

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 04 03 08 - Historic Mortars.
- .2 Section 04 03 43 - Dismantling Stone Masonry.
- .3 Section 04 05 00 - Common Work Results for Masonry.
- .4 Section 04 05 19 - Masonry Reinforcement and Connectors.

1.2 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).

1.3 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 28 - 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 "Quality Control" and Section 04 05 00 "Common Work Results for Masonry".
- .2 Construct mock-up 2.0 m x 2.0 m to demonstrate raking out and repointing procedure for the following:
 - .1 Brick Masonry:
 - .1 raking out of joints
 - .2 backpointing of joints
 - .3 finish pointing of joints
 - .2 Stone Masonry:
 - .1 raking out of joints
 - .2 backpointing of joints
 - .3 finish pointing of joints

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Store cementitious materials and aggregates in accordance with CSA-A23.1.
- .2 Store lime putty in plastic lined sealed drums. Protect from freezing.
- .3 Ensure that manufacturer's labels and seals are intact upon delivery.
- .4 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 moist-cured for a period of 5 days as specified in PART 3 - EXECUTION.
- .5 Newly laid mortar shall be protected from excessive exposure to rain and full sunlight for a period of 7 days following the 5-day wet cure period or until the surface is fully cured.
- .6 Provide and maintain protection for masonry walls at all times when work is suspended to prevent water from entering partially repointed masonry.
- .7 Protection shall consist of 6 mil. polyethylene sheets, tarpaulins or burlap, secured to prevent lifting during windy conditions or storms.
- .8 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 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 Protection requirements are specified in Section 04 05 00 "Common Work Results for Masonry".
- .4 Obtain approval from Departmental Representative for methods of enclosure and protection.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 "Construction/Demolition Waste Management and Disposal and Section 04 05 10 - Common Work Results for Masonry".

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Mortar materials: as specified in 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 tool to remove deteriorated mortar and ensure that no masonry units are chipped/altered/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 Raking joints:
 - .1 Rake out all joints required for test openings.
 - .2 Rake unsound joints free of deteriorated and loose mortar, dirt and other undesirable material.
 - .3 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, unless demonstrated to be harmless to masonry units and of real benefit to assisting with joint removal.

- .4 Where grinders are deemed appropriate by the Departmental Representative to remove existing mortar, proceed as follows:
 - .1 Grind the centre of the joint only, to a maximum depth that is equal to half of the joint width. Mortar must remain on each side of the cut. The grinders must not touch the masonry units. Joints whose widths are less than 6 mm must be "relief" cut using specialty rotary grinding tools equipped with a diamond cutting blade of small diameter (86 mm). Dremil- type rotary saw to be used by Contractor, as follows: Dremil type rotary saw: Rotostar Flexible Shaft Machine, manufactured by Suhner (tel: 706-235-8046), with the following parts:
 - .1 Rotostar Kit, Part No. 11014301
 - .2 FSM accessory, Part No. 5789102
 - .3 Angle cutting head accessory for 356 mm collete, Part No. W1 10.
 - .4 Diamond cutting blades, turbo style, 86 mm, supplied by Ogden Tools Inc, Part No.807, Attn. Gordon (Tel: 819-876-7733)
 - .2 For vertical joints, and discontinuous horizontal joints, stop sawcut 50 to 75 mm from end of joint. Do not cut into masonry units.
 - .3 The Contractor must notify the Departmental Representative to inspect the grinding, prior to removing the remaining mortar with hand tools.
 - .4 The remaining mortar must be removed using hand tools.
 - .5 Permission to use power tools will be based on the Contractor's ability to comply with the above conditions, in the mock-up.
 - .1 Only one mason will be appointed to the work of cutting mortar from joints with a grinder, and only after complete satisfaction of his/her work has been proven by demonstration. Notification must be given well in advance of any intention of the Contractor to change this appointed mason for another
 - .6 If the Contractor is found not to comply with these requirements, he will be required to remove all mortar using hand tools (non-powered), at no extra cost to the Owner.
 - .5 Clean joints to full depth of deteriorated mortar but in no case to less than 25 mm. Note that voids in vertical joints can reach as deep as 250 mm. Clean all voided joints and cavities of loose material voids as they are encountered. Fabricate tools, as necessary, to suit the execution of a specific problem as it is encountered in order to insure the all debris and loose mortar particles are removed.
 - .6 Clean by compressed air, surfaces of joints without damaging texture of exposed joints.
 - .7 Flush open joints and voids; clean open joints and voids with low pressure water and compressed air to remove all debris and dust.
 - .8 Fine joints (less than 4 mm) need not be raked out more than 10 mm, in order to reduce the danger of chipping the masonry edges. When saw cutting vertical joints, stop sawcut 50 to 75 mm from end of joint and finish by hand in order to avoid cutting into adjacent masonry.
 - .9 Any masonry unit damaged as a result of careless raking, or saw cutting, shall be replaced at no cost to the Owner.
 - .10 If masonry bond is broken, remove unit and reset.

