testing frequency:
.1 Pipe bedding and cover - every lift
.2 Structural backfill within and around building foundation - every lift for every stage of construction.
.4 Each layer of compacted fill to be approved by Departmental Representative before succeeding layer is placed.
.5 Provide notification when completed stages of work are ready for inspection or testing by Departmental Representative or independent inspection/testing agency.

.7 Excavated material to be disposed off site, or upon request by Departmental Representative, to designated on-site location.

.8 Use engineered fill Granular A and Granular B adjacent to structures as shown on contract drawings.

.9 Against foundations: Granular B or imported material with no stones larger than 150 mm diameter within 600 mm of structures.

.10 Around piping and buried services: 150 mm sand bedding and 300 mm sand cover.

.11 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.

.12 Do not place backfill around or over cast in place concrete within 48 hours after placing of concrete.

.13 Install drainage, insulation and filter systems in backfill as indicated.

3.8 GRADING

.1 Provide grading and drainage in accordance with details as noted on contract drawings.
.1 Grade to be gradual and consistent between finished spot elevations shown on drawings.
.2 Tolerance of grading and backfill: within 25mm of elevations shown on drawings.

3.9 FIELD QUALITY CONTROL

.1 Contractor is responsible for Quality Control. Employment of independent inspection/testing agencies does not relax responsibility to perform work in accordance with contract documents.

.2 Testing of materials and compaction of granulars as detailed in Clause 3.7 Backfill will be carried out by testing laboratory designated by Departmental Representative.
.1 Cost of testing to be paid by contractor and invoices to be submitted for reimbursement under Allowances. Costs for subsequent testing due to failure of initial test results to be borne by the contractor.

.3 Provide to designated testing agency, samples of granular materials as described in OPSS 1010, if requested by Departmental Representative, not later than one week before backfilling.

3.10 SHORTAGE AND SURPLUS

.1 Supply necessary fill to meet backfilling and grading requirements and with minimum and maximum rough grade variance.

.2 Dispose of surplus material off site.

3.11 RESTORATION

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

.2 Replace topsoil as indicated.

3.11 RESTORATION (Cont'd)

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

.4 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

3.12 CLEANING

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

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 03 10 00 Concrete Forming and Accessories

.2 03 30 00.01 Cast in Place Concrete

.3 04 03 43 Historic - Dismantling Stone Masonry

.4 04 05 00 Common Work Results for Masonry

.5 06 08 99 Carpentry

.6 31 00 00.01 Earthwork

.7 31 36 00 Gabions

.8 31 63 00 Micropiles

1.2 REFERENCES

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

.1 ASTM A 325M-13, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.

.2 ASTM A 490M-12a, Standard Specification for High Strength Steel Bolts, Classes 10.9 and 10.9.3, Structural Steel Joints Metric.

.2 Canadian Standards Association (CSA International)

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.3 CAN/CSA O86.1-09, Engineering Design in Wood.

.4 CSA O121-M1978(R2003), Douglas Fir Plywood.

.5 CSA O151-09, Canadian Softwood Plywood.

.6 CSA O153-13, Poplar Plywood.

.7 CAN/CSA-S16-14, Limit States Design of Steel Structures.

.8 CAN/CSA-S136-12, North America Specification for the Design of Cold Formed Steel Structural Members

.9 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

1.3 DEFINITIONS

.1 Bracing: temporary support installed in excavation or structure to stabilize against deformations or failure.

.2 Shoring: temporary support installed in an excavation or structure to relieve loads.

.3 Unified Hydraulic Jacking System: Jacks are locked together by a unifying system and will raise and lower in unison regardless of individual jack loading. Each unified jack is on a separate hydraulic circuit and failure of one jack will not cause pressure loss in the other jacks.

1.4 PERFORMANCE REQUIREMENTS

.1 Ensure that materials, equipment and procedures safely supporting the existing structure resist environmental forces (eg.dead,wind,live,snow,construction,etc.) during dismantling and installation; allow work to be accomplished, and minimize risk of damage to historic and archaeological elements. Provide bracing and shoring as required. Repair damage caused by construction as directed by Departmental Representative.

.2 Wall Shoring & Bracing for Foundation Wall Replacement: For removal of existing foundations walls and for installation of new concrete grade beams beneath the masonry walls,

.1 Use methods detailed on drawings.

.2 Install a Unified Hydraulic Jacking System.

.1 Operator to have minimum 10 years experience using unified hydraulic jacking systems to raise buildings.

.2 Provide constant monitoring of hydraulic apparatus during shoring operation.

.3 Shoring and bracing shall not permit movement of the existing walls.

.3 Wall Shoring & Bracing for Dismantling and

1.4 PERFORMANCE REQUIREMENTS (Cont'd)

.3 (Cont'd)
Replacement of Historic Mass Masonry Walls:
.1 For removal of existing walls and bracing of existing roof, floors and walls remaining, shoring and bracing shall not permit movement of the structure; Note: roof structure at south end will need to be jacked up approximately 20mm to compensate for settlement and final realignment of foundation walls and roof.
.2 Provide shoring and bracing system as detailed on construction drawings.

1.5 SUBMITTALS

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

.2 Submit to Departmental Representative for review:
.1 all proposed shoring, bracing, temporary framing for clause 1.4 Performance Requirements, including
.2 Unified Hydraulic Jacking System design drawings or plans.
.3 Shop drawings prior to fabrication,
.4 Erection details.

.3 Designs to be prepared by professional engineer licensed in the Province of Ontario, Canada.

.4 Submit Certificate of Conformance/ Inspection Report - Engage service of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada to inspect and approve installation of shoring and bracing prior to use.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

1.6 DELIVERY, STORAGE AND HANDLING (Cont'd)

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Structural wood members: timber parallel strand lumber (PSL) built-up timber grade No. 1 or 2.

.2 Structural steel members: to CSA G40.21, grade 350, type W.

.3 Wood connections: Canadian soft wood plywood to CSA O151 sheathing grade.

.4 Steel connections: steel gusset plates angles channel to CSA G40.21, grade 300, type W.

.5 HSS to CSA G40.21 grade 350W, or to ASTM A500 grade 50, class as noted on drawings.

.6 Nails: to CSA B111.

.7 Bolts: lag screws, nuts and washers to CAN/CSA O86.1.

.8 High-tensile bolts: to ASTM A 325M.

