

**SPECIFICATIONS for  
161 Middle Street – Victoria Island  
Level 3 Roof Replacement**

*NCC Project No. DC 4260-13  
CSV Project No. 2013-0100*



**DESIGN AND CONSTRUCTION DIVISION  
ISSUED FOR TENDER**

June 2, 2014



**Architect: CSV Architects**

**Structural Engineer: Halsall Engineers**

**Roofing Consultant: BTC Group**

**Masonry Consultant: John G. Cooke & Associates LTD**

## TABLE OF CONTENTS

01 00 00	General Requirements
01 33 00	Submittal Procedures
01 35 30	Health and Safety
01 45 00	Quality Control
01 52 00	Construction Facilities
01 54 23	Temporary Scaffolding and Platforms
01 56 00	Temporary Barriers and Enclosures
01 74 19	Construction Waste Management and Disposal
01 77 00	Closeout Procedures
01 78 10	Closeout Submittals
02 41 19	Selective Demolition
04 03 07	Historic – Masonry Repointing and Repair
04 03 08	Historic - Mortaring
04 05 10	Common Work Results for Masonry
04 21 13	Brick Masonry
05 50 00	Metal Fabrications
06 10 00	Rough Carpentry
07 55 50	SBS Steel Deck Mech Fastened 2 Ply Torch
07 62 00	Sheet Metal Flashing and Trim
07 72 33	Roof Hatches
07 92 00	Joint Sealing
11 24 29	Facility Fall Protection

## 1 Summary

### 1.1 SUMMARY OF WORK

#### .1 Description of Work:

.1 Work under this contract/package: *161 Middle Street, Victoria Island - Level 3 Roof Replacement* includes but is not limited to:

- .1 Restoration, repair and re-building of brick parapets
- .2 Removal of existing roofing, metal flashings, and concrete roof slab;
- .3 Installation of structural steel and metal deck
- .4 Re-roofing and metal flashings;
- .5 Fall arrest roof anchor and cable system;
- .6 Roof hatch, guard, platform and ladder.

.2 Work covered by Contract Documents:

.1 Work included in this package: Refer to Architectural and Structural Specifications, as well as A-series, R-series and S-series of drawings.

.3 Project Specific Conditions and Schedule:

- .1 Regular tenant hours of operation for this occupied building are from 4:30pm to 12:00am.
- .2 During work related to shoring, concrete slab demolition, various welding work, installation to new steel decking and roof membrane, and all related work affecting the interior of the building, the section of the building located under the Level 3 roof will be closed to regular operations by tenant.
- .3 The Contractor shall ensure that all work noted above is completed no later than August 29th, 2014, as the building will need to be re-occupied safely by tenant and general public by that said date;
- .4 The Contractor shall ensure that all trades are available to work continuously during the construction period;
- .5 Throughout the entire duration of the work, the Contractor shall have full responsibility of ensuring protection of property and installations from all elements, including debris from demolition work, dust, precipitation/rain, etc. Protection of work and property to be ensured on a daily basis.

.4 Interpretation

- .1 The *Contract Documents* are complementary and what is required by any one shall be as binding as if required by all.
- .2 Words and abbreviations that have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.
- .3 All terminology used within these documents identifying "Engineer", "Architect", "Consultant", "NCC Engineer", "Departmental Representative" etc. shall be replaced by "*NCC Representative*" as defined in the *General Conditions*.

.5 Priority of *Contract Documents*

- .1 The priority of documents, from highest to lowest, is:
  - .1 Division 1 of the Specifications,
  - .2 Divisions 2 through 09 of the specifications
  - .3 *material* and finishing schedules (*included on plans*), and
  - .4 The drawings.
- .2 Later dated documents govern over earlier documents of the same type.
- .3 Architectural documents govern over structural documents with respect to the location of structural components.

- .6 Site Examination
  - .1 The NCC will conduct a non-mandatory job showing of the work to be contracted. Claims for additional compensation will not be entertained for any items of labor or material required to complete the work that could have been reasonably ascertained by the Site Examination.
- .7 Addenda
  - .1 Answers to questions directed to the *NCC Representative* and all amendments to the drawings or specifications during the tender period shall be issued in the form of Addenda to all. Addenda form part of the Contract Documents.
- .8 Reasonably foreseeable hidden conditions and interference
  - .1 Obtain directions from *NCC Representative* before proceeding with work if a substrate or subsurface condition or interference may be reasonably anticipated while not fully described in the *Contract Documents*.
  - .2 Redo work if directed by *NCC Representative* when such condition or interference is encountered without seeking prior direction from *NCC Representative*. Assume the costs of work required for this reason.
- 9. Designated Substances
  - 1. A copy of the designated substances survey report will be provided to the contractor as part of the project tendering documents.
- 10. Reasonably foreseeable weather and climate conditions
  - .1 The Contractor shall plan and organize the work in a manner taking into account weather and climate conditions normally affecting the location of the work at the time of during which the work is to be performed.
  - .2 The Contractor shall provide at his expense any and all temporary facilities, equipment and materials required to assure that the work is performed within the contract time under the environmental conditions required by the applicable quality standards and best industry practices.
  - .3 For the application of paragraphs 1.1.10.1 and 1.1.10.2, normal weather conditions shall be defined as conditions that the Contractor can reasonably ascertain and provide for based on the statistical information available for the period of 1981 to 2010 from the Ottawa Macdonald-Cartier International Airport published by from Environment Canada regarding climate normals and averages for the location of the work.

## **2 Quality requirements**

### **2.1 REGULATORY REQUIREMENTS**

- .1 Fees, permits, inspections, certificates and by-laws:
  - .1 Submit copies of all receipts, permits, inspection reports and certificates issued by authorities having jurisdiction to *NCC Representative*.
- .2 Building Permit:
  - .1 Contractor shall provide building permit. Also provide all other applicable permits at own expense.

## 2.2 QUALIFICATIONS

- .1 General Contractor: Contractor must have a minimum of five (5) years experience with conservation of historic buildings similar to this project. Contractor shall provide prior to contract award a chronology of projects (min. 3, including name of project, description and references which may be called) completed in the past five (5) years similar in terms of scope, related to masonry rehabilitation, roof rehabilitation and demolition of concrete slabs.
- .2 Masonry Work: Contractor shall provide prior to contract award all required qualification documents, as per Section 04 05 10 Common Work Results for Masonry. Submit proof of the qualifications of the principal mason and the masonry site superintendant to the *NCC Representative*.
- .3 Roofing Work: Contractor shall provide prior to contract award all required qualification documents, as per Section 07 55 10 SBS Steel Deck. Submit proof of the qualifications to the *NCC Representative*.
- .4 Facility Fall Protection Work: Contractor shall provide prior to contract award all required qualification documents, as per Section 11 24 29 Facility Fall Protection. Submit proof of the qualifications to the *NCC Representative*.

## 2.3 REFERENCES

- .1 Associations/organizations
  - .1 CSA: Canadian Standards Association
  - .2 FCC: Fire Commissioner of Canada
  - .3 HRSDC: Human Resources and Skills Development Canada
  - .4 NCC: The National Capital Commission
  - .5 NRC: National Research Council of Canada
  - .6 ULC: Underwriters Laboratories of Canada
- .2 Standards
  - .1 ULC-S115: ULC, ULC-S115 (Standard Method of Fire Tests of Firestop Systems)
  - .2 NBC: NRC, National Building Code (2005)
  - .3 NBC Part 8: NRC, National Building Code (2005), Part 8 (Construction Safety Measures)
  - .4 WHMIS: HRSDC, Workplace Hazardous Materials Information System
  - .5 FC 301: FCC, FC 301 (Standard for Construction Operations)
  - .6 FC 302: FCC, FC 302 (Welding and Cutting Operations)

## 2.4 QUALITY CONTROL

- .1 Refer to Section 01 45 00 – Quality Control.

## 3 Price and payment procedures

### 3.1 ALTERNATIVES AND SUBSTITUTION PROCEDURES

- .1 Content, quality and workmanship
  - .1 Substitutions: Considered when *materials*, or processes are specified with the

- term "approved equivalent" applied.
- .2 *NCC Representative* determines "approved equivalent" status.
- .2 Assume cost of additional work or modifications to the *Work* due to the use of alternatives and substitutions.
- .3 Where a product or products have been listed with proprietary names in the technical specifications, the product text description shall be understood to include the statement "and approved equivalent."

### **3.2 PAYMENT PROCEDURES**

- .1 Schedule of values
  - .1 Submit a schedule of values:
    - .1 within five (5) days of contract award,
    - .2 with every progress claim, and
    - .3 as specified and directed by *NCC Representative*.
  - .2 Include the following items, and other items as directed by *NCC Representative*:
    - .1 mobilization costs,
    - .2 individual fees, permits and licenses,
    - .3 as-built records,
    - .4 work under individual trade sections of the specification, and
    - .5 individual change orders.
  - .3 Update schedule and include current value of work performed for each line item for each schedule submission.
  - .4 Obtain *NCC Representative*'s approval of schedule prior to first progress claim.
  - .5 Use approved schedule as basis for progress claims.

## **4 Administrative requirements**

### **4.1 PROJECT MANAGEMENT AND COORDINATION**

- .1 Meetings
  - .1 Mobilization meeting
    - .1 Organize and conduct mobilization meeting within five (5) days of *Contract* award, to be attended by *Contractor*, major subcontractor(s) and *NCC Representative*.
    - .2 Review specified post-contract award submittals including schedules, security procedures and provisions for site access.
    - .3 Commence work only AFTER submittals, security procedures and provisions for site access have been confirmed and approved by *NCC Representative*.
  - .2 Progress meetings: Organize and conduct meetings, to be attended by *Contractor*, major subcontractor(s) and *NCC Representative*, as directed by *NCC Representative*.
- .2 Maintain one copy each of the following at job site:
  - .1 *Contract Documents*,
  - .2 site instructions,
  - .3 permits, licenses and inspection reports,
  - .4 reviewed copies of submittals, and
  - .5 construction progress documentation.
- .3 Execute work with least possible disruption to the normal use of premises.
- .4 Service interruptions

- 1 Notify *NCC Representative* and utility authorities 48-hours in advance of intended services interruptions.
- 2 Obtain required approvals, permits and inspections from utility authorities.
- 3 Minimize duration of interruptions.
- 4 Schedule interruptions outside standard hours of work and preferably not during workweek.