- .2 Backpointing:
 - .1 Where cut out joints are deeper than minimum raking out depths specified, backpoint joints to bring mortar face to specified depth for raked out joints, in preparation for finish pointing. Where voids exist that conventional backpointing cannot fill, most often met at perpendicular joints, notify Departmental Representative for direction.
 - .2 Immediately prior to pointing, thoroughly wet joints and masonry units in order to control absorption.
 - .3 Allow water to soak into masonry and mortar, leaving no standing water, but the joint surface remaining damp.
 - .4 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 30 mm thick, minimum 12 mm thick, allowing each layer to set to thumb print hard before placing next layer. Bring face of mortar in backpointed joint to specified minimum depth from the face of the masonry, measured from the arris of the masonry unit.
 - .5 Leave mortar in joint square and of even depth measured from masonry arris. Where joints are wide, such as found on some sandstone walling, be certain to score the surface of the backpointing in order to assist bonding of the frontpointing when it is placed.
 - .6 Prevent mortar from being placed or smeared onto face of masonry during pointing work.

- .3 Frontpointing:
 - .1 When Departmental Representative advised that investigative opening review work is complete, carry out repointing.
 - .2 Dampen entire surface of masonry to saturate masonry for 4 to 6 hours prior to repointing.
 - .3 Dampen joints again and completely fill with mortar. If surface of masonry units has worn 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-elasticize the mix.
 - .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 for minimum of 5 days.
 - .2 Keep area and burlap misted and burlap completely covered with a polyethylene draped lining to prevent drying.
 - .3 Maintain a minimum ambient temperature of 10°C for the entire curing period.
 - .4 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 7 days following the 5-day wet cure period.

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.
- .2 Install new masonry anchors into backup masonry, as directed.
- .3 Install masonry unit.
- .4 Fix masonry units in correct location with water soaked hardwood wedges.
- .5 Backpoint to within 25 mm of front edge of masonry unit. Insert grout tubes along top joint. Allow mortar to set 24 hours. Grout the reset masonry unit or units under low pressure.
- .6 Pull out wood wedges when dried and shrunken.
- .7 Proceed with frontpointing only once grout has cured and humidity related to the grout installation has dried. Remove any salts that may have formed on surface of masonry with a stiff bristle nylon brush prior to front pointing.

3.4 FIELD QUALITY CONTROL

- .1 The Departmental Representative will inspect the quality of the work on a regular basis.
- .2 Notify Departmental Representative prior to removing mortar joints, so that before condition can be recorded. Provide clear access to all points of masonry to permit this photography to occur.
- .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 48 hours notice for required inspections.

- .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.

3.5 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 debris from masonry faces, ledges and sills, as scaffolding is being removed.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 04 03 43 – Dismantling Stone Masonry
- .2 Section 04 05 00 - Common Work Results for Masonry.
- .3 Section 04 21 13 - Brick Masonry.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C207-06, Specification for Hydrated Lime for Masonry Purposes.
 - .2 ASTM C348-08, Test Method for Flexural Strength of Hydraulic-Cement Mortars.
 - .3 ASTM C348-02, Test Method for Flexural Strength of Hydraulic-Cement Mortars.
 - .4 ASTM C940-98a(2003), Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced Aggregate-Concrete in the Laboratory.
- .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).

1.3 SUBMITTALS

- .1 Submit documents and samples in accordance with Section 01 33 00 – Submittals and 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
 - .2 For each type of mortar, submit as many samples as necessary to achieve a satisfactory colour acceptable to the Departmental Representative at no additional cost to the Contract.
 - .3 For each sample, keep detailed records of the materials and mix used that the approved mortar colour can be accurately replicated in the actual work.