.9 Welding materials: CSA W59.

2.2 SOURCE QUALITY CONTROL

.1 Timber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Before starting work , verify existing conditions and variations from original contract documents and notify Departmental Representative.

3.2 PREPARATION

.1 Remove services as required. Store in area designated by Departmental Representative

.2 Remove historic windows and doors. Brace all window and door openings.

3.3 INSTALLATION

.1 Commence work following Departmental Representative approval.

.2 Obtain approval from Departmental Representative before execution, if alteration to bracing shoring system is necessary.

.3 Support individual elements that become loose during shoring & bracing installation.

.4 Erect structural timber to CAN/CSA O86.1.

.5 Erect structural steel work to CAN/CSA-S16 and CAN/CSA-S136.

.6 Weld to CSA W59.
.1 Steel inspections and testing: by testing organizations designated by Departmental Representative, paid by contractor and invoices to be submitted for payment under Allowances. Costs for subsequent testing due to failure of initial test results to be borne by contractor.
.2 Inspection organization undertaking to inspect welding shall be qualified in accordance with the requirements of CSA W178.1 Qualification Code for Welding and Inspection Organizations, and approved by the Canadian Welding Bureau.
.3 Inspector shall be Level 2 or 3 certified for CSA W178.2, and make a full

3.3 INSTALLATION (Cont'd)

.6 (Cont'd)
.3 (Cont'd)
prompt written report to the Departmental Representative, of all inspections and tests.

3.4 ADJUSTMENT

.1 Monitor bracing & shoring system performance and maintain its effectiveness by making adjustments, replacing or repairing damaged and weakened elements of system until completion of work.

.2 If adjustments exceed specified parameters are major, frequent and repetitive, notify Departmental Representative.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 31 00 00.01 Earthwork

.2 31 04 31 Historic - Shoring and Bracing

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM A 313/A 313M-13, Standard Specification for Stainless Steel Spring Wire.

.2 ASTM A 764-07(2012), Standard Specification for Metallic Coated Carbon Steel Wire, Coated at Size and Drawn to Size For Mechanical Springs.

.2 Canadian Standards Association (CSA)

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

.3 Ontario Provincial Standard Specifications (OPSS) - Ontario Ministry of Transportation

.1 OPSS-1860 - (April 2012) Geotextiles.

.2 OPSS-512 - (November 2013) Construction Specification for Installation of Gabions.

1.3 SUBMITTALS

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

.2 Submit to Departmental Representative for approval, the following samples at least 1 weeks prior to beginning Work.

.1 Minimum 2 m of roll width of geotextile.

.3 Shop drawings and product data sheets.

.1 Materials to comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

.3 Layout plans/sketches in accordance with contract drawings.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Gabion baskets:
.1 Factory fabricated with front, back, base and lid woven into a single unit. The ends of internal diaphragms to be factory connected at the base. All perimeter edges forming the basket and top to be selvedged with wire of larger diameter.
.2 Provide diaphragms of same mesh as gabion walls, when length exceeds horizontal width. Diaphragms to divide basket into equal cells of length not to exceed horizontal width.
.3 Wire mesh gabions:
.1 Wire mesh: uniform hexagonal pattern wire woven in double twist pattern with openings of approximately 80 x 100 mm, non-ravelling.
.2 Securely selvedge perimeter edges to form joints connecting selvedges with same strength as mesh body.
.3 Wire to have following dimensions:
.1 Mesh: 3.0 mm diameter.
.2 Selvedges: 3.8 mm diameter.
.3 Binding: 2.0 mm diameter.
.4 Wire: hot dip galvanized with min. coverage 244 g/m^2 to CAN/CSA G164.
.5 Interlocking wire fasteners: galvanized steel to ASTM A 764, finish 1, class 1, type 3.

.2 Stone fill:
.1 Hard, durable, abrasion resistant, capable of resisting degradation from action of wetting and drying,freezing thawing cycles.
.2 Minimum 100 mm to maximum 200 mm dimension for individual stones.
.3 Exposed faces - Select sandstone from available stockpiled material on site, or from foundation excavations, to match building

2.1 MATERIALS (Cont'd)

.2 Stone fill:(Cont'd)
.3 (Cont'd)
masonry, as approved by Departmental Representative.

.3 Geotextile filter:non-woven, OPSS Class II, Filtration opening size 75-150 microns,

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install gabions and geotextiles to lines and grades as indicated. Follow manufacturer's instructions in assembling baskets.

.2 Excavate for and backfill behind gabions in accordance with Section 31 00 00.01 Earthwork.

.3 Provide temporary shoring and bracing as required to meet OHSA requirements.

.4 Prepare foundation base for gabion wall as indicated on contract drawings. Completed base to be approved by Departmental Representative prior to commencing gabion installations.

.5 Assemble the units individually, ensuring all panels are aligned and in the correct locations. Follow manufacturers instructions for assembly and filling. All connections to be made with approved lacing wire or fasteners. Fasteners to be installed in accordance with manufacturers instructions using proper fastening tool.

.6 Ensure wire ends do not project outside the units on any exposed surface.

.7 Place baskets in position prior to filling with stones.

.8 Join adjacent baskets together as recommended by manufacturer. Join together securely along vertical and top edges of contact surfaces using lacing wire or approved fasteners.

.9 Any mesh cutting and folding to suit site conditions to be in accordance with

3.1 INSTALLATION (Cont'd)

.9 (Cont'd) manufacturer recommendations. Mesh shall be cleanly cut and surplus mesh folded back or overlapped so it can be secured in place with approved lacing wire or fasteners.

.10 For stacked installations, the upper empty baskets shall be connected to the top of the lower layer along the front and back edges of contact surfaces using lacing wire or approved fasteners.

3.2 GEOTEXTILE

.1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with securing pins or weights.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.3 Overlap each successive strip of geotextile 600 mm over previously laid strip.

.4 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.5 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

3.3 FILLING BASKETS

.1 Fill gabions with select sandstone as specified in clause 2.1 Materials,and in accordance with manufacturers instructions.

.2 Exposed faces shall be carefully hand placed to give a neat, flat compact appearance, to resemble the stone masonry of the historic building, or to the satisfaction of the Departmental Representative.

.3 On exposed faces of gabions, place stones by hand with flattest surfaces bearing against face mesh to produce satisfactory alignment and appearance.