#### 4.2 CONSTRUCTION PROGRESS DOCUMENTATION

- .1 Construction schedule
  - .1 Submit schedule to *NCC Representative* within five (5) days of contract award.
  - .2 Include dates for following, other items as directed by *NCC Representative*:
    - .1 site mobilization,
    - .2 specified submittals,
    - .3 major equipment and *material* deliveries,
    - .4 commencement and completion of work in each specification trade section, and
    - .5 completion date within time required by *Contract Documents*.
- .2 As-built records
  - .1 Maintain precise and accurate as-built progress records by annotating a set of drawings and specifications set aside for this purpose.
  - .2 Update records daily to note all deviations from indicated and specified requirements, including actual location of service lines, hidden constructions and services, and *materials* installed in the finished *Work*.
  - .3 Transfer records to two sets of drawings and specifications obtained from *NCC Representative* prior to *NCC Representative*'s inspection for issuance of *Final Certificate of Completion*.

#### 4.3 SUBMITTAL PROCEDURES

- .1 Refer to Section 01 33 00 – Submittal Procedures.

#### 4.4 SPECIAL PROCEDURES

- .1 Environmental procedures
  - .1 Pressure-treated wood: Do not use wood treated with compounds containing metals including, but not limited to, copper and arsenic, unless otherwise specified or indicated.
  - .2 Waste water: Dispose of water from cleaning operations, surface run-off, and pumping as directed by *NCC Representative*.
  - .3 Solid waste disposal
    - .1 Dispose of waste materials in accordance with requirements of authorities having jurisdiction
    - .2 Submit dump slips and receipts indicating the disposal date, method, and location to *NCC Representative*.
  - .4 Protection of watercourses and trees
    1. To prevent the entry of debris into the Ottawa River, as well as to protect any surrounding trees, the contractor must install a geotextile, net or other device around the perimeter of the structure prior to the removal of the roof and drains.
- .2 Security procedures
  - .1 Confidentiality: Return of all copies of all documentation related to the project,

except records required to meet records retention requirements set out in law, when directed by *NCC Representative*.

- .3 Historic treatment procedures
  - .1 Protect relics, antiquities, items of historical or scientific interest, and similar objects found during the course of work.
  - .2 Notify *NCC Representative* immediately of any findings. Await *NCC Representative's* written instructions before proceeding with work adjacent to findings.
  - .3 Relics, antiquities, and items of historical or scientific interest shall remain the property of the Crown.

## **5 Temporary facilities and controls**

### **5.1 TEMPORARY UTILITIES**

- .1 Temporary electricity
  - .1 Existing service designated by *NCC Representative* may be used without charge.
  - .2 Ensure capacity is adequate prior to imposing additional loads.
  - .3 Connect and disconnect at own expense and responsibility.
  - .4 Do not use electricity for space heating.
- .2 Temporary fire protection: to FC 301 and FC 302.
- .3 Temporary heating
  - .1 Provide temporary heating if required during construction period.
  - .2 Obtain *NCC Representative's* approval for use of proposed heaters, heat distribution methods, venting method and location. Vent so as to prevent building staining and damage to plantations.
  - .3 Obtain *NCC Representative's* approval for temporary use of installed building heating system. Assume responsibility for care and maintenance of heating system affected by temporary use, including initial, periodical and final filter replacements.
- .4 Temporary lighting: Provide temporary lighting as required for the work and as directed by the *NCC Representative*.
- .5 Temporary telecommunication: Provide temporary telecommunications services and equipment required for own use and *NCC Representative*.
- .6 Temporary water
  - 1 Existing service designated by *NCC Representative* may be used without charge.
  - 2 Ensure capacity is adequate prior to imposing additional loads.
  - 3 Connect and disconnect at own expense and responsibility.

### **5.2 CONSTRUCTION FACILITIES**

- .1 Refer to Section 01 52 00 – Construction Facilities.

### **5.3 CONSTRUCTION AIDS**

- .1 Provide scaffolding, ladders, access equipment, conveyors, and other construction aids required for work.
- .2 Support aids independently to minimize damage to structure, finished surfaces, landscaping, and paved surfaces.



- .3 Locate, construct and maintain aids in accordance with applicable legislation.
- .4 Access control
  - .1 Fixed aids: At the end of each workday, disable, clearly mark as off-bounds and fasten down.
  - .2 Mobile aids: Lock down when not in use. Store as directed by *NCC Representative* at close of workday.

#### **5.4 TEMPORARY BARRIERS AND ENCLOSURES**

- .1 Protect adjacent work, occupants, the public, air handling systems and building interior against spread of dust, debris, harmful vapors and dirt. Use *materials* and methods that minimize inconvenience to occupants and damage to finished surfaces.
- .2 Obtain *NCC Representative's* approval of *materials* and methods including:
  - .1 area pressurization, barrier seals, and openings in barriers or in permanent enclosures,
  - .2 accommodation of activities affected by protection measures (ex. circulation, ventilation), and
  - .3 contaminant collection devices.
- .3 Provide weather-tight closures for unfinished building envelope openings, including roof, parapets, flashings, overhangs and roof hatch. Protect tenant improvements and equipment on the interior of the building from damage. General Contractor must submit a Plan to the *NCC Representative* to show how weather tight enclosures will be installed and maintained. Refer to General Conditions for insurance requirements.
- .4 Provide modular metal fencing on south and east sides of building.
- .5 Interior enclosures/protection: provide sealed dust screens to protect occupants for spread of dust, and debris.

#### **5.5 PROJECT IDENTIFICATION**

- .1 Site boards and other advertising are prohibited.
- .2 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, in both official languages or by the use of commonly-understood graphic symbols, to *NCC Representative's* approval.

### **6 Product requirements**

#### **6.1 COMMON PRODUCT REQUIREMENTS**

- .1 Use products compliant with standards referenced in applicable federal, provincial, and municipal legislation unless otherwise indicated or specified. Resolve conflict or discrepancy among standards as directed by *NCC Representative*.

#### **6.2 PRODUCT STORAGE AND HANDLING REQUIREMENTS**

- .1 Store *materials* in accordance with manufacturer instructions unless otherwise specified, and as directed by *NCC Representative*.
- .2 *NCC Representative* may designate on-site areas for storage of *material*. Equip and

maintain designated storage areas.

- .3 Refer to Section 01 52 00 – Construction Facilities, for storage and protection of materials on site.
- .4 Do not unreasonably encumber site with *materials* or equipment. Move stored *materials* or equipment that interfere with operations of other contractors or occupants as directed by *NCC Representative*.
- .5 Obtain and pay for storage or work areas off-site as needed for operations.

## **7 Execution and closeout requirements**

### **7.1 EXAMINATION AND PREPARATION**

- .1 Acceptance of conditions, site examination
  - .1 Examine site and review all information pertaining to existing conditions likely to affect the proper execution of the *Work*.
  - .2 Claims for additional compensation will not be entertained for labor or *material* required to complete the *Work* that could have been reasonably ascertained by site examination and review of existing conditions.
- .2 Construction layout
  - .1 Provide all equipment, *material* and services required to set out the *Work*, and as required by *NCC Representative* to inspect setting out of the *Work*.
  - .2 Set out the *Work* as indicated and specified. Resolve conflict or discrepancy among indicated and specified requirements as directed by *NCC Representative*.
  - .3 Submit record of setting out to *NCC Representative* if requested.

### **7.2 EXECUTION**

- .1 Work restrictions
  - .1 Standard hours of work and workweek: 0700-1800 hrs, Monday to Friday.
  - .2 For work on site outside standard hours or workweek:
    - .1 obtain permission from *NCC Representative*,
    - .2 give *NCC Representative* 48-hours notice, and
    - .3 assume extra costs of labor, *material* and equipment.
- .2 Workmanship
  - .1 Use best quality workmanship, executed by workers experienced and skilled in respective duties for which they are employed.
  - .2 Install *materials* to manufacturer instructions unless otherwise specified.
  - .3 Ensure cooperation of workers in laying out the *Work*. Maintain efficient and continuous supervision.
  - .4 Pay for redoing work that, in the *NCC Representative* 's opinion, does not meet the indicated or specified quality of workmanship.
- .3 Cutting, patching, and making good
  - .1 Perform cutting, fitting, and patching to complete the *Work*.
  - .2 Make cuts with clean, true, smooth edges. Do not use impact devices to cut concrete, masonry or tile work.
  - .3 Prepare surfaces to receive patching and finishing. Remove and replace defective and non-conforming work that is to form the base or substrate for new work.
  - .4 Perform work to avoid damage to other work.
  - .5 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to

- nearest intersection. Refinish entire assemblies to attachment points.
- .6 Fit work airtight to pipes, sleeves, ducts and conduits and, in the case of work penetrating exterior building elements, make watertight.
- .4 Firestops and smoke seals: Install as required and to ULC-S115 to provide fire resistance not less than that of surrounding fire separation.
- .5 Sleeves, hangers and inserts: Coordinate setting and packing of sleeves and supply and installation of hangers and inserts. Obtain *NCC Representative's* approval before cutting into structure.

### **7.3 CLEANING AND WASTE MANAGEMENT**

- .1 Refer to Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

### **7.4 PROTECTING INSTALLED CONSTRUCTION**

- .1 Protect adjacent property and installed construction such as hard and soft landscaping, roads, utilities, structures, and finishes, from damage including the effects of extreme heat or cold.
- .2 Restore property and construction damaged during the execution of the *Work*, or provide appropriate compensation to affected parties.
- .3 Prevent snow and ice accumulation on the *Work*.

### **7.5 CLOSEOUT PROCEDURES**

- .1 Refer to Section 01 77 00 – Closeout Procedures.

### **7.6 CLOSEOUT SUBMITTALS**

- .1 Refer to Section 01 78 10 – Closeout Submittals.

**END OF SECTION**

## Part 1 General

### 1.1 ADMINISTRATIVE

- .1 Submit to the NCC Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to the NCC Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify the NCC Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by the NCC Representative, review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the NCC Representative's review.
- .10 Keep one reviewed copy of each submission on site.

