

PART 1 - GENERAL

1.1 References

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A276-08a, Standard Specification for Stainless Steel Bars and Shapes.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A23.1-04/A23.2-04, Construction Materials and Methods of Concrete Construction.
 - .2 CSA-A371-04, Masonry Construction for Buildings.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).

1.2 Description

- .1 Work of this Section includes but is not limited to:
 - .1 Visually inspecting for deteriorated masonry.
 - .2 Raking out of masonry joints where identified on drawings.
 - .3 Preparation of masonry surface including flushing of voids and open joints and masonry wetting.
 - .4 Repointing of masonry joints, including backpointing and frontpointing where identified on drawings.
 - .5 Resetting masonry units.
 - .6 Curing mortar.

1.3 Submittals

- .1 Submit documents and samples in accordance with Section 04 05 00 "Common Work Results for Masonry".
- .2 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 35 29 - Health and Safety Requirements for materials used for the work of this Section. Indicate VOC content.

1.4 Quality Assurance

- .1 Refer to Section 04 05 00 "Common Work Results for Masonry".

1.5 Mock-Ups

- .1 Construct mock-ups in accordance with Section 01 45 00 "Testing and Quality Control" and Section 04 05 00 "Common Work Results for Masonry".
- .2 Size and location of mock-up(s) to be determined onsite by the Departmental Representative.
- .3 Construct mock-up(s) to demonstrate raking out and repointing procedure for the following, including protection and curing for the following:
 - .1 Stone and Brick Masonry:
 - .1 raking out of joints
 - .2 backpointing of joints
 - .3 front pointing of joints
 - .4 curing and environmental protection, including finishing of joints.
- .4 When accepted, mock-ups shall demonstrate the minimum standard for this work. Accepted mock-ups may remain as part of the finished work.

1.6 Delivery, Storage
and Handling

- .1 Store cementitious materials and aggregates in accordance with CSA-A23.1.
- .2 Ensure that manufacturer's labels and seals are intact upon delivery.
- .3 Remove rejected or contaminated material from site.

1.7 Protection

- .1 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.
- .2 Protect adjacent finished work against damage which may be caused by on-going work.
- .3 All methods of enclosure and protection shall be to the approval of the Departmental Representative.
- .4 Newly laid mortar shall be protected from drying winds, rain and full sunlight for a period of 14 days or until the surface is fully cured.
- .5 Provide and maintain protection for masonry walls at all times when work is suspended to prevent water from entering partially repointed masonry.
- .6 Protection shall consist of 6 mil polyethylene sheets over burlap or tarpaulins over burlap, secured to prevent lifting during windy conditions or storms.
- .7 Provide protection boards to exposed corners and all openings such as doors and windows that could be damaged by construction activities. Maintain protection for the duration of operations. Remove and dispose of protective materials as directed by the Departmental Representative.

1.8 Existing Conditions

- .1 Report in writing, to Departmental Representative areas of deteriorated masonry revealed during work. Obtain Departmental Representative approval and instructions of repair and replacement of masonry units before proceeding with repair work.

1.9 Environmental
Requirements

- .1 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.
- .2 When temperature is 10°C or less:
 - .1 Store cements, limes, premixed mortars and sands for immediate use within heated enclosure. Allow these materials to reach minimum temperature of 12°C.
 - .2 Heat water to minimum of 20°C and maximum of 25°C:
 - .1 At time of use, temperature of mortar to be minimum of 12°C and maximum of 30°C.
- .3 Obtain approval from Departmental Representative for methods of enclosure and protection. Protection requirements are specified in Section 04 05 00 "Common Work Results for Masonry".

**1.10 Waste Management
and Disposal**

- .1 Separate and recycle waste materials in accordance with Section 04 05 10 – “Common Work Results for Masonry”.
- .2 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.
- .3 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.

PART 2 - PRODUCTS

2.1 Materials

- .1 Mortar materials: to Section 04 03 08 "Historic Mortars".
- .2 Dowels for Setting Stone: to Section 04 05 19 – “Masonry Reinforcement and Connectors”.
- .3 Stainless steel anchors: to Section 04 05 19 – “Masonry Reinforcement and Connectors”.
- .4 Hardwood wedges.

2.2 Coloured Lime Mortar

- .1 Coloured lime mortar: to Section 04 03 08 "Historic Mortars".

PART 3 - EXECUTION

3.1 General

- .1 Perform work in accordance with CSA-A371. Extent of raking out and repointing is as noted on the Drawings.
- .2 Use manual raking tools to remove deteriorated mortar and ensure that no masonry units are chipped/alterd/damaged by work to remove mortar, unless otherwise specified. Tools for cutting out must be narrower than the joint; procure and use dove-tailed tipped chisels.
- .3 Tool and compact using jointing tool to force mortar into joint.
- .4 Finish joints as approved after mock-ups; except where specified otherwise.
- .5 Use suitable and pre-approved jointing tools to place and form mortar in joints.