3.3 FILLING BASKETS (Cont'd)

.4 Prepare a sample filled gabion for approval of Departmental Representative prior to commencing work. Use approved gabion fill method as minimum standard for filling the remainder of the work.

.5 Place stones manually or as approved by Departmental Representative to minimize voids.

.6 Care shall be taken when placing fill material to ensure the basket is not damaged.

.7 For wire mesh gabions, fill gabion cells in lifts not to exceed 300 mm and connected with preformed internal stiffeners or connecting wires after each lift. Internal connecting wires to be installed according to manufacturer recommendations.

.8 Overfill gabions by 25 to 50mm to allow for settlement of the fill material.

.9 Behind the gabion wall, compact the backfill material simultaneously to the same level as the filled baskets.

.10 Once the baskets are completely filled, the lids are to be pulled tight to the perimeter edge of the basket. Secure lid with tight lacing or approved fasteners along edges, ends and tops of diaphragms.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 03 30 00.01 Cast in Place Concrete

.2 31 00 00.01 Earthwork

.3 31 04 31 Historic - Shoring and Bracing

1.2 REFERENCES

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

.1 ASTM A 252-10, Standard Specification for Welded and Seamless Steel Pipe Piles.

.2 ASTM A722/A722M-12 Uncoated High Strength Bar for Prestressing Concrete.

.3 D1143-07 Standard Test Methods for Deep Foundations Under Static Axial Compressive Load.

.4 D1784-11 Standard Specification for Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly (Vinyl Chloride)(CPVC) Compounds.

.2 Canadian Standards Association (CSA International)

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

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

.3 CAN/CSA-G30.18-09, Billet-Steel Bars for Concrete Reinforcement.

.4 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

.5 A23.1-09/A23.2-09 Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practice for Concrete.

.6 A283-06 Qualification Code for Concrete Testing Laboratories.

.3 Post Tensioning Institute Publications - Recommendations for Prestressed Rock and Soil Anchors - 2004. Canadian Foundation Engineering Manual (CFEM), 4 Edition.

.4 American Society of Civil Engineers (ASCE)- ASCE 20-96 Standard Guidelines for the Design and Installation of Pile Foundations.

1.3 QUALIFICATIONS

.1 The minimum pre-qualification requirements of the micropile Contractor are as follows:
.1 The Contractor shall be fully experienced in all aspects of micropile construction and with the execution of pile load tests. The Contractor shall demonstrate that he has successfully completed at least three (3) projects in the previous five (5) years of similar scope, complexity and size.
.2 The micropile superintendent, micropile project manager and the drill and grout operators responsible for installation of the micropile system must have micropile installation experience on at least 3 successfully completed projects over the past 5 years. The Contractor shall provide resumes of key personnel who will be present full time on site (and will be substantially involved) and who will each have at least five (5) years of relevant experience. These personnel include as a minimum the micropile superintendent, the micropile project manager, the foreman driller and grouter and the Quality Verification Engineer.
.3 The micropile work shall be carried out in whole by a specialist Contractor having the qualifications stated above.

1.4 MEASUREMENT PROCEDURES

.1 Work of this section will be paid for by lump sum price.

.2 No payment will be made for micropiles that fail the load test.

.3 No payment will be made for additional work for pre-production micropiles that fail to meet the acceptance criteria.

1.5 RESTRICTIONS

.1 The Contractor shall carefully examine the site conditions regarding access to the drilling areas, positioning of equipment and all other working restrictions that are specific to the site,including:
.1 west embankment,
.2 interior locations height restrictions and door width restrictions,

1.5 RESTRICTIONS (Cont'd)

.1 (Cont'd)

.3 Historic building to be protected from damage. Be responsible for and remediate any damage to structures, property, services and installations.

.4 Temporary shoring and bracing as may be installed prior to micropile work.

.5 Fragile south wall. Limit vibrations in vicinity of wall to avoid collapse.

1.6 SUBSURFACE CONDIIONS

.1 See attached geotechnical report provided in Appendix A.

1.7 DEFINITIONS

.1 Admixture means a substance added to the grout to either control bleed and/or shrinkage, improve flowability, reduce water content, retard setting time, or resist washout.

.2 Alignment Load (AL) means a nominal load applied to a micropile during testing to keep the testing equipment correctly positioned.

.3 Apparent Free Micropile Length means the length of micropile that is not bonded to the surrounding ground, as calculated from the elastic movement data during testing.

.4 Bond Length means the length of the micropile that is bonded to the ground and capable of transferring the applied axial loads to the surrounding soil or rock.

.5 Bond-Breaker means a sleeve placed over the reinforcement steel to prevent load transfer.

.6 Casing means a steel pipe introduced during the drilling process to temporarily stabilize the drill hole and/or permanently reinforce the pile.

.7 Centralizer means a device used to centrally locate the reinforcing element(s) within the

1.7 DEFINITIONS (Cont'd)

.7 (Cont'd)
casing and/or borehole to ensure that minimum grout cover is provided.

.8 Central Bar or Central Steel means steel reinforcing bars (solid or hollow core) or pipes used to strengthen or stiffen the pile, excluding any left-in drill rod or casing.

.9 Coupler means a device used to transmit load from one partial length of reinforcement to another.

.10 Creep Movement means the movement that occurs during the creep test of a micropile under a constant load.

.11 Design Engineer means the Engineer retained by the Contractor who produces the Working Drawings and designs the pile load test system(s).

.12 Design Load (DL) means the anticipated final maximum service load in the micropile. The design load includes appropriate factors to ensure that the overall structure has adequate capacity for its intended use.

.13 Duplex Drilling means a drilling system involving the simultaneous rotation and advancement of (inner) drill rod and (outer) drill casing in which the cuttings from the inner drill rod exit the borehole via the annulus between the rod and the casing.

.14 Elastic Movement means the recoverable movement measured during a micropile load test.

.15 Encapsulation means a corrugated or deformed tube protecting the reinforcing steel against corrosion.

.16 Engineer means a professional engineer, licensed by Professional Engineers Ontario to practice in the Province of Ontario.

.17 Free (Unbonded) Length means the designed length of the micropile that is not bonded to

1.7 DEFINITIONS (Cont'd)

.17 (Cont'd) the surrounding ground or grout during testing.

.18 Micropile means a bored, cast-in-place pile containing steel reinforcement, designed to accept load (axial, bending or lateral) directly, and transfer it to an appropriate bearing stratum.

