

**PART 1 - GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 02 41 19 – Selective Demolition
- .2 Section 06 10 00 - Rough Carpentry.
- .3 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .4 Section 07 92 10 - Joint Sealing.

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA):
  - .1 CSA-A179-04 (R2009) – Mortar and Grout for Unit Masonry.
  - .2 CSA-A371-04 (R2009) – Masonry Construction for Buildings.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .3 International Masonry Industry All-Weather Council (IMIAC).
  - .1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.

**1.3 ACTION AND INFORMATION SUBMITTALS**

- .1 Submit documents and samples in accordance with Section 01 33 00 - Submittal Procedures and as specified in related Sections.
- .2 Product Data: submit manufacturer's printed product literature, specifications and data sheet for each product:
  - .1 Indicate date of manufacture of product and shelf life.
  - .2 Indicate initial rate of absorption, saturation coefficient and compressive strength of bricks.
  - .3 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.
  - .4 Indicate VOC's for epoxy coatings and galvanized protective coatings and touch- up products for masonry reinforcement and connectors.
  - .5 Indicate VOC's for joint fillers and lap adhesives.
- .3 Table of anchors, cramps and dowels; include dimensions, shapes and assemblies for standard and non-standard items.
- .4 Shop drawings:
  - .1 Submit drawings for non-standard anchors, cramps and dowels.
  - .2 Provide drawings stamped and signed by professional engineer registered or licensed in Province of New Brunswick.
  - .3 Provide shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.
- .5 Samples; submit:
  - .1 One of each type of masonry accessory, anchor and reinforcing.
  - .2 Two of each type of brick.
  - .3 Two cured, and coloured samples of mortar and grout, illustrating mortar colour and colour range.
  - .4 One of each mortar constituent in 500 ml plastic container with screw top lid.

1.3 ACTION AND INFORMATION SUBMITTALS (continued)

- .5 One of each type of cleaning material in 250 ml container with safety screw caps.
- .6 One of each type of proprietary product including mortars, anchors and consolidation materials.
- .6 Scheduling: Submit dates indicating critical stages in masonry work. Include supply date, completion of shop fabrication and delivery to site.
- .7 Manufacturer's Instructions: Submit manufacturer's installation instructions.
- .8 Test Reports: Submit certified test reports showing compliance of materials with specified performance characteristics and physical properties.

1.4 QUALITY ASSURANCE - MASONRY CONTRACTOR QUALIFICATIONS

- .1 Masons: company or person specializing in masonry installations with documented experience with masonry work similar to this project.
  - .1 Masons working on this project must demonstrate ability to reproduce mock-up standards.
  - .2 Apprentices may work for limited portions of the work within their demonstrated level of competence. Apprentices shall work only under the direct supervision of the qualified masons.
- .2 The Masonry Contractor shall engage a Project Supervisor with at least 10 years documented successful experience of masonry repair of the of the types required for this project. The Project Supervisor shall be present on site, full-time, for the entire duration of the project.
- .3 The Masonry Contractor shall engage only demonstrated, specialized, skilled and competent qualified masons who shall have at least 5 years documented successful experience in masonry repair of the type required for this project. The skills of individuals will be subject to review and acceptance by the Departmental Representative. Review will include production of basic mock-ups for all types of work specified.
- .4 Apprentices may be engaged for limited portions of the work within their demonstrated level of competence. Apprentices shall work only under the direct supervision of the qualified masons.
- .5 The Masonry Contractor shall submit, prior to Award, the following documentation:
  - .1 History of the firm, demonstrating a record of successful completion of equivalent masonry repair projects: masonry type, building size, building age, and scope as this project, including a list of no less than five comparable projects, complete with contact information with respect to the Owner and Prime Consultant for each project.
  - .2 Name and curriculum vitae of the Masonry Contractor's proposed Project Supervisor, demonstrating the required level of experience in masonry repair work of the type required for this project, as noted above in Item 1.4.5.1.
  - .3 Names of the proposed masons, complete with a summary each mason's experience in masonry repair work of the type required for this project as noted above in Item 1.4.5.1, complete with a list of completed projects involving masonry repair work similar to that required for this project.