3.2 Repointing

- .1 Joint Preparation:
 - .1 Clean all voided joints and cavities of loose material and defective mortar where identified on the drawing as "mortar joints requiring deep repointing" and as confirmed on site by the Departmental Representative.
 - .2 Clean surfaces of joints full depth of void by compressed air to remove all debris and dust without damaging texture of exposed joints. Fabricate tools, as necessary, to suit the execution of a specific problem as it is encountered in order to insure that all debris and loose mortar particles are removed.
 - .3 Where mortar is found to be defective in area of work beyond the back of deteriorated joints, rake out joint until sound mortar is encountered up to a max depth of 150 mm.
 - .4 All cutting out of joints is to be done with hammer and chisel, unless otherwise specified. Damage to masonry units adjacent to joints will not be tolerated. The use of rotary grinders is not acceptable.
 - .5 Any masonry unit damaged as a result of careless work shall be replaced at no additional cost to the Contract.
 - .6 In no area can the joints be raked for more than four levels of scaffold in height, prior to backpointing, unless approved by the Departmental Representative.
 - .7 If masonry bond is broken, remove unit and reset
- .2 Backpointing:
 - .1 Where deteriorated joints are deeper than 25 mm, backpoint joints to bring mortar to 25 mm from the face of the masonry. Where voids exist that conventional backpointing cannot fill, notify Departmental Representative for direction. In such instances, the following work will be carried out:
 - .1 Place backpointing to reach a depth of 150 mm. When mortar is firm, rake to prepare depth of backpointing such that 25 mm at face is empty for frontpointing.
 - .2 Dampen surfaces of masonry in area of work only by wetting thoroughly with water and natural fibre brush minimum 1 hour before backpointing and again immediately prior to backpointing.
 - .3 For backpointing, fill all joints full with mortar, compacting firmly into joints to ensure positive adhesion to all inner surfaces. Place mortar in layers max 100 mm thick, min 25 mm thick, allowing each layer to set to thumb print hard before placing next layer. Bring face of mortar in backpointed joint to 25 mm depth from the face of the masonry, measured from the arris of the masonry unit.
 - .4 Leave mortar in joint square and of even depth measured from masonry arris. Where joints are wide, be certain to score the surface of the backpointing in order to assist bonding of the frontpointing when it is placed.
 - .5 Prevent mortar from being placed or smeared onto face of masonry during pointing work.

3.2 Repointing

(continued)

.3 Frontpointing:

- .1 When all required repair and replacement work is complete, carry out repointing.
- .2 Dampen surfaces of masonry in area of work only by wetting thoroughly with water and natural fibre brush minimum 1 hour before frontpointing.
- .3 Dampen joints again and completely fill with mortar. Masonry units have rounded edges. Keep pointing back from surface to keep same width of joint. Avoid feather edges. Pack mortar solidly into voids and joints.
- .4 Before repointing, wash walls to be repointed and allow to dry to damp, but not wet, conditions. Ensure that all dust, mortar particles, and other debris are removed from joints and wall surfaces before repointing.
- .5 Keep masonry damp while pointing is being performed.
- .6 Do no pointing in freezing weather. See Section 04 05 00 "Common Work Results for Masonry".
- .7 Firmly pack frontpointing mortar into joint being certain that full contact with backpointing and joint edges of masonry unit is made. Fill joint with mortar to slightly overfill.
- .8 Allow mortar to set to thumb-pressed firmness, pack by pressing with slicker one last time, and then cut mortar to match approved mock-up. Mortar must be recessed by approximately 1 mm or as established during mock-up, such that the arris edge is visible. Flush cut joints or overpointing will not be allowed.
- .9 Final finish to expose aggregate texture will be completed using a stiff bristle brush which is struck, not wiped, against the surface of the finished joint.
- .10 Do not retemper pointing mortars by adding water. Retempering of mortar is only allowed by means of rewhipping it with a highspeed paddle mixer sufficiently to re plasticize the mix within 2 hours of initial mix. Retempering of mortar in this way is permissible only once.
- .11 Remove excess mortar from masonry face before it sets and clean thoroughly with water, brushes and thick cotton rags.

.4 Curing:

- .1 Moist-cure freshly pointed joints by covering with moist heavy and tight woven burlap and polyethylene sheeting. Ensure burlap and polyethylene sheeting do not come in contact with masonry.
- .2 Moist-cure back pointing and bedding mortars for 3 days minimum.
- .3 Moist-cure front pointing mortars for 7 days.
- .4 Keep burlap misted and burlap completely covered with a polyethylene draped lining to prevent drying.
- .5 Maintain a minimum ambient temperature of 10°C for the entire curing period.
- .6 Provide for off-hours and weekend work as required to maintain specified curing conditions.

.5 Protection:

- .1 Protect newly laid mortar from frost, rainfall or rapid drying conditions such as wind for 14 days.

3.3 Resetting

- .1 Repoint all void joints in backup masonry. Replace deteriorated masonry as directed by Departmental Representative. Chip and clear away core masonry as necessary to allow reset masonry unit to fit. Parge back up masonry cavity with mortar.
- .2 Install new stainless steel anchors built into backup masonry if required and as directed by Departmental Representative.
- .3 Install salvaged face masonry units in original location. When salvaged face masonry is deemed unsuitable for resetting, select from Parks Canada stock pile to suit existing condition.
- .4 Fix masonry units in correct location with water soaked hardwood wedges.
- .5 Pull out wood wedges when dried and shrunken.
- .6 Proceed with frontpointing after the bedding and backpointing mortars have moist-cured for minimum 3 days. Remove any salts that may have formed on surface of masonry with a stiff bristle nylon brush prior to front pointing.