- .4 The samples approved by the Departmental Representative will be the standard of acceptance for the work.

1.4 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 requires specified in Section 04 50 00 – Common Work Results for Masonry.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and 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 Sand: to CSA A179.
 - .1 Sand is to be dried 100% and kept dry throughout period of work.
 - .2 Submit sand for approval by Departmental Representative.
- .5 Water: potable or from approved non-potable supply.
- .6 Lime:
 - .1 Hydrated lime: ASTM C 207, type SA.
- .7 Portland Cement: CSA-A3000, white, non staining, normal.

2.2 PROPERTIES

- .1 Bedding and backpointing mortar for stonework:
 - .1 Use type N mortar 1:1:6 white Portland cement : lime : aggregate mix.
 - .2 Range for compressive strength: 5.5 Mpa to 8.5 Mpa.
- .2 Frontpointing mortar for stonework:
 - .1 Use type O mortar 1:2:8 white Portland cement : hydraulic lime NHL 3.5 and NHL 13 : aggregate mix.
 - .2 Range for compressive strength: 2.0 Mpa to 3.5 Mpa.
- .3 Mortar for brickwork:
 - .1 Use proprietary premixed type N mortar 1:1:6 white Portland cement : lime : aggregate mix.
 - .2 Range for compressive strength: 5.5 Mpa to 8.5 Mpa.
- .4 Vicat cone penetration for stonework:
 - .1 Frontpointing mortar: 15 - 22 mm.
 - .2 Bedding and backpointing mortar: 20 - 35 mm
- .5 Allowable air content for all cement/lime/sand mortars: 8% to 12%.

2.3 MIXES

- .1 Pointing and bedding mortar:
 - .1 Correct water content and proper consistency for pointing will be established using a Vicat Penetrometer.
 - .2 Mixes throughout project will 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

- .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 regular paddle mixer. Only electric motor mixers are permissible. Mixers run on fossil fuels are not permitted because of fumes.
 - .1 Mixing by hand for repointing mortars must be pre-approved by the Departmental Representative and 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.
 - .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 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 3.5 minutes. Let rest for 5 minutes. Final whip-mix ingredients for a final approximate 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 causing lime streaking on stone.
 - .3 Clean masonry surfaces only when deemed necessary by Departmental Representative, using low-pressure clean water and soft natural bristle brush.

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 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.
- .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 maintain Vicat penetrometer throughout the duration of the project work.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 02 41 19 - Selective Structure Demolition.
- .2 Section 04 03 42 - Replacement of Stone.
- .3 Section 04 05 00 – Common Work Results for Masonry.

1.2 STORAGE AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 "Common Product Requirements".
- .2 Protect stone units and facilitate their resetting.
- .3 Store dismantled stone masonry units in the designated area on site.
 - .1 Protect from exposure to water, elements, and potential damage under shelter or fully covered with polyethylene.
 - .2 Units to be placed on wooden pallets and are not to sit directly on the ground.

1.3 QUALITY ASSURANCE AND QUALIFICATIONS

- .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.

1.4 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. Keep the chart or card-index up-to-date and, if requested by Departmental Representative, produce a copy every day.
- .4 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.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- .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 SUPPORT

- .1 Construct temporary shoring and cradling, and other temporary framing work needed to support the exterior masonry, or parts of it, during removal operations and in anticipation of resetting.

3.3 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 advised that the existing stone has a very low compressive strength when saturated and is consequently vulnerable to damage.
- .5 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.

3.4 HANDLING

- .1 The use of Lewis bolts for handling stone is not permitted.
- .2 Place detached stones on wood surfaces during handling. Prevent contact with metal.
- .3 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 requirements.
- .4 Ensure that sharp edges of stones do not come into contact with any hard object.
- .5 Do not place stones directly on ground or vegetation.
- .6 In freezing weather, keep stones dry.
- .7 Protect wet stones from freezing.

3.5 TEMPORARY STORAGE

- .1 Place stones in a designated area of the deck.