### 1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Refer to NCC GENERAL CONDITIONS
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in the province of Ontario, Canada.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow five (5) days for the NCC Representative's review of each submission.
- .6 Adjustments made on shop drawings by the NCC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the NCC Representative, prior to proceeding with Work.
- .7 Make changes in shop drawings the NCC Representative may require, consistent with Contract Documents. When resubmitting, notify the NCC Representative in writing of revisions other than those requested.
- .8 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date,
  - .2 Project title and number,
  - .3 Contractor's name and address,
  - .4 Identification and quantity of each shop drawing, product data and

- sample,
- .5 Other pertinent data.
- .9 Submissions include:
  - .1 Date and revision dates,
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor,
    - .2 Supplier,
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication,
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances,
    - .3 Setting or erection details,
    - .4 Capacities,
    - .5 Performance characteristics,
    - .6 Standards,
    - .7 Operating weight,
    - .8 Wiring diagrams,
    - .9 Single line and schematic diagrams,
    - .10 Relationship to adjacent work.
    - .10 After the NCC Representative's review, distribute copies.
    - .11 Submit six (6) prints or pdf files of shop drawings for each requirement requested in specification Sections and as the NCC Representative may reasonably request.
    - .12 Submit six (6) copies or pdf files of product data sheets or brochures for requirements requested in specification Sections and as requested by the NCC Representative where shop drawings will not be prepared due to standardized manufacture of product.
    - .13 Submit six (6) copies or pdf files of test reports for requirements requested in specification Sections and as requested by the NCC Representative.
      - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
      - .2 Testing must have been within three (3) years of date of contract award for project.
- .14 Submit six (6) copies or pdf files of certificates for requirements requested in specification Sections and as requested by the NCC Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .15 Submit six (6) copies or pdf files of manufacturer's instructions for requirements requested in specification Sections and as requested by the NCC Representative.

- .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Supplement standard information to provide details applicable to project.
- .18 If upon review by the NCC Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

### **1.3 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to the NCC Representative's business address.
- .3 Notify the NCC Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by the NCC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the NCC Representative prior to proceeding with Work.
- .6 Make changes in samples which the NCC Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

### **1.4 MOCK-UPS**

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

### **1.5 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic copy of digital photography in jpg format, standard resolution with progress statement, or as directed by the NCC Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 2 locations.
- .1 Viewpoints and their location as determined by the NCC Representative.
- .4 Frequency of photographic documentation: weekly as directed by the NCC Representative.

### **1.6 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 SECTION INCLUDES**

- .1 Health and safety considerations required to ensure that the *Commission* shows due diligence towards health and safety on construction sites, and meets the requirements laid out in the *Commission's Policy - Occupational Health and Safety for Construction*.

**1.2 RELATED SECTIONS**

- .1 Section 01 00 00 – General Requirements.
- .2 Section 01 33 00 – Submittal Procedures.

**1.3 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
  - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990 updated 2005.

**1.4 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan prior to Award of Contract. Plan shall include:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to the *NCC Representative* weekly.
- .4 Submit copies of reports or directions issued by Federal or Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 – Submittal Procedures.
- .7 *NCC Representative* will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor prior to Award of Contract. Revise Plan as appropriate and resubmit prior to Award of Contract.
- .8 *NCC Representative's* review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.



- .9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

## **1.5 FILING OF NOTICE**

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

## **1.6 SAFETY ASSESSMENT**

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

## **1.7 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with *NCC Representative* prior to commencement of Work.

## **1.8 GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 *NCC Representative* may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

## **1.9 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.10 COMPLIANCE REQUIREMENTS**

- .1 Comply with Ontario Health and Safety Act and Regulations for Construction Projects, R.S.O..

## **1.11 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise *NCC Representative* verbally and in writing.

## **1.12 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have minimum 2 years' site-related working experience specific to activities associated with similar projects.
  - .2 Have working knowledge of occupational safety and health regulations.

- .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

#### **1.13 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with *NCC Representative*.

#### **1.14 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by *NCC Representative*.
- .2 Provide *NCC Representative* with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 *NCC Representative* may stop Work if non-compliance of health and safety regulations is not corrected.

#### **1.15 POWDER ACTUATED DEVICES**

- .1 Use powder actuated devices only after receipt of written permission from *NCC Representative*.

#### **1.16 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work'

#### **1.17 DESIGNATED SUBSTANCES, VOLATILE COMPOUNDS, UNFORESEEN HAZARDS**

- .1 Notify *NCC Representative* 48 hours in advance of work in occupied areas involving designated substances (under applicable provincial legislation), hazardous substances (Canada Labor Code Part II Section 10), and before painting, or using volatile compounds.
- .2 Asbestos: Stop work and notify *NCC Representative* immediately if a material resembling asbestos is encountered. Do not proceed at such locations without written instructions from *NCC Representative*.
- .3 Silica: Use appropriate respiratory protection and ventilation during the demolition and/or modification of structures with products that contain silica. Silica is a crystalline component of concrete and cement. Silica dust is created by blasting, grinding, crushing and sandblasting silica-containing materials.

#### **1.18 BUILDING SMOKING ENVIRONMENT**

- .1 Smoking is not permitted on site. Obey smoking restrictions on building property.

#### **1.19 SITE-SPECIFIC CONDITIONS**

.1 Not used

**Part 2 Products**

**2.1 NOT USED**

.1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

.1 Not used.

**END OF SECTION**

## **Part 1 General**

### **1.1 REFERENCES**

- .1 NCC General Conditions
- .1 NCC General Conditions, Stipulated Price Contract.

### **1.2 INSPECTION**

- .1 Refer to NCC GENERAL CONDITIONS
- .2 Allow the NCC Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by the NCC Representative's instructions, or law of Place of Work.
- .4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .5 The NCC Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

### **1.3 REJECTED WORK**

- .1 Refer to NCC General Conditions
- .2 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the NCC Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .3 Make good other Contractor's work damaged by such removals or replacements promptly.
- .4 If, in opinion of the NCC Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by the NCC Representative.

### **1.4 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Prepare mock-ups for the NCC Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .3 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .4 If requested, the NCC Representative will assist in preparing schedule fixing dates for preparation.
- .5 Remove mock-up at conclusion of Work or when acceptable to the NCC Representative.
- .6 Mock-ups may remain as part of Work.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

## **1 General**

### **1.1 RELATED SECTIONS**

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

### **1.2 REFERENCES**

- .1 CAN/CSA-Z321- R2001: Signs and Symbols for the Occupational Environment.

### **1.3 INSTALLATION AND REMOVAL**

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

### **1.4 SCAFFOLDING**

- .1 Provide and maintain scaffolding.

### **1.5 HOISTING**

- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists cranes shall be operated by qualified operator.

### **1.6 USE OF THE WORK**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with Products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

### **1.7 CONSTRUCTION PARKING**

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

### **1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

### **1.9 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities.
- .3 Except where connected to municipal sewer system, periodically remove wastes from Site.
- .4 Existing permanent facilities may be used on approval of NCC Representative.
- .5 Keep sanitary facilities clean and fully stocked with the necessary supplies at all times.

**END OF SECTION**

## **Part 1            General**

### **1.1                REFERENCES**

- .1 Canadian Standard Association (CSA)
  - .1 CSA S269.1-1975 (R2003), Falsework for Construction Purposes.
  - .2 CSA Z797-09, Code of Practice for Access Scaffold.
  - .3 CAN/CSA Z91-02(R2010), Health and Safety Code for Suspended Equipment Operations.
  - .4 CAN/CSA Z271-98(R2004), Safety Code for Suspended Elevating Platforms.
- .2 Occupational Health and Safety Act, Ontario Regulations for Construction Projects, latest edition.

### **1.2                DESIGN REQUIREMENTS**

- .1 Maximum allowable scaffold load on existing roof structure is 2.4kPa, and at grade level over underground structures is 4.8kPa unless noted.
- .2 Design scaffolding to support loading from material hoist attached to scaffold frames.
- .3 Design bridging to ensure adequate distribution of scaffold loads to prevent overloading of structural members.
- .4 Design adequate connections to building elevation to resist lateral loads from scaffolding.
- .5 Design for wind loading in compliance with Occupational Health and Safety Act, Ontario Regulations for Construction Projects.

### **1.3                SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 When scaffolding is higher than 15.25m for arch frame and system scaffolding, submit shop drawings. For work platform and hoarding, submit shop drawings. Shop drawings to be stamped by a qualified professional Engineer registered in the Province of Ontario.
- .3 On shop drawings, indicate material specifications, and all details and information necessary for assembly and erection of scaffolding and work platform, including anchorage to the existing building.
- .4 The shop drawings shall show all superimposed service dead, live and lateral loads, for which the scaffolding and work platform is designed.
- .5 Submit scaffolding design engineer's calculations of scaffold load distribution on existing roof members. Scaffold legs must bear over steel roof members. Total maximum loading on roof to be 2.34kPa.

### **1.4                REGULATORY REQUIREMENTS**

- .1 Design and construct scaffolding and work platform in accordance with:
  - .1 CSA S269.1 - Falsework for Construction Purposes.
  - .2 CSA Z797 - Code of Practice for Access Scaffold.



- .3 Ontario Ministry of Labour Occupational Health and Safety Act and Regulations for Construction Projects and for Window Cleaning, Scaffolds, boatswain's chairs and related equipment.
- .2 Install and use work platform in accordance with:
  - .1 CAN/CSA Z271 - Safety Code for Suspended Elevating Platforms.
  - .2 CAN/CSA Z91 - Health and Safety Code for Suspended Equipment Operations.

## **1.5 SITE CONDITIONS**

- .1 Scaffolding and work platform shall be erected, or dismantled as the case may be, within a 5 day period after notification from the NCC Representative.
- .2 Maintain access to the building for all entrances where scaffolding and work platform is erected, providing all necessary enclosures, bridging, etc. to protect the building occupants, and public in general.
- .3 When the scaffold and work platform is in place, locate existing ventilation openings/louvers within the scaffold area, prior to the start of the masonry work. Extend ventilation shaft outside the enclosure, in order to prevent dust entering adjacent areas.
- .4 Provide lighting for all public areas covered by the scaffolding.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Scaffolding material must conform to CSA Standard CSA Z797.
  - .1 System scaffold with standing head clearance of a minimum of 1800mm, and side brackets. Welded arched steel frames are acceptable.
- .2 Fabric Enclosure
  - .1 Heavy duty T.S.E. construction tarps, fire resistant, minimum of 8mm in thickness and a minimum of 155kg in tensile strength, and low temperature bond to -55<sup>0</sup>C.
- .3 Insulation
  - .1 Closed cell rigid insulation, capable of supporting a minimum load of 100 kPa.

## **Part 3 Execution**

### **3.1 PROTECTION FOR EXISTING ROOFING**

- .1 Under scaffold frame legs that bear on roofing, provide 15mm thick plywood over rigid insulation to protect existing roofing. Damage to roofing to be repaired at contractor's expense.