.19 Maximum Test Load (TL) means the maximum load to which the micropile is subjected during testing.

.20 Overburden means a non-lithified material, natural or placed, which normally requires cased drilling methods to provide an open borehole to underlying strata.

.21 Post-Grouting means the injection of additional grout into the load transfer length of a micropile after the primary grout has set.

.22 Pre-Production Micropile means a sacrificial micropile that is not part of the final foundation system, and is load testing to verify the design and installation procedures.

.23 Primary/Structural Grout means a Portland cement based grout that is injected into the micropile hole prior to, during or after the installation of the reinforcement to provide the load transfer to the surrounding ground along the micropile and affords a degree of corrosion protection when the micropile is in compression.

.24 Production Micropile means a micropile that forms part of the final foundation support system to a structure.

.25 Proof Load Test means the incremental loading of a production micropile, recording the total movement at each increment.

.26 Quality Verification Engineer (QVE) means an engineer who has a minimum of five (5) years experience in the field of design and/or installation of micropiling or alternatively

1.7 DEFINITIONS (Cont'd)

.26 (Cont'd) has demonstrated expertise by providing satisfactory quality verification services for the work at a minimum of two (2) projects of similar scope to the Contract. The Quality Verification Engineer shall be retained by the Contractor to certify that the work is in general conformance with the Contract Documents and to issue Certificate(s) of Conformance.

.27 Reinforcement Steel means the steel component(s) of the micropile which accepts and/or resists applied loadings. This includes the central steel bar and the permanent steel casing on this project.

.28 Residual Movement means the non-elastic (non-recoverable) movement of a micropile measured during load testing.

.29 Rotary Percussive Duplex (Concentric) means a drilling system involving the simultaneous rotation, percussion and advancement of an (inner) drill rod and an (outer) drill casing in which the cuttings from the inner drill rod exit the borehole via the annulus between rod and casing.

.30 Rotary Percussive Duplex (Eccentric or Lost Crown) means a drilling system involving the simultaneous rotation, percussion and advancement of an (inner) drill rod combined with an eccentric underreaming bit and an (outer) drill casing in which the cuttings from the inner drill rod exit the borehole via the ann ulus between rod and casing. Previously called the Overburden Drilling Eccentric (ODEX) System.

.31 Sheathing means a smooth or corrugated piping or tubing that protects the reinforcing steel against corrosion.

.32 Spacer means a device used to separate elements of a multiple-element steel bar reinforcement.

1.7 DEFINITIONS (Cont'd)

.33 Tremie Grouting means the placing of grout in a borehole via a grout pipe introduced to the bottom of the hole.

.34 Ultimate Grout-To-Ground Bond Value means the estimated ultimate geotechnical unit grout-to-ground bond strength selected for use in design.

.35 Verification Load Test means a pile load test performed to verify the design of the pile system and the construction methods proposed, prior to installation of production piles.

1.8 DESIGN REQUIREMENTS

.1 The Contractor shall be responsible for the design of the pile load testing set-up including the reaction system(s), the reaction piles/ground anchors and all loading frame connections.

.2 The reaction piles/ground anchors and the reaction system(s) shall be designed to safely withstand the applied loads specified in the Contract Documents.

.3 The design assumptions of the reaction piles/ground anchors, the reaction system(s) and all loading frame connections shall accurately represent the subsurface conditions prevalent at the site.

.4 Except as specified herein, the reaction piles/ground anchors shall be designed in accordance with the design recommendations of the Post Tensioning Institute Recommendations for Prestressed Rock and Soil Anchors (2004).

1.9 SUBMITTALS

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

.2 Site survey:
.1 One week prior to commencing any work associated with the micropile operation, the

1.9 SUBMITTALS (Cont'd)

.2 Site survey:(Cont'd)
.1 (Cont'd)
Contractor shall submit to the Departmental Representative,
.1 a condition survey of property and structures that may be affected by the work.
.2 a Total Station Survey of all structural elements of the existing building, to facilitate the layout of the micropiles accurately.

.3 Product data: submit manufacturer's printed product literature, specifications and datasheets for all components.

.4 Working Drawings:
.1 Bearing the seal and signature of the Design Engineers who have a minimum of five years of experience on projects of a similar nature and scope to the required work.
.2 Information on the Working Drawings shall describe and illustrate the complete details of the micropile installations for each stage of construction, as well as the micropile testing equipment, test set-up, and reaction system(s) for the pre-production test micropile(s).
.3 The Contractor shall review the details of the micropile design as shown in the Contract Drawings and Documents and shall verify and detail any proposed modifications accordingly.
.4 The information on the Working Drawings shall include:
.1 Plans, Elevations and Sections at each pile cap location, indicating:
.1 micropile spacing
.2 orientation
.3 minimum total micropile length
.4 casing plunge length
.5 uncased bond length
.6 design load
.7 identification number for each micropile
.8 micropile components and details
.2 Materials

1.9 SUBMITTALS (Cont'd)

.4 Working Drawings:(Cont'd)

.4 (Cont'd)

.1 physical properties of reinforcement steel (central bar and casing)

.2 physical properties of pile top attachment

.3 bond length grout materials and mix proportions

.4 corrosion protection material physical/mechanical properties

.3 Micropile Installation

.1 methods

.2 restrictions

.3 major equipment

.4 sequence of pile installation and coordination of work

.5 procedures for monitoring micropile installation

.6 type, number and location of pre-production load tests

.7 method of evaluation of load test results

.4 Micropile Construction Details

.1 Detailed description of the proposed construction procedures.

.2 Method of layout of the micropile holes in the concrete slabs to avoid potential conflicts with the existing building foundations and underground services.

.3 Method of drilling the micropile holes and maintaining the stability of the holes, as well as the existing structure components, during the micropile installation.

.4 Method to be employed to penetrate the overburden, including the cobbles, and the bedrock while minimizing the surface ground movement at the adjacent structure.

.5 Detailed description of the drilling equipment and materials including drill bit/auger diameter and lengths, casing diameter and lengths, flush type, slurry materials or other materials to

1.9 SUBMITTALS (Cont'd)

.4 Working Drawings:(Cont'd)

.4 (Cont'd)

facilitate the construction of the micropile hole.

.6 Method of verifying the lengths and inclination of micropile holes.