- .2 Ensure that stones are accessible and easily removed, and placed so as to be retrieved quickly, when required.
- .3 Do marking in a colour and dimensions to be legible from a distance of 1M.
- .4 Ensure that the product used will not affect mortar-to-stone adhesion when re-setting, and will last until re-setting of stone.
- .5 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.
- .6 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.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 02 41 19 – Selective Demolition
- .2 Section 04 03 43 – Dismantling Stone Masonry
- .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 and brick.

- .2 Two cured, and coloured samples of mortar and grout, illustrating mortar colour and colour range.
- .3 One of each mortar constituent in 500 ml plastic container with screw top lid.
- .4 One of each type of cleaning material in 250 ml container with safety screw caps.
- .5 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 historic 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 historic masonry repair 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 historic 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 conservation and 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 conservation and 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.
- .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.
- .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.
- .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 Backpointing and repointing: Construct mock-up 1.5 m x 1.5 m to demonstrate raking out, backpointing and repointing procedure as per the following (imp: locations of all the tests to be identified by the Departmental Representative once the scaffold is set up):
 - .1 Raking out of joints (horizontal and vertical)
 - .2 Backpointing of joints (1 test for each type of stonework, brick work, and mortar type, including junctions at differing types of masonry and methodology to meet environmental requirements for mortar curing).
 - .3 Front pointing of joint. One test for each type of mortar and each type of stonework, brick work, including junctions at differing types of masonry and methodology to meet environmental requirements for mortar curing.
 - .2 Brick, coursing or bond pattern, joints between units, and movement control joints.
 - .3 Backup wall, connectors and accessories that comprise existing wall assembly.
- .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 Allow minimum 3 business day's notification to Departmental Representative before commencing work of mock-ups so that Departmental Representative can be present during construction of mock-ups.
- .5 Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with work.
- .6 Repeat mock-up until satisfactory results are obtained to satisfaction of Departmental Representative.
- .7 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

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

- .2 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 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 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.
- .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. Wall materials / assembly temperature must be at minimum 10°C at time of rebuilding work.
- .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 12°C and 25°C and Relative Humidity (RH) is greater than 50% during installation and curing.
 - .1 Curing conditions for seven (7) day period, 100% humidity:
 - .1 Maintain an ambient temperature above 10°C for the installed masonry work.
 - .2 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 10°C and 50°C until batch is used or becomes stable.
 - .5 Maintain ambient temperature of masonry work and its constituent materials between 10°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 10°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 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 - 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.

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 carved masonry units 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 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 stone or brick units produce stone or 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.
- .5 Moisture Protection of Exploratory Openings:
 - .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.

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 Temporary Bracing and/or Support:
 - .1 Construct shoring, cradling, and temporary framing work to support structure parts during removal and resetting operations, in accordance with approved drawings.
 - .2 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place, as required.
 - .3 Leave work in safe condition when work is not in progress.
 - .4 Bracing approved by Departmental Representative.
- .3 Take utmost care not to damage existing building 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.
- .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.
- .5 Wetting of bricks:
 - .1 Except in cold weather, wet bricks having an initial rate of absorption exceeding 1 g/minute/1000 mm²: 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.

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 Testing on all types of mortars and grouts in the project (grouting, bedding mortar, front pointing mortar and backpointing mortar) shall be carried out by a Testing Laboratory designated by the Departmental Representative and engaged by PWGSC. The laboratory tests shall occur once a week (2 tests on each type of mortar) during the entire grouting and mortaring operations throughout the project on all types of mortars and grouts. The tests shall be done with on-site fresh samples and shall include the compressive strength at 7 days and 28 days, air entrainment %age, vicat cone testing (mortar only) and flexural strength.

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 0.5 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 three weeks.

END OF SECTION

PART 1 - GENERAL**1.1 RELATED SECTIONS**

- .1 Section 04 03 08 – Historic Mortars.
- .2 Section 04 03 43 - Dismantling Stone Masonry.
- .3 Section 04 05 10 - Common Work Results for Masonry.
- .4 Section 04 21 13 - Brick Masonry.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM A580/A580M-08, Standard Specification for Stainless Steel Wire.
 - .2 ASTM A666-03, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- .2 Canadian Standards Association (CSA):
 - .1 CSA-A179-04, Mortar and Grout for Unit Masonry.
 - .2 CSA-A370-04, Connectors for Masonry.
 - .3 CSA-A371-04, Masonry Construction for Buildings.
 - .4 CSA-S304.1-04, Design of Masonry Structures.
 - .5 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).