### **3.2 SCAFFOLDING WORK PLATFORM ERECTION**

- .1 Supply and install the scaffolding and work platform sufficient to carry out the scope of work identified on the drawings.

- .2 Set scaffold anchors in horizontal masonry joints only. NO DRILLING INTO THE FACE BRICK IS PERMITTED. Repointing of masonry joints as scaffolding is removed will be carried out as part of masonry contract.
- .3 Provide bridge scaffolding and hoarding to allow continual access to entrances and fire exits in the area of the contract.
- .4 Erect scaffolding independent of walls. Connect scaffold to existing structure at alternate floor levels. Allow for removal and reinstallation of brick as necessary to achieve this.
- .5 Supply and install full width, continuous platform and side brackets, planking, braces (cross and horizontal), jacks and baseplates (with special attention for safety on the adjustable jacks), hangers, guardrails, guardrail posts, coupling pins, safety clips and all clamps for safe installation. Number of fully planked decks required, to be determined by Scaffold Design Engineer.
- .6 Do not bear any part of scaffolding, hoist or construction plant directly against the masonry. Provide isolation material, lumber or plywood with additional padding as required to prevent damage to the existing masonry or roof.
- .7 Provide minimum one set of access stairs to service each elevation of scaffolding, to be located as approved by the NCC Representative.
- .8 Provide, operate and maintain hoists and equipment required for moving of workers, materials and equipment.
- .9 Provide and maintain adequate access to project site at all time.
- .10 Provide all safety handrails, toe-boards and fencing as required for safe working conditions.
- .11 Prior to use, provide proof of review and approval of scaffolding and work platform erection by a Professional Engineer licensed in the Province of Ontario.
- .12 Maintain the scaffolding and work platform in satisfactory condition for the duration of the work.
- .13 Provide hoarding, around scaffolding at grade level, to a height of 3.6m, to prevent access to scaffolding by the public. Maintain security on the scaffold. Refer to Section 01 56 00 - Temporary Barriers and Enclosures.

### **3.3 SCAFFOLDING ENCLOSURE**

- .1 Install scaffold enclosure using heavy duty, fire resistant construction tarps as per manufacturer's recommendations. All connections to the scaffolding must be capable of resisting applicable wind loads as specified in the Ontario Building Code.

### **3.4 SCAFFOLD DISMANTLING**

- .1 After repointing has been allowed to cure for a minimum of seven days, relocate all scaffold anchors into fresh horizontal mortar joints. Rake out and repoint all existing mortar at original scaffold anchor locations as specified.

- .2 Work to be reviewed by NCC Representative prior to removal of scaffold.
- .3 On completion of masonry work, remove all scaffold anchors from masonry joints and repair mortar joints.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.189M-2000, Primer, Alkyd, Wood, Exterior.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA O86-09 Consolidation, Engineering Design in Wood.
  - .2 CSA O121-08, Douglas Fir Plywood.
  - .3 CSA O141-05 (R2009), Softwood Lumber.
- .3 National Lumber Grades Authority (NGLA)
  - .1 NGLA Standard Grading Rules for Canadian Lumber, Latest Edition: December 2010.

**1.2 DESIGN REFERENCES**

- .1 Design hoarding and shelter in accordance with CSA O86.1.
- .2 Hoarding to be designed and braced to resist all lateral loads.

**1.3 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings for temporary barriers and enclosures stamped by a qualified Professional Engineer registered in the Province of Ontario.
- .3 On shop drawings, indicate material specification and all details and information necessary for assembly and erection of hoarding and enclosures.
- .4 The shop drawings shall show all superimposed dead, live and lateral loads for which the hoarding and enclosures are designed.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Hoarding: Material specifications to be as follows;
  - .1 Timber Studs: grade marked to conform to CSA O141, grade SPF #2 or better. Lumber to be grade stamped according to NLGA grading rules and shall be kiln dried.
  - .2 Aluminum beams and plywood 20 mm thick for roofing of the mortar mixing shelter.
  - .3 Plywood: to CSA O121, Douglas Fir Plywood, exterior grade.
  - .4 Paint:
    - .1 Exterior alkyd primer to CAN/CGSB-1.189.
    - .2 Alkyd exterior gloss enamel paint to CAN/CGSB-1.59. Colour to be selected by NCC Representative.

- .2 Construction Fence:
  - .1 2300mm modular steel construction fence. Provide fence bases that will not present a tripping hazard for the public.
    - .1 Acceptable Material: by Instafence.

### **Part 3 Execution**

#### **3.1 INSTALLATION AND REMOVAL**

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.
- .3 Install temporary barriers and enclosures as per manufacturer's recommendations.

#### **3.2 HOARDING**

- .1 Construct hoarding in accordance with CSA O86.1.
- .2 Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121.
- .3 Apply plywood panels vertically flush and butt jointed. Install quarter rounds at all exposed corners.
- .4 Provide and maintain hoarding around the entire perimeter of the scaffolding at grade level. Hoarding height to be 3.6m above grade, except as noted.
- .5 Provide one lockable pedestrian door as directed. Equip door with locks and keys.
- .6 Install hoarding fastening devices in such a way that clamps or wire ends cannot cause damage to the general public/pedestrians/site personnel.
- .7 Paint public side of site enclosures in selected colours with one coat primer to CGSB 1.189M and one coat exterior paint to CGSB 1.59. Maintain public side of enclosures in clean condition.
- .8 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

#### **3.3 CONSTRUCTION FENCE**

- .1 Erect and maintain secure construction fence on street side of hoarding, around perimeter of work area.
- .2 Install fence in accordance with manufacturer's recommendations.

#### **3.4 SIGNAGE**

- .1 Provide common use signs related to traffic control, information, instruction, use of equipment, public safety devices, and other signs as directed by NCC Representative in both official languages or by use of commonly understood graphic symbols to approval of NCC Representative.

- .2 No advertising is permitted on this project. Immediately remove handbills, flyers, stickers, graffiti, etc. which may be placed on the hoarding by others.
- .3 Signage for Contractor advertising, beyond emergency contact details, is not allowed on any element of this project. Size of lettering on emergency contact notice to be approved by Owner, prior to display of such notice.

### **3.5 SHELTER ERECTION**

- .1 Construct shelter in accordance with CSA O86.1.
- .2 Provide mortar mixing shelter of sufficient size to house all mortar materials and mixer in a dry environment.
- .3 Paint public side of site enclosure in selected colours with one coat primer to CAN/CGSB 1.189M and one coat exterior paint to CAN/CGSB 1.59. Maintain public side of enclosure in clean condition.
- .4 Install fastening devices in such a way where clamps or wire ends cannot cause damages to the workers.

### **3.6 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent signal flag operators and barricades as required to perform Work and protect the public.
- .2 Provide signage inside all exits from building affected by this work. Maintain signage for the duration of the project.

### **3.7 FIRE ROUTES**

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

### **3.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect adjacent private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

### **3.9 PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with NCC Representative locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of, or improper protection.

**END OF SECTION**

## 1 General

### 1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

### 1.2 DEFINITIONS

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including but not limited to, building materials, packaging, trash, debris, and rubble resulting from construction, re-modelling, repair and demolition operations.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including, but not limited to, ignitability, corrosiveness, toxicity or reactivity.
- .4 Non-hazardous: Exhibiting none of the characteristics of hazardous substances, including, but not limited to, ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non-toxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the Project site to another site for re-manufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the Project site.
- .11 Salvage: To remove a waste material from the Project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOCs): Chemical compounds common in and emitted by many building products over time through outgassing:
  - .1 Solvents in paints and other coatings,
  - .2 Wood preservatives; strippers and household cleaners,
  - .3 Adhesives in particle board, fibreboard, and some plywood; and foam insulation,
  - .4 When released, VOCs can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- .18 Waste Management Plan: A Project-related plan for the collection, transportation, and disposal of the waste generated at the construction site. The purpose of the plan is to ultimately reduce the amount of material being landfilled.



### 1.3 SUBMITTAL

- .1 Submit requested submittals in accordance with Section 01 33 00.
- .2 Prepare and submit the following submittals prior to project start-up:
  - .1 Submit two (2) copies of completed Waste Reduction Work Plan.

### 1.4 WASTE MANAGEMENT GOALS

- .1 NCC Representative has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- .2 NCC Representative recognizes that waste in any project is inevitable, but indicates that as much of the waste materials as economically feasible shall be reused, salvaged, or recycled.
- .3 Waste disposal in landfills shall be minimized.
- .4 Contractor to develop a Waste Management Plan for this Project and submit to the NCC Representative for review.

### 1.5 WASTE MANAGEMENT PLAN

- .1 Draft Waste Management Plan: Within ten (10) days after receipt of Notice of Award of Bid, or prior to any waste removal, whichever occurs sooner. The Waste Management Plan must meet the minimum requirements for conducting waste audits and preparing waste reduction work plans for construction and demolition projects as required under Ontario Reg. 102/94 and Ontario Reg. 103/94.
- .2 Contractor to submit a Draft Waste Management Plan to the NCC Representative for review, refer to MOE Reg. 102/94 & 103/94.
- .3 Draft Plan shall contain the following:
  - .1 Analysis of the proposed site waste generated, including types and quantities.
  - .2 Landfill Options: The name of the landfill where trash will be disposed, the applicable landfill fees, and the projected cost of disposing of Project waste in the landfill.
  - .3 Alternatives to Landfill: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed local market for each material, and the estimated net cost savings or additional costs resulting from separating and recycling versus landfill each material; "Net" means that the following have been subtracted from the cost of separating and recycling:
    - .1 Revenue from the sale of recycled or salvaged materials, and
    - .2 Landfill tipping fees saved due to diversion of materials from the landfill. The list of these materials is to include, at minimum, the following materials:
      - .1 Cardboard.
      - .2 Clean dimensional wood.
      - .3 Beverage containers.
      - .4 Land clearing debris.
      - .5 Concrete.
      - .6 Brick.
      - .7 Concrete Masonry Units (CMU).
      - .8 Asphalt.
      - .9 Metals from banding, steel stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
      - .10 Gypsum board.
      - .11 Plastic buckets; waste can be reduced by using plastic lined cardboard dry packed materials instead of premixed moist packed materials where this option is available.