1.4 QUALITY ASSURANCE - MASONRY CONTRACTOR QUALIFICATIONS (continued)

- .4 Names of the proposed apprentices complete with documented evidence of each apprentice's registration in a formal masonry apprentice program and the name(s) of the mason(s) to whom each apprentice will be assigned.
- .6 The Departmental Representative reserves the right to reject any Masonry Contractor, proposed Project Supervisor, proposed mason or proposed apprentice if, in the opinion of the Departmental Representative, the required supportive documentation is insufficient to demonstrate the level of experience and/or skill required for the successful completion of this project.
- .7 The Project Supervisor and masons shall be required to demonstrate competence levels to the satisfaction of the Departmental Representative, before being permitted to work on the building.
- .8 If, during the project, the Project Supervisor, a mason or an apprentice, demonstrate a level of competence which is deemed by the Departmental Representative to be inadequate for the proper completion of the work, that person shall be subject to dismissal from the site, at the sole discretion of the Departmental Representative.
- .9 No personnel shall be changed during the progress of the work without written acceptance by the Departmental Representative.

1.5 QUALITY ASSURANCE – EXECUTION

- .1 Perform work in accordance with established procedures for historic masonry conservation and The Standards and Guidelines for the Conservation of Historic Places in Canada, published by Parks Canada.
- .2 Shoring and cradling, and other temporary framing work needed to support the structure shall be designed by a qualified structural engineer, familiar with historic masonry structures and licensed to practise in the Province of New Brunswick. Drawings to be stamped and signed by the aforementioned engineer.

1.6 QUALITY ASSURANCE – MOCK-UPS

- .1 General:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control, as described herein and as specified in the applicable other Sections of the Specifications.
  - .2 Construct mock-ups under supervision of Departmental Representative to demonstrate a full understanding of specified procedures, techniques and formulations are achieved before work commences.
  - .3 Construct mock-up where indicated by Departmental Representative.
  - .4 Coordinate and sequence activities accordingly.
  - .5 Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with work.
  - .6 Repeat each mock-up as many times as necessary to achieve a satisfactory result, acceptable to the Departmental Representative, at no additional cost to the Contract.

1.6 QUALITY ASSURANCE – MOCK-UPS (continued)

- .7 For each mock-up, keep detailed records of the materials, mixes, tools, equipment, environmental conditions, and procedure used so that the work of the approved mock-up can be accurately replicated in the actual work.
  
- .2 Construct mock-ups to illustrate:
  - .1 Each type of repair procedure.
  - .2 Raking out of mortar: 4 lineal metres of each type of masonry work, including horizontal and vertical joints.
  - .3 Repointing: Each type of masonry work and mortar type, including junctions at differing types of masonry and methodology to meet environmental requirements for mortar curing. Locations and extents as indicated.
  - .4 Backpointing: Each type of masonry work and mortar type, including junctions at differing types of masonry and methodology to meet environmental requirements for mortar curing. Locations and extents as indicated.
  - .5 Grouting: Each type of masonry work and mortar type, grouting at deep backpointing.
  - .6 Brick, coursing or bond pattern, joints between units, and movement control joints.
  - .7 Backup wall, connectors and accessories that comprise existing wall assembly, such as weep holes, cavity mortar stop, flashings, insulation, air-vapour barrier membrane, etc.
  - .8 Expansion joint.
  
- .3 Mock-ups will be used:
  - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
  - .2 For testing to determine compliance with performance requirements.
  - .3 Quality and degree of finish required.
  - .4 When accepted by Departmental Representative in writing, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.7 QUALITY ASSURANCE - INSPECTIONS

- .1 Make mason's workshop accessible to Departmental Representative for inspection of current work-in- progress.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
  
- .2 Deliver materials to job site in dry condition.
  
- .3 Storage and Protection:
  - .1 Keep materials dry until use except where wetting of bricks is specified. Protect from freezing and contamination.
  - .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
  - .3 Store mortar materials in a protected enclosure at a minimum temperature of 10°C as specified in Section 04 03 07 - Masonry Repointing and Repair.

1.8 DELIVERY, STORAGE, AND HANDLING (continued)

- .4 Do not use materials which have exceeded manufacturer's recommended shelf life.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
- .4 Unused metal materials are to be diverted from landfill to a metal recycling facility as approved by Departmental Representative.
- .5 Unused or damaged masonry materials must be diverted from landfill to a local facility as approved by Departmental Representative.
- .6 Identify hazardous and related materials which cannot be reused, are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Provincial Ministries of Environment and Regional Levels of Government.
- .7 Safely store materials defined as hazardous or toxic waste, including emptied containers and application apparatus, in containers or areas designated for hazardous waste and dispose of contaminants in an approved legal manner.
- .8 Place materials defined as hazardous or toxic in designated containers.
- .9 Handle and dispose of hazardous materials in accordance with applicable federal, regional and municipal regulations.
- .10 Do not dispose of unused materials into sewer systems, into lakes, streams, onto ground or in other location where they will pose health or environmental hazard
- .11 Fold up metal banding, flatten, and place in designated area for recycling.