.7 Detailed description of the grout mixing procedure and the method of grout installation and placement. The description shall include the grout pressures and details of the grout mix design.

.5 All design assumptions, loads, parameters and bond stresses used for micropile load tests.

.6 Testing records and evaluation when testing has been completed to assess bond stress and micropile movement.

.7 Layout and description of micropile hole drilling and micropile installation method(s) to prevent any contact with the existing structure and underground services. Some flexibility will be acceptable in order to avoid in-situ obstructions if encountered.

.5 Installation records including the following information:

.1 Pile identification number and location,

.2 Pile drilling duration, including date of installation and start and finish time,

.3 Pile drilling oservations, including nature of and variation in cuttings return, penetration rates for each 0.5 m of penetration, presence of boulders, cobbles or obstructions or voids, top of bedrock,

.4 Depth of drilling,and soil and rocktypes encountered, thickness of existing concrete, description of strata,depth to water table,

.5 Sequence of installation;

.6 Inclination and direction;

.7 Final tip elevation;

.8 Casing tip elevation;

.9 Cut-off elevation;

1.9 SUBMITTALS (Cont'd)

.5 (Cont'd)

.4 (Cont'd)

.10 Length and diameters of all components

.11 Bar length, Spacer/coupler details,

.12 Casing length,joint location details;

.13 Description of unusual installation conditions, voids, high grout takes,

.14 Any deviations from the intended parameters, exceptions,

.15 Grout pressures attained, where applicable

.16 Grout mix proportions, quantities pumped;

.17 Pile materials and dimensions;

.18 Micropile test records,analysis and details

.19 As-built drawings showing the location of the piles, their depth and inclination and details of their composition shall be submitted within five (5) calendar days of completion of each micropile.

.6 Micropile load testing: Submit details three (3) weeks prior to construction,including the following:

.1 Detailed description of the proposed load testing procedures.

.2 Detailed plans for the set-up method proposed for testing the pre-production micropile including all necessary drawings and details to clearly describe the test method, means for providing reaction, equipment proposed including independent reference beams for measuring micropile head movement.

.3 Calibration reports for each test jack, pressure gauge, and master pressure gauge to be used. The calibration tests shall have been performed by an independent testing laboratory and tests shall have been performed within one year of the date submitted.

.7 Mill Certificates: indicating that the steel meets the requirements for the appropriate standards for casing and central bar reinforcement, plates and shapes. The ultimate strength, yield strength, elongation, and material properties composition included. For

1.9 SUBMITTALS (Cont'd)

.7 Mill Certificates:(Cont'd)
steel pipe used as permanent casing, or core steel, the Contractor shall submit a minimum of two representative coupon tests or mill certifications on each load delivered to the project.

Where mill test certificates originate from a mill outside Canada or the United States of America the Contractor shall have the information on the mill certificate verified by testing by a Canadian laboratory. The laboratory shall be accredited by a Canadian National Accreditation Body to comply with the requirements of ISO/IEC 170 1.8 for the specific tests or type of tests required by the material standard specified on the mill test certificate. The mill test certificates shall be stamped with the name of the Canadian testing laboratory and appropriate wording stating that the material conforms to the specified material requirements. The stamp shall include the appropriate material specification number, the date and the signature of an authorized officer of the Canadian testing laboratory. One copy of the stress-strain curves representative of the lots to be used shall be submitted, together with the mill test certificates for the steel bar reinforcement.

.8 Manufacturer installation instructions.

.9 As-built Drawings
.1 Submitted in a reproducible format prior to final acceptance of work.
.2 Dated and bear the seal and signature of the Quality Verification Engineer.

.10 Certificate of Conformance.
.1 Pre-production Micropile testing: Submit Certificate of Conformance sealed, signed and dated by the Quality Verification Engineer (QVE) stating pre-production micropile has been installed and tested in general conformance with the approved Working Drawings and contract documents.
.2 Production Micropiles: Submit Certificate of Conformance sealed, signed and dated by the Quality Verification Engineer

1.9 SUBMITTALS (Cont'd)

.10 (Cont'd)
.2 Production Micropiles:(Cont'd)
(QVE) stating production micropiles have been supplied and installed in general conformance with the approved Working Drawings and contract documents.

1.10 QUALITY CONTROL

.1 The Quality Verification Engineer shall carry out Interim Inspections of the:
.1 drilling of pilot holes through the concrete slabs.
.2 drilling and casing installation (including cleanliness of casing and depth of penetration of casing into the bedrock);
.3 drilling of rock socket (including depth and diameter of the rock socket and cleaning/flushing of the rock socket);
.4 central bar reinforcement steel placement (including cleanliness of reinforcement);
.5 grouting.

.2 The above shall be carried out for each individual micropile to verify that the works are constructed in general conformance with the Contract Documents and Working Drawings.

1.11 WASTE MANAGEMENT AND DISPOSAL

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

.2 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Grout: in accordance with manufacturer's recommendations.

.1 Submit site specific grout mix design, including details of all materials to be incorporated, and the procedure for mixing and placing the grout. Submittal shall include certified test results verifying the acceptability of the proposed mix design. The acceptability of the mixes may be further verified on site prior to production.

.2 The Contractor shall provide a stable, homogenous neat cement grout or a sand-cement grout. The grout shall be free of any lumps and not contain any evidence of poor or incomplete mixing. The grout shall be mixed to the supplier's specification.

.3 Water/cement ratio by weight shall not exceed 0.45.

.4 The structural grout shall have the following properties:

.1 Minimum compressive strength of 25 MPa at 7 days,

.2 Minimum compressive strength of 35 MPa at 28 days,

.3 No segregation and a bleed of less than 2% when allowed to stand for 1 hour.

.2 Water for mixing grout: clean potable water.

.3 Admixtures: according to CSA A23.1/A23.2. Admixtures which control bleed, improve or control flowability, reduce water content, and retardset may be used only if the Quality Verification Engineer certifies that their use will not affect the properties of the grout. Admixtures shall be compatable with the grout and mixed in accordance with manufacturer's recommendations.

.4 Cement: All cement shall be Type GU General Use hydraulic cement conforming to CAN/CSA A3000-13.

.5 Fillers: Inert fillers such as sand may be used in the grout under special conditions, such as presence of large voids, to limit

2.1 MATERIALS (Cont'd)

.5 Fillers:(Cont'd)
grout take and travel, only if the Quality Verification Engineer certifies that their use will not affect the properties of the grout.