- .12 Carpet and carpet pad trim.
- .13 Paint.
- .14 Plastic sheeting and packaging, where recycling programs are available.
- .15 Rigid plastic foam insulation, where recycling programs are available.
- .4 Final Waste Management Plan: Once the NCC Representative has determined which of the recycling options addressed in the draft Waste Management Plan are acceptable, the Contractor shall submit, within ten (10) calendar days a Final Waste Management Plan, containing the following:
  - .1 Analysis of the proposed jobsite waste to be generated, including types and quantities.
  - .2 Landfill options: The name of the landfill where trash will be disposed of, the applicable landfill tipping fees, and the projected cost of disposing of all Project waste in the landfill.
  - .3 Alternatives to Landfill: A list of the waste materials from the Project that will be separated for reuse, salvage, or recycling.
  - .4 Materials Handling Procedures: A description of the means by which any waste materials identified in 1.5.3 above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
  - .5 Transportation: A description of the means of transportation of the recyclable materials, whether materials will be site-separated and self-hauled to designated centres, or whether mixed materials will be collected by a waste hauler and removed from the site, and destination of materials

## **1.6 THIRD PARTY RESPONSIBILITY**

- .1 Subcontractors shall cooperate fully with Contractor to implement the Waste Reduction Plan.

## **1.7 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by NCC Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non salvageable items to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify NCC Representative.
- .7 Protect surface drainage, storm sewers, sanitary sewers, and utility services from damage and blockage.

## **1.8 SCHEDULING**

- .1 Coordinate work with other activities at site to ensure timely and orderly progress of the work.

## **2 Products**

### **2.1 NOT USED**

- .1 Not Used.

### **3 Execution**

#### **3.1 PREPARATION**

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

#### **3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION**

- .1 **Manager:** Contractor to designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
- .2 **Distribution:** Contractor to distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the NCC Representative, and the NCC Representative.
- .3 **Instruction:** Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.
- .4 **Separation facilities:** Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
- .5 **Hazardous wastes:** Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
- .6 **Application for Progress Payments:** Contractor shall submit with each Application for Progress Payment a Summary of Waste Generated by the Project:
  - .1 Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment.
  - .2 The Summary shall be submitted on a form acceptable to the NCC Representative and shall contain the following information:
    - .1 The amount in tonnes or cubic metres (tons or cubic yards) of material land filled from the Project,
    - .2 The identity of the landfill, the total amount of tipping fees paid at the landfill, and
    - .3 The total disposal cost. Include manifests, weight tickets, receipt, and invoices.
  - .3 For each material recycled, reused, or salvaged from the Project, the amount tonnes or cubic metres (tons or cubic yards), the date removed from the job site, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling each material.
  - .4 Attach manifests, weight tickets, receipts, and invoices.

#### **3.3 DISPOSAL OF WASTE**

- .1 Burying of rubbish and waste materials is prohibited unless approved by authority having jurisdiction.
- .2 Disposal of waste into waterways, storm, or sanitary sewers is prohibited.
- .3 Provide on-site bins as required for separation of waste materials for recycling.

**END OF SECTION**

## **Part 1 General**

### **1.1 REFERENCES**

- .1 NCC General Conditions
  - .1 NCC General Conditions, Stipulated Price Contract.

### **1.2 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection: Contractor - conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1 Notify the NCC Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2 Request the NCC Representative's inspection.
  - .2 The NCC Representative's Inspection:
    - .1 The NCC Representative and Contractor to inspect Work and identify defects and deficiencies.
    - .2 Contractor to correct Work as directed.
    - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
      - .1 Work: completed and inspected for compliance with Contract Documents.
      - .2 Defects: corrected and deficiencies completed.
- .3 Work: complete and ready for final inspection.
- .4 Final Inspection:
  - .1 When completion tasks are done, request final inspection of Work by the NCC Representative and Contractor.
  - .2 When Work incomplete according to Owner and the NCC Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when the NCC Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement or warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
  - .1 When the NCC Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .2 Refer to NCC GENERAL CONDITIONS: when Work deemed incomplete by the NCC Representative complete outstanding items and request re-inspection.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

## **1 General**

### **1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

### **1.2 INSPECTIONS AND DECLARATIONS**

- .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  - .1 Notify NCC Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .2 Request NCC Representative's Inspection.
- .2 NCC Representative's Inspection: NCC Representative and Contractor will perform inspection of Work to identify defects or deficiencies. Correct defective and deficient Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
  - .1 Work has been completed and inspected for compliance with Contract Documents.
  - .2 Defects have been corrected and deficiencies have been completed.
  - .3 Equipment and systems have been tested, adjusted and are fully operational.
  - .4 Certificates required by authorities having jurisdiction have been submitted.
  - .5 Operation of systems have been demonstrated to NCC Representative's personnel.
  - .6 Work is complete and ready for Final Inspection.
- .4 Final Inspection: when items noted above are completed, request final inspection of Work by NCC Representative, and Contractor. If Work is deemed incomplete by NCC Representative, complete outstanding items and request reinspection.
- .5 Declaration of Substantial Performance: when NCC Representative consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Substantial Performance of the Work.
- .6 Commencement of Warranty Periods: the date of Substantial Performance of the Work shall be the date for commencement of the warranty period.
- .7 Commencement of Lien Periods: the date of publication of the certificate of Substantial Performance of the Work shall be the date for commencement of the lien period, unless required otherwise by the lien legislation applicable at the Place of the Work.
- .8 Final Payment: When NCC Representative consider final deficiencies and defects have been corrected and it appears requirements of Contract have been completed, make application for final payment.
- .9 Payment of Hold-back: After issuance of certificate of Substantial Performance of the Work, submit an application for payment of hold-back amount.

### **1.3 CLOSEOUT SUBMITTALS**

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned after final inspection, with NCC Representative's comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 Two weeks prior to Substantial Performance of the Work, submit to the NCC Representative, four final copies of operating and maintenance manuals in Canadian English.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in

Work.

- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8 Pay costs of transportation.

#### **1.4 OPERATION AND MAINTENANCE MANUAL FORMAT**

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

#### **1.5 CONTENTS - EACH VOLUME**

- .1 Table of Contents: provide title of project;
  - .1 date of submission;
  - .2 names, addresses, and telephone numbers of NCC Representative and Contractor with name of responsible parties; and
  - .3 schedule of products and systems, indexed to content of volume.
- .2 For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00.
- .4 Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Certificate of Acceptance: Relevant certificates issued by authorities having jurisdiction, including code compliance certificate.

#### **1.6 RECORDING ACTUAL SITE CONDITIONS**

- .1 Record information on set of black line opaque drawings, and within the Project Manual, provided by NCC Representative.
- .2 Annotate with coloured felt tip marking pens, maintaining separate colours for each major system, for recording changed information.
- .3 Record information concurrently with construction progress. Do not conceal Work of the Project until required information is accurately recorded.
- .4 Contract drawings and shop drawings: legibly mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.



- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, required by individual specifications
- .7 Submit record drawings and construction photographs at each site meeting.

#### **1.7 RECORD (AS-BUILT) DOCUMENTS AND SAMPLES**

- .1 In addition to requirements in General Conditions, maintain at the site for NCC Representative one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to the Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store as-built documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label as-built documents and file in accordance with section number listings in List of Contents of the Project Manual. Label each document "AS-BUILT DOCUMENTS" in neat, large, printed letters.
- .4 Maintain as-built documents in clean, dry and legible condition. Do not use as-built documents for construction purposes.
- .5 Keep as-built documents and samples available for inspection by NCC Representative.

#### **1.8 WARRANTIES AND BONDS**

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item of work.
- .4 Except for items put into use with NCC Representative's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittals.

**END OF SECTION**

## **1 General**

### **1.1 ALTERATION PROJECT PROCEDURES**

- .1 Materials: As specified in Product sections; match existing Products and work for patching and extending work.
- .2 Employ skilled and experienced installer to perform alteration work.
- .3 Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- .4 Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.
- .5 Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- .6 Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- .7 When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to NCC Representative for review.
- .8 Where a change of plane of 6 mm or more occurs, submit recommendation for providing a smooth transition to NCC Representative for review.
- .9 Patch or replace portions of existing surfaces which are damaged, lifted, discoloured, or showing other imperfections.
- .10 Finish surfaces as specified in individual Product sections.

### **1.2 SUBMITTALS FOR REVIEW**

- .1 Schedule: indicate concrete removal.
- .2 Shop Drawings: Indicate demolition; location and construction of temporary work.

### **1.3 SUBMITTALS FOR CLOSEOUT**

- .1 Section 01 78 10: Procedures for submittals.
- .2 Project Record Documents: Accurately record any diversion from the Contract Documents.

### **1.4 REGULATORY REQUIREMENTS**

- .1 Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.
- .2 Obtain required permits from authorities.
- .3 Do not close or obstruct egress width to any building or site exit.
- .4 Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to NCC Representative.
- .5 Conform to procedures applicable when hazardous or contaminated materials are discovered.

### **1.5 SCHEDULING**

- .1 Describe demolition removal procedures and schedule.
- .2 Co-ordinate noisy work with NCC Representative Provide 48hr Notice of noisy work.

## **1.6 PROJECT CONDITIONS**

- .1 Conduct demolition to minimize interference with adjacent and occupied building areas.
- .2 Cease operations immediately if structure appears to be in danger and notify NCC Representative. Do not resume operations until directed.

## **2 Products**

### **2.1 NOT USED.**

## **3 Execution**

### **3.1 PREPARATION**

- .1 Provide, erect, and maintain temporary barriers at locations indicated.
- .2 Erect and maintain temporary partitions to prevent spread of dust, odours, and noise to permit continued NCC Representative occupancy.
- .4 Protect existing materials and equipment which are not to be demolished.
- .5 Prevent movement of structure; provide bracing and shoring.
- .6 Notify affected utility companies before starting work and comply with their requirements.
- .7 Provide appropriate temporary signage including signage for exit or building egress.

### **3.2 DEMOLITION**

- .1 Disconnect remove, and identify designated utilities within demolition areas.
- .2 Demolish in an orderly and careful manner. Protect existing supporting structural members.
- .3 Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- .4 Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- .5 Remove temporary Work.

### **3.3 SCHEDULES**

1. Remove concrete in accordance with drawings.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 04 03 08 – Historic – Mortaring.
- .2 Section 04 05 10 - Common Work Results for Masonry.

**1.2 MEASUREMENT PROCEDURES**

- .1 Unit Prices
  - .1 Payment for this work will be on a unit basis and will include all costs necessary to complete the specific repair, including supplying materials, additional shoring and scaffolding where required, removal and reinstatement of existing masonry units, all anchorage, mortar and grout work necessary, executing work as described herein and reflected in contract.
  - .1 Provide unit prices for each type of repair identified on the drawings.