1.10 ENVIRONMENTAL REQUIREMENTS

- .1 Ambient Conditions: assemble and erect components when temperatures are above 5°C.
- .2 Weather Requirements: to CSA-A371 to IMIAC - Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction.
- .3 Execute all mortar work when ambient temperature is between 5°C and 30°C and Relative Humidity (RH) is greater than 50% during installation and curing.
  - .1 Curing conditions for seven (7) day period:
    - .1 For the first three (3) days, maintain an ambient temperature above 10°C for the installed masonry work.
    - .2 For the final four (4) days, protect the masonry work and maintain an ambient temperature above 5°C.

1.10 ENVIRONMENTAL REQUIREMENTS (continued)

- .3 Repointing Mortars: maintain for a period of 7 days.
  - .4 Repair Mortars: maintain for a period of 12 days.
  - .5 Mortar, Masonry Work and its Constituent Materials: protect from drying wind, direct sun, rain and windchill.
- .4 Cold weather requirements, when temperature is 10°C or less:
- .1 To CSA-A371 with following requirements:
    - .1 Preheat unheated wall sections in enclosure for minimum 72 hours above 10°C, before applying mortar.
    - .2 Store cements and sands for immediate use within heated enclosure. Allow these materials to reach minimum temperature of 12°C.
    - .3 Preheat water to minimum of 20°C and maximum of 50°C.
    - .4 Maintain temperature of mortar between 5°C and 50°C until batch is used or becomes stable.
    - .5 Maintain ambient temperature of masonry work and its constituent materials between 5°C and 50°C and protect site from windchill.
    - .6 At time of use, temperature of mortar to be minimum of 20 °C and maximum of 50°C, until batch is used or becomes stable.
    - .7 Maintain temperature of masonry above 5°C for minimum of 28 days, after mortar is installed.
  - .2 When ambient conditions do not meet requirements prescribed herein, provide enclosure system around curing area to ensure that stated environmental conditions are maintained for curing period. Take precautions to avoid overheating masonry.
    - .1 The use of heated temporary enclosures to maintain temperatures above 5°C in cold weather is subject to the written approval of the material manufacturer and the Departmental Representative.
    - .2 Submit enclosure system for approval from Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures.
  - .3 Remove work exposed to lower temperatures as directed by the Departmental Representative.
- .5 Hot Weather Requirements, when temperature is 31°C or more:
- .1 Protect freshly laid masonry and mortar from drying too rapidly from direct sunlight and drying wind, by means of waterproof, non-staining coverings.
  - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
    - .1 Use protection methods acceptable to the Departmental Representative.
  - .3 Keep repaired area humid for a period of 7 days for a proper cure.
  - .4 Do not use or prepare mortar when the ambient air temperature is above 25°C at the location of the work.
- .6 Spray mortar surface at intervals and keep moist for maximum of three days after installation.

### 1.11 EXISTING CONDITIONS

- .1 Report in writing, to Departmental Representative, areas of deteriorated masonry revealed and not conforming to specified requirements of the Work.
- .2 Obtain Departmental Representative's approval and instructions of repair and replacement of masonry units before proceeding with repair work.
- .3 Location restrictions for items embedded in exterior walls: place anchors, fasteners and metallic items required to be embedded in outer wythe at least 100 mm from the inner face of the outer wythe.
- .4 Comply with the requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous material; and regarding labelling and the provision of Material Safety Data Sheets.

## **PART 2 - PRODUCTS**

### 2.1 MATERIALS

- .1 Refer to related sections for brick, related materials, accessories and material preparation procedures.
- .2 Burlap: clean, non-staining, free of printed matter, to Departmental Representative's approval.
- .3 Plumber's hemp: asbestos-free, oil- free jute rope.

### 2.2 SOURCE QUALITY CONTROL

- .1 Retain purchase orders, invoices, suppliers test certificates and documents to prove that materials used in contract meet requirements of specification.
- .2 Produce above upon request by Departmental Representative and allow free access to sources where materials were procured.

## **PART 3 - EXECUTION**

### 3.1 INSTALLERS

- .1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work.

### 3.2 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### 3.3 PROTECTION

- .1 Take necessary precautions to ensure that existing masonry sculptural carvings are not damaged during work. Provide protection of these elements. Submit protection measures to Departmental Representative for approval.
- .2 Provide safe containment, collection and removal of brick masonry dust.