3.4 Sounding Interior Brick

- .1 Make a complete photographic record of the condition of the wall and ceiling prior to commencement of work.
 - .1 For each set of photographs, submit to the Departmental Representative:
 - .1 A complete set of digital files on CD, clearly identified with the project name and the location.
 - .2 Each photograph to be identified with a number system corresponding to the key drawings prepared for the marking of the stonework.
- .2 Sound interior brick masonry ceiling with rubber or wooden mallet.
 - .1 Sounding to be completed by highly experienced mason or professional.
- .3 Detach loose pieces in risk of falling or separating from face of brick masonry.
- .4 Record, catalogue and store brick pieces in plastic bags clearly identifying location of host brick. Store plastic bags containing brick masonry pieces in a secure, dry location.
 - .1 Mark the brick masonry on the face which will not be visible in the final assembly using marking product which can be completely erased when required without damaging brick masonry unit:
 - .1 Ball-point pen on diachylon, attached to stone; or
 - .2 Waxless chalk directly on stone.
 - .2 Mark the brick masonry using a numbering, marking, and positioning system keyed to the prepared drawings. Submit recording and marking methodology to Departmental Representative for approval prior to use.
 - .3 Ensure that temporary marking will remain in use, handling and cleaning until the completion of the work.
 - .4 Ensure that markings and adhesive are removed without damaging units by brushing with a vegetable fibre or nylon brush used either dry or with water. Use no solvent, acid or other chemical product.

3.5 Field Quality Control

- .1 The Departmental Representative will inspect the quality of the work on a regular basis.
- .2 Notify Departmental Representative prior to raking out mortar joints.
 - .1 Contractor to provide photographic record of mortar joint condition(s) prior to commencement of work.
 - .2 For each set of photographs, submit to the Departmental Representative:
 - .1 A complete set of digital files on CD, clearly identified with the project name and the location.
 - .2 Each photograph to be identified with a number system corresponding to the key drawings prepared for the marking of the mortar joints.
- .3 Approval of raked out condition of joints, and approval of backpointing mortar, must be received in writing to the Contractor before the next procedure can proceed.
- .4 Mortar tests will be done on a weekly basis for the duration of the project. Mortar for testing will be taken randomly from a batch on site. For premixed mortar, the Contractor shall also submit to the Departmental Representative the mortar tests from the manufacturer.
- .5 Provide the Departmental Representative with a minimum of 3 business days' notice for required inspections and mock-ups.
- .6 Where work proceeds to the next phase without the approval of the Departmental Representative, the Contractor will remove all unapproved mortar at his own cost.

3.6 Cleaning

- .1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses on a daily basis.
- .2 Clean masonry with stiff, non-ferrous bristle brushes and clean water only. Chemicals are not to be used unless instructed in writing by Departmental Representative.
- .3 Remove all embedded scaffolding attachment anchors and repoint masonry joints at anchor locations as scaffolding is removed.
- .4 Remove all debris from masonry faces, ledges and sills, as scaffolding is being removed.

END OF SECTION

PART 1 - GENERAL

1.1 References

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C207-06, Specification for Hydrated Lime for Masonry Purposes.
 - .2 ASTM C109 / C109M - 11b Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
- .2 Canadian Standards Association (CSA International).
 - .1 CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .2 CSA A179-04, Mortar and Grout for Unit Masonry.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).

1.2 Submittals

- .1 Submit documents and samples in accordance with Section 04 05 00 "Common Work Results for Masonry".
- .2 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 35 29 "Health and Safety Requirements" for materials used for the work of this Section. Indicate VOC content.
- .3 Samples.
 - .1 Prior to the mixing or preparation of mortars submit for approval to the Departmental Representative:
 - .1 Aggregate
 - .2 Cements
 - .3 Lime

1.3 Environmental Requirements

- .1 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.
- .2 Comply with the environmental requirements specified in Section 04 05 00 "Common Work Results for Masonry".

1.4 Waste Management and Disposal

- .1 Separate and recycle waste materials in accordance with Section 04 05 00 "Common Work Results for Masonry".
- .2 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.
- .3 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.

PART 2 - PRODUCTS

2.1 Materials

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: to CSA A179.
- .3 Aggregate: to CSA A179. Use well graded aggregate passing 4.75 mm down to 300 micron sieve where joints are greater than 6 mm. Use aggregate passing 1.18 mm down to 300 micron sieve where 6 mm thick joints or less are indicated. Colour of sand to match existing. Contractor shall custom prepare the aggregate to suit any adjustment requests of the Departmental Representative.
- .4 Colour: dry powdered inorganic pigments, maximum quantity permitted in dry form shall not exceed 2% of the total binder volume.
 - .1 Acceptable material: Mortar pigment as manufactured by Rockwood Pigments.
 - .2 Alternative Materials: Approved by addendum in accordance with Instructions to Tenderers.
 - .3 Mortar colour to match sample approved by Departmental Representative.
- .5 Sand: to CSA A179.
 - .1 Sand is to be dried 100% and kept dry throughout period of work.
 - .2 Submit sand for approval by the Departmental Representative.
- .6 Water: potable or from approved non-potable supply.
- .7 Lime:
 - .1 Hydrated lime: ASTM C 207, type SA.
- .8 Portland Cement: CSA-A3000, white, non-staining, normal.