**1.3 REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM A276-08, Standard Specification for Stainless Steel Bars and Shapes.
- .2 Canadian Standards Association (CSA)
  - .1 CSA A23.1- 09/A23.2-09, Construction Materials and Methods of Concrete Construction.
  - .2 CAN/CSA A179-04 (R2009), Mortar and Grout for Unit Masonry.
  - .3 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.

**1.4 DEFINITIONS**

- .1 Raking: the removal of loose/deteriorated mortar until sound mortar is reached, but not less than a depth of 30 mm.
- .2 Backpointing: filling of masonry joints for the depth from which mortar has been raked out to a point 30 mm from the stone face.
- .3 Finishpointing: filling and finishing of masonry joints from which mortar has been raked out, for a depth of 30 mm.
- .4 Tooling: finishing of masonry joints using tool to provide final contour.
- .5 Repair: using adhesives to rebond sections of fractured masonry.
- .6 Consolidation: strengthening masonry units to prevent deterioration (spalling).
- .7 Descaling: the removal of loose portions of the masonry (usually spalled area) through impact with a bush hammer or similar device.

**1.5 SYSTEM DESCRIPTION**

- .1 Work of this Section includes but is not limited to:
  - .1 Visually inspecting for obvious signs of deteriorated masonry.
  - .2 Raking all joints, and as noted on Drawings.

- .3 Preparation of masonry surface including joints surface cleaning, flushing of voids and open joints, and masonry wetting.
- .4 Repointing of all masonry joints, including backpointing and finishpointing.
- .5 Re-setting of dislodged masonry units.
- .6 Ensuring cure of mortar.
- .7 Grouting by hand, small voids.
- .8 Replacement of deteriorated or missing units.
- .9 Removal of caulking and cleaning of caulked mortar joints.

## **1.6 SUBMITTALS**

- .1 Samples
  - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit labelled samples of materials proposed for use on project, for approval before work commences.

## **1.7 QUALITY ASSURANCE**

- .1 Qualifications
  - .1 Refer to Section 04 05 10 - Common Work Results for Masonry.
  - .2 One thoroughly experienced, reliable and competent worker shall be in charge of all mortar mixing for the duration of the project. The experience must include mixing mortar for a minimum of three projects similar in nature and scope, to this project. Identify this individual to the NCC Representative at the start of the project.
- .2 Mock-ups
  - .1 Construct mock-up in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Construct mock-up 1200 mm x 1800 mm to demonstrate raking out and repointing procedure for the following:
    - .1 Sawcutting of joints using power tools, where permitted.
    - .2 Raking out of joints.
    - .3 Backpointing of joints.
    - .4 Finishpointing of joint.
  - .3 Construct mock-up under supervision of NCC Representative to demonstrate a full understanding of specified procedures, techniques and formulations are achieved before work commences.
  - .4 Construct mock-up where directed.
  - .5 Allow 24 hours for inspection of mock-up by NCC Representative before proceeding with masonry repointing and repair work.
  - .6 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

## **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Store cementitious materials and aggregates in accordance with CSA A23.1. Keep sand dry, in conformance with CAN/CSA A179, Clause 5.3.6. Sand that does not conform will be rejected.
- .2 Keep material dry. Protect from weather, freezing and contamination.
- .3 Ensure that manufacturer's labels and seals are intact upon delivery.
- .4 Remove rejected or contaminated material from site.

## 1.9 SITE CONDITIONS

- .1 Existing Conditions
  - .1 Report in writing, to NCC Representative areas of deteriorated masonry revealed during work. Obtain NCC Representative's approval and instructions for repair and replacement of masonry units before proceeding with repair work.
- .2 Protection
  - .1 At end of each working day, cover unprotected work with waterproof membranes. Extend membranes to 0.5 m beyond the perimeter of work area and install securely 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 Cover all sills and projecting courses with rigid protection, secured into joints, for the duration of the work.
  - .4 Protect all exposed window/door frames, wall fixtures and any other existing surfaces which may be damaged by mortar stains. Damaged or stained material to be replaced at Contractor's cost.
  - .5 All methods of enclosure and protection to be approved by NCC Representative.
  - .6 Protect newly laid mortar from excessive exposure to rain and full sunlight until the surface is thumb-print hardened.
  - .7 Provide and maintain protection for masonry walls at all times when work is suspended to prevent water from entering partially repointed masonry.
  - .8 Protection shall consist of non-staining 6 mil polyethylene sheets, tarpaulins or burlap, secured to prevent lifting in high winds.
  - .9 Provide protection boards to exposed corners and all openings such as doors and windows which may be damaged by construction activities. Maintain protection for the duration of operations. Remove and dispose of protective materials as directed by the NCC Representative.
- .3 Environmental Requirements
  - .1 When temperature is 5°C or less:
    - .1 Store cements and sands for immediate use within heated enclosure. Temperature in enclosure should be maintained at or above 5°C. Allow these materials to reach minimum temperature of 5°C (that is equilibrium with air temperature in enclosure).
    - .2 Heat water to minimum of 20°C and maximum of 30°C:
      - .1 At time of use, temperature of mortar to be minimum of 15°C and maximum of 30°C.
      - .2 Do not mix cement/lime with water or with aggregate or with water-aggregate mixtures having higher temperature than 30°C.
    - .3 Protection requirements are specified in Section 04 05 10 - Common Work Results for Masonry.
    - .4 Obtain approval from NCC Representative for methods of enclosure and protection.

## Part 2 Products

### 2.1 MATERIALS

- .1 Mortar materials: to Section 04 03 08 – Historic – Mortaring.
- .2 Dowels: Stainless Steel, to ASTM A276, Grade 304.

## **2.2 PROPORTIONS**

- .1 Proportions: to Section 04 03 08 – Historic – Mortaring.

## **2.3 MORTAR**

- .1 Mortar: to Section 04 03 08 – Historic – Mortaring.

## **Part 3 Execution**

### **3.1 GENERAL**

- .1 Perform work in accordance with CAN/CSA A371. Extent of raking out and repointing is as noted on the Drawings.
- .2 Use manual raking tool unless otherwise specified, to remove deteriorated mortar and ensure that no masonry units are chipped/altered/damaged by work to remove mortar. Tools for cutting out must be narrower than the joint.
- .3 Tool and compact using jointing tool to force mortar into joint.
- .4 For backpointing in deep, narrow joints, fabricate long stainless steel packing tools, to force mortar into the joints and compact it.
- .5 Finish joints to match existing joints as per previous phases, except where specified otherwise.
- .6 Use suitable approved jointing tool unless otherwise specified to form compacted joints. Tool length for finishpointing not to exceed 50 mm.
- .7 Do not sawcut or rake out mortar joints where ambient temperature is below 5°C in the Springtime or 0°C in the Fall, as the mortar in the joints may be frozen. Any attempt to remove frozen mortar will result in damage to the masonry. Damaged masonry resulting from removal of frozen mortar must be replaced at Contractor's cost.

### **3.2 REPOINTING**

- .1 Raking joints:
  - .1 Rake out all joints as noted on drawings.
  - .2 Rake unsound joints free of deteriorated and loose mortar, dirt and other undesirable material.
  - .3 Cutting out of joints is to be done with hammer and chisel, or air tools, unless otherwise specified. Great care must be taken so as not to damage masonry units adjacent to joints. Cut away from the arrises to prevent spalling the masonry. The use of power tools is only permitted, as noted.
  - .4 Permission to use power tools will be based on the Contractor's ability to comply with the above conditions, as observed in the mock-up.
  - .5 If these requirements are not complied with, the Contractor will be required to remove all mortar by using hand tools, at no extra cost to the Owner.
  - .6 Where the use of power tools is permitted to remove existing mortar, proceed as follows:

1. Grind the centre of the joint only, to a maximum width of half of the joint width. Mortar must remain on each side of the cut. The grinders must not touch the brick.
  2. For vertical joints, and discontinuous horizontal joints, stop sawcut 50 mm from end of joint. Do not sawcut brick.
  3. Notify the NCC Representative to inspect the grinding, prior to removing the remaining mortar with hand tools.
  4. The remaining mortar must be removed by hand tools
  7. Include removal of all existing excess mortar that may have been applied to brick face due to overpointing. Do not damage arris or finish on brick face.
  8. Clean joints to full depth of deteriorated mortar but in no case to less than 30 mm lean out voids and cavities encountered.
  9. Clean by compressed air, surfaces of joints without damaging texture of exposed joints.
  10. Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining, blow clean with compressed air.
  11. Fine joints (less than 4mm) need not be raked out more than 10mm, in order to reduce the danger of chipping the masonry edges. Use flat-bladed quirks and light hammers, hack-saw blades or similar tools to rake out joints. Do not saw-cut the brick.
  12. Leave no standing water.
  13. Damaged masonry includes widening of existing joints, nicks, gouges and chipped or scratched surfaces from cutting out tools, resulting from improper workmanship. Masonry damaged as a result of careless raking, or saw cutting, shall be replaced at no cost to the Owner.
  14. Joints cannot be raked out for more than two floors in height, prior to repointing, unless approved by the NCC Representative.
  15. If masonry unseats or bond is broken, remove unit and reset.
- .2 Backpointing
- .1 Where cut out joints are deeper than minimum raking out depths specified above, backpoint joints to bring mortar face to specified depth for raked out joints, in preparation for finishpointing. Where voids exist that conventional backpointing cannot fill, notify NCC Representative for direction.
  - .2 Immediately prior to pointing, thoroughly wet joints in order to control absorption.
  - .3 Allow water to soak into masonry and mortar, leaving no standing water, but remaining wet.
  - .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, maximum 30 mm thick, minimum 15 mm thick, allowing each layer to set to thumb print hardness before placing next layer. Bring face of mortar in backpointed joint to specified minimum depth for raked out joints, measured from the arris of the masonry unit. Leave ready for final pointing.
  - .5 Form mortar square to brick face, and leave exposed brick each side of joint clean of mortar prior to mortar setting.
  - .6 For deep joints, provide stainless steel packing tools manufactured to permit the mason to compact mortar deep in the joints.
  - .7 Prevent mortar from being placed or smeared onto face of brick. Avoid mortar staining of masonry faces during backpointing.
- .3 Finishpointing:
- .1 When all required repair and replacement work is complete, carry out finishpointing.