3.3 PROTECTION (continued)

- .3 Ensure workers are informed of hazards and trained in procedures prior to commencing work. Ensure workers wear protective clothing during work on brick masonry.
- .4 Where cutting out of brick units produce brick masonry dust particles, take the following measures.
  - .1 Use wet techniques to eliminate dust.
  - .2 Work in sealed enclosure and maintain a negative vacuum system complete with NIOSH approved vacuum and filters.
  - .3 Prevent transmission of airborne dust particles beyond sealed enclosure.
  - .4 Remove residual dust particles daily from sealed enclosure. Maintain work areas in dust- free condition.
  - .5 Prior to commencing work, provide temporary materials and take necessary measures, to prevent ingress of dust into building. Immediately remove dust entering building and make corrective measures to Departmental Representative's approval, before continuing work.

3.4 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section.
- .2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.
- .3 Verification of Conditions: Verify that:
  - .1 Substrate conditions which have been previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to installation of brick masonry.
  - .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.
- .4 Commencing installation means acceptance of existing substrates.

3.5 PREPARATION

- .1 Inspect site with Departmental Representative and verify extent and location of mortar types prior to commencing installation.
- .2 Support:
  - .1 Construct shoring, cradling, and temporary framing work to support structure parts during removal and resetting operations, in accordance with approved drawings.
  - .2 Leave work in safe condition when work is not in progress.
- .3 Take utmost care not to damage existing building fabric. Make good any damage.

3.5 PREPARATION (continued)

- .4 Seal and protect openings, doors, windows, and adjacent areas to prevent damage and spread of construction dust, water or other materials into the building.
- .5 Cover sills and projecting courses with rigid protection, secured into joints, for duration of work.
- .6 Prevent scaffolding, hoists or construction equipment from bearing directly against masonry or roof. Provide lumber or plywood with padding of sufficient thickness to prevent damage.
- .7 Obtain Departmental Representative's approval prior to proceeding, for:
  - .1 Extent and type of masonry unit to be replaced, repaired or removed.
  - .2 Methodology and tools to be employed before commencing work.

3.6 INSTALLATION

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- .4 Prevent materials from entering or penetrating wall cavities of building. Report findings of materials to Departmental Representative before continuing with work.

3.7 CONSTRUCTION

- .1 Remove chipped, cracked and otherwise damage units, in accordance with CSA-A371, and replace with undamaged units.
  - .1 Remove, repair and replace masonry as indicated.
  - .2 Make good existing work. Use materials and detailing to match existing exposed work.
- .2 Jointing:
  - .1 Allow joints to set just enough to remove excess water, then finish joint as specified.
  - .2 Finish brick masonry joints to match existing.
- .3 Cutting:
  - .1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.
  - .2 Make brick cuts straight, clean, and free from uneven edges.
- .4 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.

3.7 CONSTRUCTION (continued)

- .5 Wetting of bricks:
  - .1 Except in cold weather, wet bricks having an initial rate of absorption exceeding 1 g/minute/1000 mm<sup>2</sup>: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.
  - .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.
- .6 Support of loads:
  - .1 Use grout to CSA-A179 where grout is used in lieu of solid units.
- .7 Provision for movement:
  - .1 Leave 6 mm space below shelf angles.
  - .2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
  - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .8 Interface with other work:
  - .1 Cut openings in existing work as indicated.
  - .2 Openings in walls: approved by Departmental Representative.
  - .3 Make good existing work. Use materials to match existing.
  - .4 Finish all existing metal elements found within masonry assemblies, or that are in contact with masonry.
- .9 Loose Steel Lintels:
  - .1 Install loose steel lintels. Centre over opening width. Provide minimum 150 mm bearing.
- .10 Expansion and Control Joints:
  - .1 Construct expansion and control joints as indicated.

3.8 SITE TOLERANCES

- .1 Tolerances in notes to Clause 5.3 of CSA-A371 apply.

3.9 FIELD QUALITY CONTROL

- .1 Perform field inspection and testing in accordance with Section 01 45 00 - Quality Control.
- .2 Inspection and testing will be carried out by Testing Laboratory designated by Departmental Representative.
  - .1 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

3.10 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .3 Clean in accordance with Section 01 74 11 – Cleaning.

3.11 PROTECTION

- .1 At end of each working day, cover unprotected work with waterproof membranes. Membranes should extend to 0.6 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
- .2 Protect masonry and other work from marking and impact damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Maintain protection for minimum three weeks.
- .4 Temporary Bracing:
  - .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
  - .2 Bracing approved by Departmental Representative.
  - .3 Brace masonry walls as necessary.
- .5 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 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.
  - .3 Air Temperature and Relative Humidity Protection: protect completed masonry as recommended in 1.10 ENVIRONMENTAL REQUIREMENTS.

**END OF SECTION**