2.2 Properties

- .1 Bedding and backpointing mortar for stonework:
 - .1 Use site mixed type O mortar 1:2:8 white Portland cement: hydrated lime: aggregate mix.
 - .2 Range for compressive strength at 28 days: 2.0 Mpa to 3.5 Mpa.
 - .3 Range for compressive strength at 7 days: 1.2 Mpa to 2.8 MPa.
 - .1 Range for compressive strength at 7 days is 60% to 80% of 28 day compressive strength.
 - .2 7 Day compressive strength above the maximum 28 day compressive strength is considered a failure.
- .2 Frontpointing mortar for stonework:
 - .1 Use site mixed type O mortar 1:2:8 white Portland cement: hydrated lime: aggregate mix.
 - .2 Range for compressive strength: 2.0 Mpa to 3.5 Mpa at 28 days.
 - .3 Range for compressive strength at 7 days: 1.2 Mpa to 2.8 MPa.
 - .1 Range for compressive strength at 7 days is 60% to 80% of 28 day compressive strength.
 - .2 7 Day compressive strength above the maximum 28 day compressive strength is considered a failure.

2.2 Properties

(Continued)

- .3 Vicat cone penetration for stonework:
 - .1 Frontpointing mortar: 15 - 22 mm.
 - .2 Bedding and backpointing mortar: 20 - 35 mm
- .4 Allowable air content for all mortars: 8% to 12%.

2.3 Mixes

- 1 Pointing and bedding mortar:
 - .1 Correct water content and proper consistency for pointing shall be established using a Vicat Penetrometer.
 - .2 Mixes throughout project shall be regularly monitored with the Vicat Penetrometer during the duration of project to insure the consistency remains constant.

PART 3 - EXECUTION

3.1 Manufacturers' Instructions

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

3.2 Construction

- .1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.

3.3 Mixing - General

- .1 Prepare measuring boxes to ensure accurate proportioning of mortar ingredients.
 - .1 Each box to contain exact volume proportion for each specific mix ingredient.
- .2 Water content for mortar to be determined by Vicat penetration testing.
- .3 Record water quantities and use for subsequent mixes to help ensure uniformity of all subsequent mixes.
- .4 All mortar used for rebuild areas of wall building can be mixed using a paddle mixer. Only electric motor mixers are permissible. Mixers run on fossil fuels are not permitted because of fumes.
 - .1 Mixing by hand must be carried out using a high speed, 2500 rpm, drill with paddle mixer attachment. Mixing to be completed in sufficiently small container so as to allow full contact of the paddle with the mortar during the mixing process, thus insuring thorough incorporation of ingredients and air-entrainment.
 - .2 Submit mixing tools and container for approval prior to starting pointing work.
- .5 Use only power driven paddle mixers.
- .6 Mix mortar ingredients in small quantities as needed for use within periods specified. Do not re-temper.

3.3 Mixing – General

(Continued)

- .7 Mix to a consistency to meet specified performance requirements. Adjust water content as required.
- .8 Maintain uniformity of each mix throughout project.
- .9 Contractor to appoint one individual to mix mortar, for duration of project. In the event that this individual must be changed, mortar mixing must cease until the new individual is trained, and mortar mix is tested.
- .10 Thoroughly clean all mixing boards and mechanical mixing parts between batches.
- .11 Mortar must be weaker than the units it is binding.
- .12 Mortar must not contain elements detrimental to the original masonry or surrounding materials.
- .13 Use mix within two hours.

3.4 Mixing -
Cement/Lime/Sand Mortar

- .1 Begin by mixing pre-measured dry ingredients in a bucket for approximately 2 minutes, then add mix to predetermined quantity of water in a mixing bin/bucket with a digital timer. Whip mix for approximately 3 minutes. Let rest for 5 minutes and then final whip mix ingredients for 3 minutes. The mortar should easily form when spun by hand into a ball.

3.5 Cleaning

- .1 Upon completion of mortar work, remove surplus materials, rubbish, tools and equipment.
- .2 Remove mortar droppings using clean cotton cloth or sponge and water. Do not smear onto adjacent surface and avoid causing lime streaking on stone.
- .3 Clean masonry surfaces only where deemed necessary by the Departmental Representative, using low-pressure clean water and soft natural bristle brush. See Section 04 03 07 "Masonry Repointing and Repair".

3.6 Protection of
Completed Work

- .1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

3.7 Field Quality Control

- .1 Inspection and testing of mortar will be carried out by a testing laboratory designated by the Departmental Representative, to CSA A179.
- .2 Owner will pay for cost of initial inspections and tests. Contractor shall pay cost of re-inspecting and re-testing necessitated by failure to meet specification requirements on initial inspection/test.

3.7 Field Quality Control

(Continued)

- .3 Mortar tests will be done on a weekly basis for the duration of the project. Mortar for testing will be taken randomly from a batch on site.
- .4 Air content for all lime mortars, and penetration using Vicat cone penetrometer for mortars used in stonework, must be tested at the same frequency as strength tests, or more frequently as required by the Departmental Representative.
 - .1 Contractor is to own and have on site a fully functioning and well maintained Vicat penetrometer throughout the duration of the project work.