.6 Reinforcement steel:

.1 Control bar steel shall be uncoated, Dywidag Threadbar or approved equivalent,Grade 517 with miminum yield strength of 517 MPa.

.2 Couplers for the central bar reinforcement steel shall be as specified by the supplier of the central bar and shall develop at least 100% of the guaranteed minimum ultimate strength of the central bar.

.3 The steel casing shall meet the requirements of ASTM A252-10, Grade 3 with minimum yield strength of 552 MPa. New "Structural Grade" (a.k.a. "Mill Secondary") steel pipe meeting the above but without Mill Certification is acceptable for use as permanent casing provided it is free from defects (dents, cracks, tears) and is accompanied by two coupon tests per truckload confirming it meets the above requirements.

.4 Plates and shapes for pile top attachments shall according to G40.21 Grade 300W.

.5 Centralizers shall be fabricated from schedule PVC pipe or tube, steel, or material that is non-detrimental to the reinforcement steel.

2.2 EQUIPMENT

.1 All equipment for the installation, testing and monitoring of the pre-production (verification) and production micropiles shall be suitable for the intended purposes and capable of working on the site under the prevailing access, clearance and structure conditions.

.2 The equipment used shall be capable of installing and grouting the micropiles to the prescribed depths or elevations without damage to the pile materials or to the structure.

2.2 EQUIPMENT (Cont'd)

.3 All grout mixers, pumps and hoses shall be of an adequate capacity and shall be sized to enable grout to be pumped in one continuous operation, while keeping the grout in constant agitation prior to pumping, to allow grouting of an individual micropile within one hour.

.1 A high speed, high shear, colloidal grout mixer with a gauge to measure the quantity of water discharged into the mixer shall be used. A paddle mixer is not acceptable.

.2 The grout pump(s) shall be equipped with a pressure gauge to monitor grout pressures of at least 1 MPa or twice the actual grouting pressures used, whichever is greater.

.4 Micropile testing equipment

.1 shall be capable of loading the test piles to the maximum specified test load (TL) within the rated capacity.

.2 shall be capable of loading the pile in increments so that the load on the pile can be increased or decreased in accordance with the test procedures outlined in this specification.

.3 Dial gauges shall allow the measurement of total micropile movement at every load increment to be read to the nearest 0.02 mm increment. The gauge shall have sufficient travel to record the total pile movement at Test Load without the need to reset at an interim point.

.4 Loading equipment shall be calibrated within an accuracy of +/-2% immediately prior to use. Current calibration curves, dated and bearing the seal and signature of an Engineer shall be provided for all gauges and jacks.

PART 3 - EXECUTION

3.1 GENERAL

.1 The Contractor shall be responsible for the design, material, fabrication, installation and monitoring of a pre-production micropile, the production micropiles, and shall also be responsible for the pre-production micropile testing.

.2 In addition, the Contractor shall be responsible for design parameters and the design of the reaction piles/ground anchors.

.3 The drilling, grouting and micropile installation shall be carried out both inside and outside of the Stores Building and the Weld Shop.

.4 Select construction techniques and equipment that will prevent settlement, heave or movement, and to minimize any potential damage to the existing structure.

.5 Select drilling and grouting methods and be prepared with suitable equipment and procedures to penetrate through concrete slabs (both reinforced and unreinforced),overburden soils containing cobbles in places and into the bedrock, while minimizing basal heave,soil cave-in and surface ground movement so as to avoid causing an unacceptable disturbance to the structure.

.6 The Contractor shall not proceed with the installation of micropiles until approval has been given by the Departmental Representative.

.7 Control all drilling fluids, water and drill cuttings during micropile installation and upon completion, clean up and dispose off-site all excess fluids and cuttings in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

.8 Comply with environmental requirements of the contract.

3.2 SUBSURFACE CONDITIONS

.1 Geotechnical information regarding the subsurface conditions for the project is available in Appendix A. The information provided in the report can be relied upon with limitations and exceptions.

.2 Interpretations of data or opinions expressed in the reports are not warranted. Raw measured data is warranted.

.3 The Contractor must satisfy himself as to the sufficiency of the information presented for the intended construction purpose and obtain any updating or additional information as required to facilitate the foundation works.

.4 The Contractor is alerted that the micropiles will be installed in part through reinforced and unreinforced concrete slabs both inside and outside of the Stores Building and Weld Shop, overburden soils consisting of loose to dense silts, sands and gravels containing cobbles and rock fill, into the underlying sandstone bedrock.

.5 Factual information in the geotechnical report provide details of subsurface conditions on site.

3.3 HANDLING AND STORAGE

.1 Casings and central bar reinforcement shall be transported, stored and handled in such a manner that damage and distortion is prevented and that the strength and integrity are maintained.

.2 All materials, including cement, additives for grout and pile reinforcement steel (central bar and casing) shall be stored off-ground, under cover and protected against moisture and directly from the elements.

.3 Lifting of any casings and bar reinforcement shall not cause excessive bending.

3.4 MANUFACTURER'S INSTRUCTIONS

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

3.5 INSTALLATION GENERAL

.1 Install the micropiles in accordance with the diameter, orientation and length as detailed on the approved Working Drawings, and consistent with the geotechnical, logistical, environmental, and load carrying conditions of the project.

.2 Installations will be in close proximity to each other and to the existing building foundations.

.3 Carry out installations and grouting in such a manner as to prevent loss of ground,to prevent ground movement, and minimize undue impact to the overall structure.

.4 Monitor movements of the existing structure during the installation of the micropiles from commencement to completion, using established methods such as monitoring pins or electronic devices, and record and report movements and readings on a weekly or more frequent basis, with copies forwarded to the Departmental Representative.

.5 Where movements in excess of 5mm are observed, stop work, re-evaluate and modify the micropile installation method.

.6 The available work space is limited in and around the buildings.

.7 Inspect the work area to ensure that adequate access and headroom are available for the proposed equipment and procedures for the micropile installation work.

.8 Any micropiles not installed according to the specifications shall be replaced, or otherwise remediated appropriately. The cost of replacement and any required foundation

3.5 INSTALLATION GENERAL (Cont'd)

.8 (Cont'd) modifications are to be carried out at no additional cost to the contract.