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. Indicate VOC content.
- .3 Submit two samples for each type of masonry reinforcement and connector specified.

1.4 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.

1.5 QUALITY ASSURANCE

- .1 Submit test reports and certificates in accordance with Section 04 05 00 - Common Work Results for Masonry.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 04 05 10 - 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 for recycling in accordance with Waste Management Plan.
- .4 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.
- .5 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.
- .6 Do not dispose of waste materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Connectors including wall ties, anchors, dowels and cramps: to CSA-A370 and CSA-S304.1.
- .2 Dowels for Setting Stone: stainless steel to ASTM A580, Type 316, from 6 to 13 mm diameter, threaded, size to Departmental Representative's approval.
- .3 Cramps: stainless steel to ASTM A666, type 316, standard hooked bar or strap anchor, nominal 6 mm thickness x 40 mm, length and design to suit application.
- .4 Horizontal reinforcement:
 - .1 Single wythe and solid walls: standard duty truss type with minimum 3.66mm thick side and cross rods unless otherwise indicated; side rods centred on face cells. Acceptable material:
 - .1 BLOK-TRUS BL30 by BLOK-LOK Limited.
 - .2 DA 3100 by Dur-O-Wal Ltd.
 - .3 or approved equal.
 - .2 Provide prefabricated assemblies for corners and intersections.

- .5 Masonry ties between brick and existing structure, including columns and beams:
 - .1 Fero Cat-Tie masonry tie complete with Fero V-Tie. Space masonry ties at 400mm vertical and 600 mm horizontal.
 - .2 Alternate materials: approved by addendum in accordance with Instructions to Tenderers.
- .6 Grout: non-shrink cementitious in accordance with CSA-S304.1, CSA-A371 and CSA-A179.

2.2 FABRICATION

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

PART 3 - EXECUTION

3.1 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.

3.2 GENERAL

- .1 Install masonry connectors in accordance with CSA-A370, CSA-A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
- .2 Install horizontal reinforcing at spacing as indicated on drawings.
- .3 Prior to placing mortar and grout, obtain Departmental Representative's approval of placement of connectors.
- .4 Install dowels in stone with resin.
- .5 Install cramps in stone with grout.

3.3 BONDING AND TYING

- .1 Bond, tie and place anchors in walls in accordance with CSA-S304, CSA-A371 and as indicated.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 04 03 08 - Historic Mortars.
- .2 Section 04 05 00 - Common Work Results for Masonry.
- .3 Section 04 05 19 - Masonry Reinforcement and Connectors.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA): .1 CSA-A82-06, Fired Masonry Brick Made from Clay or Shale.

1.3 SUBMITTALS

- .1 Submit documents and samples in accordance with Section 04 05 00 – Common Work Results for Masonry.
- .2 Submit two samples of brick specified in accordance with 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 01 74 21 - Construction/Demolition Waste Management and Disposal, and 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 for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- .1 Replacement brick: Salvaged brick of size, colour and texture to match existing original brick material.
- .2 New burned clay face brick: to CSA-A82.
 - .1 Type: FBS or FBX.
 - .2 Grade: SW.
 - .3 Compressive strength: 17 MPa minimum.
 - .4 Water absorption: 2%.
 - .5 Size and appearance: to match existing brick.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's installation instructions and data sheets.

3.2 REMOVAL OF EXISTING BRICK

- .1 Verify with Departmental Representative, location and dimensions of areas of work and methods required at junctions with brick to remain.
- .2 Use mechanical hand methods of removal. Obtain Departmental Representative's approval for use of power tools before commencing work.
- .3 Carefully dismantle walls. Leave adjacent brick designated to remain clean and free of mortar, chips and cracks and ready to receive new materials.

3.3 INSTALLATION

- .1 Do masonry work in accordance with Section 04 50 00 – Common Work Results for Masonry.
- .2 Bond, coursing and jointing: to match existing.
- .3 Do tying and grouting in accordance with Section 04 05 19 – Masonry Reinforcement and Connectors.
- .4 Clean masonry as work progresses.

END OF SECTION