END OF SECTION

PART 1 - GENERAL

- 1.1 Quality Assurance
- .1 Refer to Section 04 05 00 – “Common Work Results for Masonry”.
 - .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.
- 1.2 Submittals
- .1 Make required submittals in accordance with Section 04 05 00 - Common Work Results for Masonry.
- 1.3 Delivery, Storage and Handling
- .1 Deliver, store, handle and protect materials in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .2 Deliver materials to job site in dry condition and in purpose made containers, packed to avoid chipping, damage or soiling, and protected from frost.
 - .3 Label each container to clearly indicate contents and location on building.
 - .4 Mark each stone quarry bed or direction of bedding and location of stone on building referenced to submittals. Use concealed permanent markings.
 - .5 Handling:
 - .1 Avoid excessive handling; protect against chipping damage, soiling or staining.
 - .2 Repairing stone damaged during handling is not permitted.
- 1.4 Waste Management and Disposal
- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .2 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material in appropriate containers on site for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

- 2.1 Replacement Stone
- .1 Stone Type 1, Face Stone: Reinstate existing face stone as per existing location and orientation. Estimated area is 27 m². Refer to photographic record taken prior to start of the work.
 - 1. Where Face Stone is missing or cannot be reinstated, use Face Stone that has fallen from Martello Tower and been retrieved and kept as a stockpile by Parks Canada. Contact Departmental Representative to access this inventory.

2.1 Replacement Stone

(Continued)

- .2 Stone Type 2, Fill Stone: for reconstruction of the inner portion of the wall at bulged areas.
 - .1 Stone Type 2 to be submitted to departmental Representative for review and approval.
 - .1 Flat, squared off and rough cut.
 - .2 Limestone and / or granite and or / local igneous stones.
 - .2 Do not use sandstone or rounded stone.
 - .3 Estimated quantity for replacement fill stone Type 2 is 6 m³.
- .3 Assume 50% of the existing core rubble can be re-used in the reconstruction of the inner portion of the bulged areas. Do not re-use rounded rubble stone in reconstruction of inner wall.
- .3 Stone Type 2-B, Fill Stone: for reconstruction of inner portion of the wall at core hole locations.
 - .1 rubble stone and mortar.
 - .2 Estimated quantity for replacement fill stone Type 2-B is 0.0855 m³.
- .4 Stone type to be approved by Departmental Representative prior to install.

2.2 Anchors, Ties and Mortar

- .1 Anchors, cramps, dowels: to Section 04 05 19 - Masonry Reinforcement and Connectors..
- .2 Mortar: refer to Section 04 03 08 - Historic Mortars.

PART 3 - EXECUTION

3.1 Preparation

- .1 Prevent absorption of ground water and exposure to rain. Rest stones in their natural bedding direction.
- .2 Handling:
 - .1 Move and lift stone units using means to prevent damage.
 - .2 Submit stone units dropped or impacted to Departmental Representative for inspection and approval.
 - .3 Do not make holes or indentations for Lewises or dogs on face or top side of stone.
 - .4 Fill holes after moving and lifting.
- .3 Indicate bedding planes of stone units. Duplicate bedding marks on usable pieces of cut stone.
- .4 Place safety devices and signs near work area, as directed.
- .5 Install shoring and supports as required.

3.2 Cutting/Sizing of Stone

- .1 Use calipers, squares and levels to measure hole for new stone.

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3.3 Moving Stones

- .1 Use approved methods to move stones horizontally and to lift stones to working level.
- .2 Move, handle and set stones without causing damage.

3.4 Re-Laying of Stone

- .1 Prepare wall to receive stone.
- .2 Obtain Departmental Representative's approval of cleaning of core before commencing inserting stone.
- .3 Mortar fill deep voids of cores to within 50 mm of back of stone in maximum 100 mm lifts. Build up thicknesses with stone pieces set in mortar to replicate original bonding pattern of core to facework.
- .4 Reconstruct masonry to ensure full embedding of grouted portion of anchors.
- .5 Drill and set anchors as specified in applicable Sections. Allow period of curing as specified in applicable sections prior to drilling.
- .6 Cut stones for connectors and support systems. Set connectors to face stone in appropriate sequence.
- .7 Clean stone by washing with water and natural fibre brush. Wet thoroughly minimum 1 hour before laying and dampen again immediately before laying.
- .8 Thoroughly dampen surfaces of core and apply mortar.
- .9 Set stones plumb, true and level in full bed of mortar and with vertical joints filled full except where otherwise specified. Set stones in same orientation as removed stones with even joint widths.
- .10 Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.
- .11 Prop and anchor projecting stones until wall above is set.
- .12 Set large stones on water soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry, do not break off.
- .13 Remove mortar dropping from face of stone before mortar is set. Sponge stone free of mortar along joints as work progresses.
- .14 Fill all voids around connectors with mortar type as specified.

3.5 Finish Pointing

- .1 Rake back mortar joints and leave ready for finish pointing as specified in Section 04 03 07 "Masonry Repointing and Repair".

END OF SECTION

PART 1 - GENERAL

1.1 Storage and Protection

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements and Section 04 05 00 - Common Work Results for Masonry.
- .2 Protect stone units and facilitate their resetting.
- .3 Store dismantled stone masonry units in the designated area on site. Protect from exposure to water, elements, and potential mechanical damage under shelter or fully covered with polyethylene. Units to be placed on wooden pallets and are not to sit directly on the deck. Should there be insufficient storage space on site, the contractor shall make arrangements to safely transport and store excess stone units off-site until required to be returned to the site. No additional costs can be claimed for off-site transport and storage.
- .4 Stone units designated for replacement with new units are to be retained for repair of other units. Unused removed stone units are to be handed over to the Departmental Representative. No stone units are to be disposed of without the Departmental Representative's approval.