- .2 Before finishpointing, wash walls to be finishpointed and allow to dry to damp-dry condition. Ensure that all dust, mortar particles, and other debris is removed from joints and wall surfaces before finishpointing.
- .3 Dampen joints and completely fill with mortar. If surface of masonry unit has worn rounded edges, keep pointing back from surface to provide same width of joint. Keep joints back approximately 1 mm behind arrises. Avoid feathered edges. Pack mortar solidly into voids and joints, to ensure positive adhesion to all inner surfaces.
- .4 Keep masonry damp while pointing is being performed.
- .5 Do no pointing in freezing weather. See Section 04 05 10, Common Work Results for Masonry for protection required for work in this Section.
- .6 Build-up pointing in layers not exceeding 30 mm in depth. Allow bottom layers to set before applying subsequent layers. Pack and compress mortar into voids to fit approximately, but no less than 15 mm thick. Maintain joint width.
- .7 Remove excess mortar from masonry face before it sets. Finish jointing neatly, as detailed.
- .8 Allow mortar to set so that there is no free water that will cause run off on brick faces, then tool to match approved mock-up joints. Tool head joints, followed by horizontal joints. Do not overwork the face of the joints. Joints shall be uniform in appearance. Do not brush joints until they have set to the extent that brushing will not mark the joint surface.
- .9 When mortar is thumbprint hard, finish joints with stippling action using a short bristle brush to compact the joint further, and produce a textured finish, exposing the aggregate.
- .10 Retempering of Mortar:
  - .1 Portland cement-hydrated lime mortars should only be retempered once, and should be used within 2 hours of adding water to the mix when the air temperature is less than 25 degrees C. (1½ hours for higher temperatures)
- .4 Curing:
  - .1 Moist cure freshly pointed joints by covering with moist burlap enclosure and polyethylene sheeting, for minimum of 3 days after finishpointing. Keep wall and burlap misted.
- .5 Protection
  - .1 Protect newly laid mortar from frost, rainfall or rapid drying conditions for 7 days.

### **3.3 SCAFFOLDING ANCHORAGE**

- .1 As each level of work is completed and cured for a minimum of seven days, remove embedded scaffold anchors.
- .2 Reinstall anchors into alternate masonry joints adjacent to existing anchorage location, until scaffold removal is required.
- .3 Rake out and repoint joints affected by anchors, as detailed.
- .4 Repointed joints must be inspected by NCC Representative prior to removal of scaffold deck.
- .5 Upon final removal of anchors, caulk the joints where the anchor has been removed. Colour of caulking to match colour of mortar.

### **3.4 RESETTING**

- .1 Prepare slot to receive brick. Allow for resetting backup brick in fresh mortar.
- .2 Repoint all void joints in backup brick masonry. Replace deteriorated masonry as directed by NCC Representative.
- .3 Build up core where more than 50 mm wide void exists behind back of brick to be reset. Build up in traditional manner with new brick off-sets in mortar. Allow mortar to fully set up.
- .5 Install mortar on face of backup masonry to form continuous collar joint, just prior to resetting brick.
- .6 Fix dislodged units in same location and orientation as originally set, with water soaked hardwood ledges. Reset level, true and square with even mortar joints to exact original thickness.
- .7 Insert and compress firm mortar to within 30 mm of finishpointing surface. Allow mortar to set 24 hours.
- .8 Pull out wood wedges when dried and shrunken.
- .9 Backpoint in layers, and leave ready for finishpointing.

### **3.5 FIELD QUALITY CONTROL**

- .1 The NCC Representative will inspect the quality of the work on a regular basis.
- .2 Notify NCC Representative prior to saw cutting joints so that the stone masonry can be recorded photographically. Provide clear access to all points of masonry to permit this photography to occur.
- .3 Provide the NCC Representative with a minimum of 24 hour notice for required inspections.
- .4 Approval of raked out condition of joints, and approval of backpointing mortar, must be received in writing by the contractor before the next procedure can proceed.
- .5 Where work proceeds to the next phase, without the approval of the NCC Representative, all unapproved mortar will be removed at Contractor cost.

### **3.6 CLEANING**

- .1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses, and at the end of each working day.
- .2 Carry out further cleaning after mortar has set and cured.
- .3 Clean masonry with stiff natural bristle brushes and plain water only. Vinegar or chemicals are not to be used unless instructed in writing by NCC Representative.
- .4 Remove all embedded anchors and repoint masonry joints at anchor locations as scaffolding is removed.
- .5 Remove all debris from brick faces, ledges and sills, as scaffolding is being removed.

- .6 Clean brick surface behind scaffold tie-backs as they are removed.
- .7 After final cleaning, notify NCC Representative to complete a final inspection of the masonry. Repair all noted deficiencies before dismantling scaffolding.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 04 03 07 - Historic - Masonry Repointing and Repair.
- .2        Section 04 05 10 - Common Work Results for Masonry.

**1.2            REFERENCES**

- .1        American Society for Testing and Materials (ASTM)
  - .1        ASTM C109/C109M-11b, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50-mm Cube Specimens).
  - .2        ASTM C144-04, Specification for Aggregate for Masonry Mortar.
  - .3        ASTM C185-08, Test Method for Air Content of Hydraulic Cement Mortar.
  - .4        ASTM C207-06, Specification for Hydrated Lime for Masonry Purposes.
  - .5        ASTM C348-02, Test Method for Flexural Strength of Hydraulic-Cement Mortars.
  - .6        ASTM C780-12, Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
  - .7        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        CAN/CSA A3000-08, Cementitious Materials Compendium.
  - .2        CAN/CSA A179-04 (R2009), Mortar and Grout for Unit Masonry.

**1.3            ALLOWABLE TOLERANCES**

- .1        The NCC Representative reserves the right to reject mortar which falls more than 20% outside of the 56-day compressive strength range required, and to have the Contractor remove it from the wall.

**1.4            SUBMITTALS**

- .1        Product Data.
  - .1        Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2        Submit five copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for mortar, grout, parging, colour additives and admixtures.
- .2        Samples.
  - .1        Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2        Submit two 50 mm x 50 mm size samples of mortar.
- .3        Prior to the mixing or preparation of mortars submit for approval to the NCC Representative confirmation of source or product data sheet of:
  - .1        Aggregate and Sand.
  - .2        Cements.
  - .3        Lime.
  - .4        Premixed Products.
- .4        Manufacturer's Instructions.
  - .1        Submit manufacturer's installation instructions.

## **1.5 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties. Include the following:
  - .1 Sand gradation testing in accordance with CAN/CSA A179.
  - .2 Bulking of aggregate sample, in condition as delivered to site.
  - .3 Vicat cone penetration: mortar mix.
  - .4 Mortar compressive strength: at 7 and 28 days or otherwise required.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 Mock-ups: Construct mock-ups in accordance with Section 04 05 10 – Common Work Results for Masonry.

## **1.6 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 in accordance with local collection services.

## **1.7 SCHEDULING OF WORK**

- .1 Submit work schedule indicating anticipated progress stages within time of final completion shown in bid document.
- .2 Take measures necessary to complete work within approved schedule time. Schedule may not be changed without approval.

## **1.8 ALTERNATIVES**

- .1 Obtain NCC Representative's approval before changing:
  - .1 Approved manufacturer's brands or sources of supply of mortar materials.
  - .2 Other methods of mixing mortar specified elsewhere in this specification.
- .2 These criteria apply during the entire contract.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: to CAN/CSA A179.
- .3 Aggregate: to CAN/CSA A179; gradation to ASTM C144. Use well graded aggregate passing 4.75mm down to 150 micron sieve where joints are greater than 6mm. Use aggregate passing 1.18mm down to 300 micron sieve where 6mm thick joints or less are indicated. In the event that the sand does not meet the noted gradation requirements, carry out additional sieving to meet the requirements or provide alternate sand.
- .4 Colour: ground coloured natural aggregates or metallic oxide pigments. Colour of sand to match existing. Acceptable material:

- .1 Inorganic mineral oxide colouring pigments as supplied by Elementis Pigments Inc. Toronto, ON in accordance with the manufacturer's written recommendations. Provide a sample of the mortar to the NCC Representative prior to commencement of the work.
- .5 Water: potable or from approved non-potable supply.
- .6 Lime:
  - .1 Hydrated lime: ASTM C 207, type SA.
- .7 Portland Cement: CAN/CSA A3000, white, non staining, type GU.
- .8 Calcium chloride is not to be used for any mortar.

## **2.2 PROPERTIES**

- .1 Bedding and pointing mortar for stonework: type N based on Proportion specifications. Range for compressive strength; 7 MPa to 12 MPa at 56 days.
  - .1 Brick: 1:1:6 cement: lime: aggregate mix.
- .2 Vicat Cone Penetration: to ASTM C780.
  - .1 Pointing Mortar: 15-20mm
  - .2 Bedding Mortar: 20-30mm
- .3 Allowable air content for all Lime Mortars; 8% to 14%.

## **2.3 MIXES**

- .1 Do not add air entraining admixture to mortar mix.

## **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 CONSTRUCTION**

- .1 Masonry mortar and grout work in accordance with CAN/CSA A179 except where specified otherwise.

### **3.3 MIXING**

- .1 Prepare measuring boxes to ensure accurate proportioning of mortar ingredients. Each box to contain exact volume proportion for each specific mix ingredient.
- .2 Introduce approximately 75% of the total volume of water into the mixer, followed by 50% of the sand and all of the dry hydrated lime. Mix for approximately 3 minutes or until the materials are thoroughly blended and no particles of white lime are apparent in the mix.
- .3 Allow to stand for 5 minutes.
- .4 Add the full volume of Portland cement, the remainder of the sand and water. Mix for further 3-5 minutes until thoroughly blended and mortar has reached consistency determined by Vicat Cone penetration testing.

- .5 Add just sufficient water to obtain workable consistency for setting units. Avoid too wet a mix which stains the face of the work. Vicat Cone penetration may be slightly greater for bedding mixes, but should not exceed maximum value specified by more than 20%. Record water quantities and use for subsequent mixes to help ensure uniformity of all subsequent mixes.
- .6 Adjust mix proportions based on percentage bulking shown in the test.
- .7 All pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes.
- .8 Mixing by hand must be pre-approved by the NCC Representative, as follows:
  - .1 Hand mixing must be carried out using 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 ensuring thorough incorporation of ingredients and air entrainment.
  - .2 Submit masonry tools and container for approval prior to starting pointing work.
- .9 Clean all mixing boards and mechanical mixing machine between batches.
- .10 Mortar must be weaker than the masonry units it supports.
- .11 Mortar must not contain elements detrimental to the original masonry or surrounding materials.
- .12 Appoint one individual to mix mortar, for duration of project. In the event that this individual must be replaced, mortar mixing must cease until the new individual is trained, and mortar mix is tested.