3.6 DRILLING

.1 Employ drilling equipment and methods suitable for drilling through reinforced and unreinforced concrete slabs, and the anticipated subsurface conditions to be encountered without causing damage or disruption to existing structure or services.

.2 The Contractor shall use steel casing during drilling and installation. Bentonite slurries to stabilize the holes are not permitted.

.3 The micropile holes shall be drilled using duplex drilling techniques with the cuttings returning up the inside of the casing. Drilling shall be conducted in a manner that does not result in significant loss of ground beyond the hole diameter. Disposed cuttings shall not exceed 110% of the theoretical borehole volume. Take appropriate measures to prevent interconnection between drill holes.

.4 Use methods and equipment to accurately position the micropile drill holes.

3.7 REINFORCMENT STEEL

.1 Pile reinforcement steel(central bar and casing) shall be installed as specified and detailed on the stamped Working Drawings.

3.8 TOLERANCES

.1 Centreline of the installed micropiles at the finished elevation at the top of the pile cap, shall not be more than ±50 mm from the theoretical centerline as shown on the contract drawings.

.2 Top elevation of micropiles shall be within ±25 mm of the vertical design elevation.

.3 Centreline of central bar reinforcement shall not be more than 10 mm from centerline of micropile casing.

3.9 PLACEMENT

.1 Centralizers shall be provided at 2 m centre maximum spacing on the central bar reinforcement. The uppermost centralizer shall be located a maximum of 1.5 m from the top of the micropile. Centralizers shall permit the free flow of grout without misalignment of the reinforcement.

.2 The central bar reinforcement steel with centralizers shall be lowered into the stabilized, open and unobstructed drill holes to the desired depth.

.3 All pile top elevations shall be checked and adjusted to ensure all installed micropiles are installed to the planned elevations.

3.10 CONNECTIONS

.1 The pile reinforcement steel connections (splices and joints) shall be constructed to develop the required design strength of the pile section. The central bar reinforcement steel connections (splices) shall be constructed using mechanical connectors only. The casing connections shall be constructed using either mechanical connectors (e.g., threaded joints) or full penetration field welds.

.2 The proposed pile splice connections shall be submitted to the Departmental Representative for information purposes only, prior to use.

.3 Reinforcement steel central bar connections shall not be in the same plane as casing connections/splices.

.4 Secure lengths of casing and reinforcement steel central bar shall be joined in proper alignments and in such a manner that causes no eccentricity between the axes of the two joined lengths or the angle between them.

3.11 WELDING

.1 Weld in accordance with CSA W59.

.2 Welding certification of companies in accordance with CSA W47.1.

3.12 GROUTING

.1 Grout shall be installed as specified and as detailed on the stamped Working Drawings, and in accordance with manufacturers instructions and procedures.

.2 Provide systems and equipment to measure the grout quality, quantity and pumping pressure during the grouting operations.

.3 After drilling, flush the hole to remove drill cuttings and/or other loose debris.

.4 As soon as practical after completion of drilling and installation of reinforcement steel, the Contractor shall inject the grout from the lowest point of the drill hole (by tremie methods) until clean, pure grout flows from the top of the micro pile.

.5 The entire micropile shall be grouted to the design cut-off level through the tremie grout tube(s).

.6 Use grout mix that has been demonstrated to produce required strength at temperature prevailing in socket and pile in specified time.

.7 Hold pile securely in position so that it does not move during grouting and until grout has attained specified strength.

.8 Place grout in one continuous operation to fill socket and pile up to specified level.

.9 The grout within the micropiles shall be permitted to attain the minimum design strength prior to being loaded.

.10 The temperature of the grout during mixing and pumping shall be maintained between 10 C and 30 C.

.11 Include Quality Control testing to ensure grout meets strength requirements.
.1 Grout cubes shall be prepared as follows on site from the grout pumped into the micropile.

3.12 GROUTING (Cont'd)

.11 (Cont'd)
.2 Three sets of grout cubes, consisting of three cubes each, shall be made each day the grouting operations are carried out.
.3 The grout cubes shall be prepared and stored according to CSA A23.2-1B, and shall not be moved prior to demoulding.
.4 The grout cubes shall be demoulded and transported to the laboratory within 24 hours.
.5 Transport in a sealed white opaque plastic bag containing at least 250 mL of water, and maintained between 15 and 25 degrees C.
.6 Compressive strength testing shall be carried out according to CSA A23.2-1B on the grout cubes at 3, 7 and 28 days and the test results provided to the Departmental Representative.

.12 Bleed Requirements:
.1 Testing for bleed of the grout to be according to CSA 23.1-1B.
.2 Perform a trial batch prior to grouting operation, in the presence of the Quality Verification Engineer and the Departmental Representative.
.3 Grout from trial batch shall not be used unless it meets requirements as specified herein and on the Working Drawings.
.4 During grouting operation, perform bleeding measurements on grout sampled at the mixer, and record at least once daily and as requested by the Departmental Representative.
.5 Submit results to the Departmental Representative in writing at the end of each working day.
.6 Results not meeting requirements shall be reported to the Departmental Representative immediately, and grouting operation halted until the cause of the problem is identified and corrected.

3.13 TESTING OF MICROPILES

.1 Verification load tests shall be carried out on a pre-production test micropile. The micropile load testing shall be carried out

3.13 TESTING OF MICROPILES (Cont'd)

.1 (Cont'd)
according to the approved Working Drawings and as specified herein.

.2 The pre-production micropile will be included as part of the final foundation system following successful load testing.

.3 Provide a minimum of three (3) Working Days notice of when the load tests will be carried out. The load tests shall be conducted at a time mutually acceptable to the Contractor and Departmental Representative.

.4 The maximum load in the reaction piles/ground anchors shall not exceed 80% of the guaranteed minimum ultimate tensile strength of the central bar reinforcement or tendon.

.5 The testing shall not be performed until after the grout in the micropiles (or reaction piles/ground anchors) has reached a minimum 7 days unconfined compressive strength.

.6 The load tests shall be closely monitored for the duration of the test by the Quality Verification Engineer and the test results recorded and submitted to the Departmental Representative.

.7 Reaction system:
.1 for Pre-production load tests to be designed by the contractor and detailed on the Working Drawings.
.2 The number of reaction piles or ground anchors required for proper execution of axial compression testing to be determined by contractor.
.3 Reaction piles or ground anchors shall not be located within 2m of the micropile being tested.
.4 Ensure safety and structural stability of the reaction piles, ground anchors and connections to the load frame and apparatus.