1.2 Quality Assurance

- .1 Refer to Section 04 05 00 - Common Work Results for Masonry.
- .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.

1.3 Sequencing

- .1 The extent of stone masonry units that are to be removed and reinstalled is indicated on the drawings.
- .2 Mark stones and other elements or components to show their identity and position in the building. Markings to be on faces which will be concealed in the final assembly.
- .3 Prepare a chart or card-index to help locate any stone or unit when necessary, and to control availability of platforms and of work and storage areas.
- .4 Keep the chart or card-index up-to-date and, if required, produce a copy every day.
- .5 Ensure that the chart or card-index contains relevant information which will facilitate the reinstallation of each stone in its original location, as indicated on the drawings.
- .6 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.

**1.4 Waste Management
and Disposal**

- .1 Separate and recycle waste materials in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .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 in appropriate containers on site for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 Not Used

- .1 Not Used.

PART 3 - EXECUTION

3.1 Inspection

- .1 Examine areas and conditions under which work is to be performed and notify the Departmental Representative in writing of conditions detrimental to the proper and timely completion of the work.

**3.2 Examination, Marking
and Recording**

- .1 For each section of stonework, after scaffolding has been erected but prior to starting stonework removal or repair, examine the condition of the stonework to verify the exact scope of the work.
- .2 Make a complete photographic record of the condition of the wall in areas to be repaired or dismantled prior to commencement of work.
 - .1 For each set of photographs, submit to the Departmental Representative:
 - .1 A complete set of digital files on CD, clearly identified with the project name and the location.
 - .2 Each photograph to be identified with a number system corresponding to the key drawings prepared for the marking of the stonework.
 - .3 Designate a set of drawings to be used as key drawings and mark them up to provide a referencing system to identify locations of repair, disassembly and reconstruction of stone.
 - .4 Mark the stone, on the face, using marking product which can be completely erased when required without damaging masonry unit:
 - .1 Ball-point pen on diachylon, attached to stone; or
 - .2 Waxless chalk directly on stone.
 - .5 Mark the stone using a numbering, marking, and positioning system keyed to the prepared key drawings.

**3.2 Examination, Marking
and Recording**

(continued)

- .6 Ensure that temporary marking will remain in use, resistant to weather, handling and cleaning until the completion of the work or final marking of stones designated for removal.
- .7 When marking is complete obtain the Departmental Representative's acceptance and agreement with respect to the scope of work. Should the agreed upon scope of work be found to vary substantially from that indicated on the drawings, changes in the Contract Price will be made, with resulting credits or expenditures to the Contract Price accruing to the Departmental Representative.
- .8 Ensure that markings and adhesive are removed without damaging units by brushing with a vegetable fibre or nylon brush used either dry or with water. Use no solvent, acid or other chemical product.
- .9 When stones are removed for repair or replacement, transfer temporary markings to a face which will not be visible in the final assembly using permanent markers.
- .10 Make a complete photographic record of the condition of the wall prior to commencement of work.

3.3 Support

- .1 Construct shoring and cradling, and other temporary framing work needed to support the structure, or parts of it, during removal operations and in anticipation of resetting, where the structure is not to be completely dismantled, according to approved drawings, prepared by and bearing the seal and signature of the structural engineer referred to above under "Quality Assurance".

3.4 Loosening Stones

- .1 Use approved methods to loosen stones which will cause no damage either to stones or to other architectural elements.
- .2 Do not use circular millstone or saw, pneumatic chisel, steel tools exerting concentrated pressure on edges of stone. Obtain the Departmental Representative's approval for the use of power tools before commencing work.
- .3 Loosen wet masonry only when the temperature is above 5°C.
- .4 Be responsible for damage to stones being removed, adjacent stonework designated to remain and other adjacent construction. Make good such damage to the satisfaction of the Departmental Representative, at no additional cost to the Contract.

3.5 Handling

- .1 Place detached stones on wood surfaces during handling. Prevent contact with metal.
- .2 When stones are lowered to the deck, place directly on wooden platforms that will be used for storage. Distribute stored stones so as to ensure that the structural loading capacity of the deck is not exceeded. Refer to Section 01 50 00 "Temporary Facilities" for structural analysis requirements.
- .3 Ensure that sharp edges of stones do not come into contact with any hard object.
- .4 Do not place stones directly on ground or vegetation.
- .5 In freezing weather, keep stones dry.
- .6 Protect wet stones from freezing.

3.6 Temporary Storage

- .1 Place stones in a designated area of the deck for cleaning, detailed inspection and for final marking, before storage.
- .2 Ensure that stones are accessible and easily removed, and placed so as to be retrieved quickly, when required.

3.7 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 the Departmental Representative. Do not use high pressure water jet.
- .3 Remove excess mortar by hand.

3.8 Final Marking

- .1 Do final marking after cleaning, on a surface that supports good adhesion and legibility and will not be visible after resetting.
- .2 Do marking in a colour and dimensions to be legible from a distance of 2 m.
- .3 Ensure that the product used will not affect mortar-to-stone adhesion when resetting.
- .4 Ensure that the product used for marking will survive storage until resetting of stone.

3.9 Chemical Treatment

- .1 The need for chemical cleaning is not anticipated. Use chemical cleaning methods only with the prior written approval of the Departmental Representative.

3.10 Final Storage

- .1 When stones are placed under shelter, the shelter must be adequately ventilated and designed to keep condensation from forming on the internal surfaces of shelter.
- .2 Lay out the storage so that each stone will have its numbered face visible, and be accessible or removable without having to move adjacent stones.
- .3 Show the layout of stones to be stored on a record drawing and submit a copy to the Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 References

- .1 Canadian Standards Association (CSA):
 - .1 CSA-A179-04, Mortar and Grout for Unit Masonry.
 - .2 CSA-A371-04, Masonry Construction for Buildings.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

1.2 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 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.
- .3 Shop drawings: submit drawings for non-standard anchors, cramps and dowels.
- .4 Samples; submit:
 - .3 One of each mortar constituent in 500 ml plastic container with screw top lid.
 - .4 Three of each type of stone, sized and dressed to match existing stone units with direction of bedding marked. Indicate visible markings and finish.
 - .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 masonry accessory.
- .5 Scheduling: Submit dates indicating critical stages in masonry work. Include supply date, completion of shop fabrication and delivery to site.
- .6 Manufacturer's Instructions: Submit manufacturer's installation instructions.
- .7 Test Reports: Submit certified test reports showing compliance of materials with specified performance characteristics and physical properties.

**1.3 Quality Assurance -
Masonry Contractor
Qualifications**

- .1 The Masonry Contractor shall have at least 10 years documented successful experience of historic masonry repair and conservation work of similar type and scope as described in the tender documents and shall be responsible for all aspects of the masonry work for the entire duration of the project.
- .2 The Masonry Contractor shall engage a Project Supervisor with at least 10 years documented successful experience of historic masonry repair and conservation work of similar type and scope as described in the tender documents. The Project Supervisor shall be present on site, full-time, for the entire duration of the project.

1.3 Quality Assurance -
Masonry Contractor
Qualifications

(Continued)

- .3 The Masonry Contractor shall engage only demonstrated, specialized, skilled and competent certified masons who shall have at least 5 years documented successful experience in historic masonry repair and conservation work of similar type and scope as described in the tender documents. 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 certified masons. Apprentices to be registered in a formal masonry apprenticeship program.
- .5 The Masonry Contractor shall submit, prior to Award, the following documentation:
 - .1 History of the firm, demonstrating a record of successful completion of masonry conservation and repair projects of similar type and scope as described in the tender documents, including a list of no less than three 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 conservation and repair work of similar type and scope as described in the tender documents.
- .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, which will be achieved by review of mock-ups and workmanship, 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.

**1.4 Quality Assurance -
Execution**

- .1 Perform work in accordance with established procedures for historic masonry conservation and with these specifications.
- .2 Shoring and cradling, and other temporary framing work needed to support the structure shall be designed by a certified 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.

**1.5 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 Mock-ups to be prepared by individual(s) who will be completing the work.
 - .5 Coordinate and sequence activities accordingly.
 - .6 Allow 3 business days for inspection of mock-up by Departmental Representative before proceeding with work.
 - .7 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.
 - .8 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 for each type of masonry work, including horizontal and vertical joints. Size and location of mock-up to be determined onsite by the Departmental Representative.
 - .3 Repointing: Each type of masonry work, including methodology to meet environmental requirements for mortar curing. Locations and extents as indicated.
 - .4 Backpointing: Each type of masonry work and mortar type including methodology to meet environmental requirements for mortar curing. Locations and extents as indicated by Departmental Representative onsite.
 - .5 Stone, coursing or bond pattern, joints between units.
 - .6 Backup wall, connectors and accessories if required.
 - .7 Coring from the exterior to the interior to a depth of 75% of wall thickness.
 - .8 Detaching loose pieces of brick masonry in risk of falling or separating from face of brick masonry.

**1.5 Quality Assurance -
Mock-Ups**

(Continued)

- .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.
- .4 Construct mock up where indicated by Departmental Representative.
 - .1 All mock ups indicated above will be in same location.
 - .2 Coordinate and sequence activities accordingly.
- .5 Allow minimum 3 business days notification to Departmental Representative before commencing work of mock-ups so that Departmental Representative can be present during construction of mock-ups.
- .6 Allow 3 business days for inspection of mock up by Departmental Representative before proceeding with work.
- .7 Repeat mock up until satisfactory results are obtained to satisfaction of Departmental Representative.
- .8 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.

**1.6 Quality Assurance -
Inspections**

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

**1.7 Quality Assurance –
Weekly Lab Tests
on Mortar**

- .1 Contractor to include costs for provision of laboratory testing on bedding and pointing mortars on a weekly basis.
- .2 The following properties, at a minimum, will be tested:
 - .1 compressive strength.
 - .2 percentage air entrainment.
 - .3 Vicat cone penetration.
- .3 Mortar for testing purposes will be sampled directly on site. Submit one test result at 7 days and one test result at 28 days.
- .4 The testing laboratory will be designated by the Departmental Representative.

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 stone 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 12°C as specified in Section 04 03 07 - Masonry Repointing and Repair.
- .4 Do not use materials which have exceeded manufacturer's recommended shelf life.