.8 Reference System, testing equipment and procedures:
.1 Layout as specified herein and as detailed on Working Drawings.

3.13 TESTING OF MICROPILES (Cont'd)

.8 (Cont'd)

.2 Supply a suitable means for providing independent reference beams for measuring micropile head movement, jack, electronic load cell, dial gauges, electronic displacement transducers, anchor extension and any other hardware required to perform the load tests.

.3 Minimum 3 dial gauges or electronic displacement transducers is required with accuracy of 0.0254mm (0.001 in).Load cells accuracy with 2% of maximum test load.

.4 All reference beams to be independently supported with support firmly embedded in the ground at least 2.5m from the reaction system, and sufficiently rigid to support instrumentation such that variations in readings do not occur.

.5 Gauges, scales and reference points attached to the micropile (or reaction piles/ground anchors) mounted to prevent movement relative to the micropile(or reaction piles/ground anchors)during the test.

.6 Jacks to be secured with chains or protective housing to provide adequate protection of personnel in the event of breakage of the micropile, anchors or loading system.

.7 Perform Pre-production micropile load tests according to ASTM D-1143, superceded by procedures specified herein, indicating as a minimum the following:

.1 Type and accuracy of apparatus for measuring load.

.2 Type and accuracy of apparatus for applying load.

.3 Type and accuracy of apparatus for measuring micropile displacement.

.4 Type and capacity of reaction load system including sealed Working Drawings.

.5 Hydraulic Jack calibration report.

3.14 PRE-PRODUCTION MICROPILE LOAD TESTS

.1 Perform a pre-production load test for axial compression on a micropile to verify design assumptions and acceptability of construction

3.14 PRE-PRODUCTION MICROPILE LOAD TESTS (Cont'd)

.1 (Cont'd)
procedures prior to installation of production micropiles.

.2 Subject micropile to axial compressive load equal to 2.0 times the design load, but not necessarily to failure.

.3 Pre-production micropile load tests with dead weight or reaction piles/ground anchors shall be designed, constructed and tested by the contractor.

.4 Based on acceptable load test results, Departmental Representative will issue approval to proceed with installation of production micropiles within 3 days of completion of pre-production micropile load testing.

.5 The pre-production test pile and reaction anchors will be installed near the south-east corner of the Stores Building, at a location selected by the Departmental Representative.

.6 Employ identical drilling and grouting methods, casing and reinforcement details, depth of embedment, as proposed for production micropiles.

.7 The Quality Verification Engineer shall be responsible for logging the holes for the pre-production test pile and reaction piles/ground anchors. Subsurface conditions are required for proper interpretation of test results.

.8 Facilitate the Departmental Representative in preparing a separate log of test hole data.

.9 Restore test site area to original condition upon completion of testing as per direction of the Departmental Representative .

3.15 TEST PROCEDURES AND MEASUREMENT

.1 Load the pre-production test pile to a minimum of 200% of the design load(DL).

.2 Jack to be positioned at the beginning of the tests such that unloading and repositioning of the jack during the test will not be required.

.3 Apply an Alignment Load (AL) to the pile prior to setting the movement recording devices. AL shall be no more than 10% of the DL. Gauges shall be zeroed at the first setting of the AL.

.4 Carry out the axial load test by loading the micropile and recording the micropile head movement according to the load increments listed below. The maximum axial test load shall be as noted below.

.5 Maintain each load increment minimum duration as specified or until settlement rate is less than 1mm/log cycle of time.

.6 AXIAL COMPRESSION LOAD TEST INCREMENTS

LOAD	MIMIMUM HOLD TIME (MINUTES)
AL	-
0.15 DL	2.5
0.30 DL	2.5
0.50 DL	10
AL	10
0.15 DL	1
0.45 DL	1
0.60 DL	2.5
0.75 DL	10
0.80 DL	10
0.90 DL	10
1.00 DL	30
AL	10
0.15 DL	1
1.00 DL	1
1.15 DL	2.5
1.30 DL	2.5
1.50 DL	10
AL	10
0.25 DL	2.5
0.50 DL	2.5
0.75 DL	2.5
1.00 DL	10
1.25 DL	2.5

3.15 TEST PROCEDURES AND MEASUREMENT (Cont'd)

.6 (Cont'd)

LOAD	MIMIMUM HOLD TIME (MINUTES)
1.50 DL	2.5
1.75 DL	2.5
2.00 DL	60
1.50 DL	5
1.00 DL	5
0.50 DL	5
AL	10

AL = ALIGNMENT LOAD
DL = DESIGN LOAD 400 KN (AXIAL UNFACTORED)
TL = MAXIMUM TEST LOAD = 800 KN (2.0 DL)

.7 Movement of the test pile (or reaction piles/ground anchors) shall be measured at each load increment. The hold period shall begin as soon as the test load is applied.

.8 For each load increment, record movements at 1,2,3,4,5 and 10 minutes, and at 10 minute increments thereafter.

3.16 ACCEPTANCE CRITERIA

.1 Sustaining the axial compression load with no more than 5mm total vertical movement at the top of the pile, at 1.0 DL, measured relative to the top of the pile at the start of testing. If an AL is used, the allowable movement will be reduced by multiplying by a factor of (DL-AL)/DL.

.2 Creep rate at the end of the 2.0 DL increment not greater than 1mm/log cycle time from 1 to 10 minutes, or 2mm/log cycle rate from 5 to 60 minutes and having a linear or decreasing creep rate.

.3 Failure does not occur at the end of 2.0 DL axial load, defined as slope of the applied load vs deflection (at end of load increment) curve exceeding 0.15mm/KN.

.4 Overall micropile alignment of test micropile within 2% of vertical.

3.16 ACCEPTANCE CRITERIA (Cont'd)

.5 Test piles installed in accordance with the specifications and to proper standard of care.

3.17 FINAL SUBMISSIONS

.1 Submit as-built drawings upon completion of work indicating final conditions.
.1 for all items on the Working Drawings
.2 for any changes from original contract requirements
.3 sealed and signed by QVE.

.2 Submit installation records.

.3 Submit test records.

.4 Submit Certificates of Conformance for pre-production micropile testing, and for production micropiles.

3.18 CLEANING

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

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END