1.9 Waste Management
and Disposal

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material for recycling.
- .3 Unused metal materials are to be diverted from landfill to a metal recycling facility as approved by Departmental Representative.
- .4 Unused or damaged masonry materials must be diverted from landfill to a local facility as approved by Departmental Representative.
- .5 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.
- .6 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.
- .7 Place materials defined as hazardous or toxic in designated containers.
- .8 Handle and dispose of hazardous materials in accordance with applicable federal, regional and municipal regulations.
- .9 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
- .10 Fold up metal banding, flatten, and place in designated area for recycling.

**1.10 Environmental
Requirements**

- .1 Execute all mortar work when ambient temperature is between 10°C and 27°C and Relative Humidity (RH) is greater than 50% during installation.
 - .1 Curing conditions for frontpointing mortars: maintain for a period of 7 days, 100% humidity.
 - .2 Curing conditions for bedding and backpointing mortars: maintain for a period of 3 days, 100% humidity.
- .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 10°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.
- .3 Remove work exposed to lower temperatures as directed by the Departmental Representative.
- .4 Hot Weather Requirements:
 - .1 Protect repair mortar from direct sunlight and wind.
 - .2 Use protection methods acceptable to the Departmental Representative.
 - .3 Keep repaired area humid for a proper cure for a period of 7 days for front pointing and 3 days for backpointing and bedding mortars.
 - .4 Do not use or prepare mortar when the ambient air temperature is above 27°C at the location of the work.

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: If required, 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 stone, related materials, accessories and material preparation procedures.

2.1 Materials

(Continued)

- .2 Burlap: Heavy, tight-woven, clean, non-staining and 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 Manufacturers' Instructions

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

3.2 Protection

- .1 Provide safe containment, collection and removal of stone and stone dust.
- .2 Ensure workers are informed of hazards and trained in procedures prior to commencing work. Ensure workers wear protective equipment during work on stone.

3.3 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 historic fabric. Make good any damage.
- .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.

3.4 Preparation

(Continued)

- .7 Obtain Departmental Representative's approval prior to proceeding, for:
 - .1 Extent and type of stone to be replaced, repaired or removed.
 - .2 Methodology and tools to be employed before commencing work.

3.5 Installation

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with joints to match existing.
- .3 Lay out 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 the building. Report findings of materials to Departmental Representative before continuing with work.

3.6 Construction

- .1 Remove, repair and replace masonry as indicated.
- .2 Jointing:
 - .1 Allow joints to set just enough to remove excess water, then finish joint as specified.
 - .2 Finish stone joints as specified in Section 04 03 07 - Stone Masonry Repointing.
- .3 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.
- .4 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.

3.7 Site Tolerances

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

3.8 Field Quality Control

- .1 Inspection and testing will be carried out by Testing Laboratory designated by Departmental Representative.

3.9 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.

3.10 Protection

- .1 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.
- .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 14 days.

END OF SECTION

**MASONRY REINFORCEMENT
AND CONNECTORS**

PART 1 - GENERAL

- 1.1 References
- .1 Canadian Standards Association (CSA):
 - .1 CSA-A370-04, Connectors for Masonry.
 - .2 CSA-A371-04, Masonry Construction for Buildings.
 - .3 CSA-S304.1-04, Design of Masonry Structures.
 - .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).
- 1.2 Submittals
- .1 Submit documents and samples in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .2 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 35 29 - Health and Safety Requirements. Indicate VOC content.
 - .3 Submit two samples for each type of masonry reinforcement and connector specified (if used).
- 1.3 Environmental Requirements
- .1 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.
- 1.4 Quality Assurance
- .1 Submit test reports and certificates in accordance with Section 04 05 00 Common Work Results for Masonry.
- 1.5 Waste Management and Disposal
- .1 Separate and recycle waste materials in accordance with Section 04 05 00 - Common Work Results for Masonry.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Connectors including dowels and cramps: to CSA-A370 and CSA-S304.1. Only connectors fabricated from stainless steel to ASTM A580, Type 304 are acceptable.
 - .2 Dowels: 100 mm long threaded dowels for setting stone: stainless steel to ASTM A580, Type 304.
 - .1 Estimated quantities: 10 – 6 mm diameter and 10 - 13 mm diameter.
 - .3 Cramps: stainless steel to ASTM A666, type 304, standard hooked bar or strap anchor, nominal 3 mm thickness x 25 mm, variable length (300 mm – 600 mm) and design to suit application.
 - .1 Estimated quantities: 10 – 300 mm length, 10 – 400 mm length and 4 600 mm length.

- 2.2 Fabrication .1 Fabricate connectors in accordance with CSA-A370.

PART 3 - EXECUTION

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

- 3.2 General .1 Install masonry connectors in accordance with CSA-A370, CSA-A371, CAN/CSA-A23.1 and CSA-S304.1 unless directed otherwise by the Departmental Representative.
- .2 Prior to placing mortar, obtain Departmental Representative's approval of placement of connectors.
- .3 Install dowels and cramps in mortar.
- .1 Install dowels and cramps in areas where additional lateral support is required as determined by onsite inspection of Departmental Representative.

- 3.3 Lateral Support and Anchorage .1 Do lateral support and anchorage in accordance with CAN3-S304 and as directed by the Departmental Representative.

END OF SECTION