### **3.4 CLEANING**

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Remove droppings and splashings using clean sponge and water.
- .3 Clean masonry with low pressure clean water and soft natural bristle brush. Water pressure should be between 276 kPa and 410 kPa. See Section 04 03 07-Historic: Masonry Repointing and Repair.

### **3.5 SCHEDULE**

- .1 Mortar matching existing mortar in colour for finishpointing to minimum depth of 30mm.
- .2 Non-staining mortar for all repointing work.

### **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 NCC Representative, to CAN/CSA A179.
- .2 Owner will pay for cost of test as specified.

- .3 Frequency of mortar testing will be specified by NCC Representative.
- .4 Air content for all lime mortars to ASTM C185, and penetration using Vicat Cone to ASTM C780. Testing at the same frequency as strength tests to ASTM C109, or more frequently as required by the NCC Representative.
- .5 Test sand and aggregate for bulking at start of project, at each new sand delivery, and at severe change in weather. Verify moisture content conforms to CAN/CSA A179.
- .6 The NCC Representative reserves the right to reject sand if bulked volumes are excessive.

**END OF SECTION**



**Part 1            General**

**1.1            RELATED SECTIONS**

- .1    Section 04 03 07 – Historic- Masonry Repointing and Repair.
- .2    Section 04 03 08 – Historic - Mortaring.

**1.2            REFERENCES**

- .1    Canadian Standards Association (CSA International).
  - .1    CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.

**1.3            SUBMITTALS**

- .1    Product Data.
  - .1    Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures.
- .2    Shop Drawings.
  - .1    Where existing masonry becomes laterally unsupported during construction, provide shop drawings for temporary bracing, stamped by a Professional Engineer registered in the Province of Ontario.
- .3    Samples.
  - .1    Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
  - .2    Submit samples.
    - .1    One sample of each type of brick to be used to replace existing brick.
  - .3    The approved samples denote the standard of material to be used.
- .4    Manufacturer's Instructions.
  - .1    Submit manufacturer's installation instructions.

**1.4            QUALITY ASSURANCE**

- .1    Test Reports.
  - .1    Submit certified test reports showing compliance with specified performance characteristics and physical properties.
  - .2    Submit laboratory test reports in accordance Section 01 33 00 – Submittal Procedures.
  - .3    Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
  - .4    For brick replacement units, submit test reports confirming compressive strength, density and porosity to requirements set out in referenced CSA and ASTM Standards.
- .2    Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3    Mock-ups.
  - .1    Construct mock-up panel of exterior masonry wall construction 1200 mm x 1800 mm minimum showing masonry colours and textures, jointing, mortar, tooling, workmanship and cleaning procedures.
  - .2    For repointing, mock-up must include samples of saw-cut joints, raked joints, backpointed joints, and finishpointed joints, for both horizontal and vertical applications.
  - .3    Mock-up will be used:

- .1 To judge workmanship, substrate preparation, operation of equipment and material application.
  - .4 Construct mock-up where directed.
  - .5 Allow 48 hours for inspection of mock-up by NCC Representative before proceeding with work.
  - .6 When accepted by NCC Representative, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
  - .7 Start work only upon receipt of written approval of the mock-up by the NCC Representative.
  - .8 Allow for 3 mock-ups of different brick types and mortar colours.
- .4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
  - .6 The principal mason and site superintendent, engaged by the Masonry Contractor must have a minimum of ten (10) years experience with historic masonry conservation similar to this project, and can demonstrate an ability to pass a hands-on test of skills, if so administered by the NCC Representative. These individuals must be identified prior to signing of Contract. The NCC Representative has the right to reject either of these individuals, if their qualifications cannot be substantiated. The NCC Representative has the right to reject any mason who does not demonstrate the appropriate abilities or experience on the following tasks:
    - .1 Raking joints by hand.
    - .2 Historical repointing.
  - .7 All masons employed on this project must demonstrate the ability to reproduce the mock up standards.
  - .8 All masons employed on this project must meet the above requirements. Where, during the course of the project, masons leave the work force, replacement masons must also meet all the requirements.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with manufacturer's requirements.
- .2 Deliver materials to job site in dry condition.
- .3 Storage and Protection.
  - .1 Keep materials dry until use.
  - .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

## **1.6 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, corrugated cardboard packaging material for recycling in accordance with local collection services.
- .3 Unused metal materials are to be diverted from landfill to a metal recycling facility as approved by NCC Representative.
- .4 Unused or damaged masonry materials must be diverted from landfill to a local facility as approved by NCC Representative.

## 1.7 SITE CONDITIONS

- .1 Site Environmental Requirements.
  - .1 Cold weather requirements: Supplement Clause 6.7.2 of CAN/CSA A371 with following requirements:
    - .1 Maintain temperature of mortar between 5°C and 30°C until batch is used or becomes stable.
    - .2 Maintain ambient temperature between 5°C and 30°C and protect site from wind chill.
    - .3 Cover mortar less than 7 days old with tarpaulins when temperature is forecast to fall below 5°C, and insulated tarpaulins when temperature is forecast to fall below 0°C.
    - .4 Provide heating of masonry work when air temperature falls below -5°C.
    - .5 Maintain mean temperature of masonry above 0°C for a minimum of 7 days, after mortar is installed.
    - .6 Do not repoint if the temperature is forecast to drop below -5°C in the following 24 hours.
    - .7 Each unheated section of wall must be preheated in it's enclosure for a minimum period of 72 hours above 10°C, before any mortar is applied.
  - .2 Hot weather requirements:
    - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
    - .2 Protect masonry 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.
    - .3 Spray the mortar surface at intervals to keep it moist, for a minimum of three days after installation.
  - .3 Maintain minimum/maximum thermometers and relative humidity gauges on site and maintain a daily record of temperature and humidity.

## 1.8 PERFORMANCE

- .1 The following will be considered deficiencies in the work in addition to any failure to meet other provisions of these specifications:
  - .1 Mortar shrinkage cracks between units.
  - .2 Unfilled joints.
  - .3 Spalling of units or joints.
  - .4 Poor colour or texture blending of joints or units.
  - .5 Dusting, efflorescence of joints or units.
  - .6 Surface discolouration, discoloration, variance of colour or crumbling of mortar.
  - .7 Failure of anchors of built-in items.
  - .8 Sloppy fitting, or otherwise poor workmanship in leveling, bedding or jointing of units.
  - .9 Failure to match adjacent work or failure to match control test area.
  - .10 Failure to adequately cure the mortar.

## Part 2 Products

### 2.1 MATERIALS

- .1 Masonry materials are specified in Related Sections.
- .2 Mortar and grouting materials: See Section 04 03 08 – Historic - Mortaring.

**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 PREPARATION**

- .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
- .2 Bracing must be approved by NCC Representative.

**3.3 INSTALLATION**

- .1 Masonry work in accordance with CAN/CSA A371 except where specified otherwise.

**3.4 CONSTRUCTION**

- .1 Jointing: For joint finishing, see Section 04 03 07 – Historic – Masonry Repointing and Repair.

**3.5 SITE TOLERANCES**

- .1 Tolerances: Conform to Clause 6.2 of CAN/CSA-A371, unless otherwise noted.

**3.6 FIELD QUALITY CONTROL**

- .1 Inspection and testing will be carried out by Testing Laboratory designated by NCC Representative.
- .2 Owner will pay costs for testing.

**3.7 CLEANING**

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.8 PROTECTION**

- .1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1            Section 04 05 10 – Common Work Results for Masonry.

**1.2            REFERENCE STANDARDS**

- .1            Canadian Standards Association (CSA)
  - .1            CAN/CSA A82-06, Fired Masonry Brick Made from Clay or Shale.
  - .2            CAN/CSA A165 Series - 04, CSA Standards on Concrete Masonry Units.
  - .3            CAN/CSA A179-04 (R2009), Mortar and Grout for Unit Masonry.
  - .4            CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.
  - .5            CSA S304-04, Design of Masonry Structures.

**1.3            SUBMITTALS**

- .1            Product Data
  - .1            Provide manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures.
- .2            Samples
  - .1            Submit two samples of replacement face brick, matching existing as closely as possible in colour, size and aesthetics.

**1.4            QUALITY ASSURANCE SUBMITTALS**

- .1            Test and Evaluation Reports: Submit certified test reports in accordance with Section 04 05 10 – Common Works Results for Masonry, supplemented as follows:
  - .1            Provide compressive strength, density and porosity values for proposed replacement brick.
  - .2            Provide compressive strength, density and porosity values for existing brick for comparison purposes.
- .2            Mock-ups: Construct mock-ups of replacement brick installation as per Section 04 05 10 – Common Work Results for Masonry.

**1.5            PRODUCT HANDLING & STORAGE**

- .1            Deliver materials to job site in dry condition and maintain dry until use.
- .2            Completely cover masonry units waterproof material and store on pallets or plank platforms held off ground by means of plank or timber skids.

**1.6            PROTECTION**

- .1            Protect masonry and adjacent work from marking and damage. Protect finished faces from mortar droppings with non-staining coverings. Install protective planks to prevent damage to completed work, where necessary.
- .2            Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

## **1.7 WARRANTIES**

- .1 Contractor hereby warrants that masonry work shall remain free from defects in workmanship and materials for two (2) years.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Face brick: Clay type to CAN/CSA A82, extruded brick, strength, density, porosity, size, texture and colour to match existing bricks. Acceptable product: Ibstock Orange or similar; 22 MPa compressive strength; 16.6% absorption rate.
- .2 Mortar and grouting materials: See Section 04 03 08 – Mortaring.

### **2.2 MIXES**

- .1 Mortar and grout mixes to conform to CAN/CSA A179.
- .2 Mix mortar in accordance with clauses relating to Property Specifications. For Brick Masonry, use Type N mortar and grout. Colour of mortar to match existing.
- .3 Do not use accelerators or other additives with mixes unless approved by NCC Representative.

## **Part 3 Execution**

### **3.1 ERECTION GENERAL**

- .1 Build masonry plumb, level and true to line with joints of uniform width.

### **3.2 BRICK SALVAGE**

- .1 In areas of work, identify salvageable bricks with NCC Representative.
- .2 Carefully dismantle, clean and store bricks for re-use.

### **3.3 FACE BRICK ERECTION**

- .1 Bond: Match existing.
- .2 Coursing height: Match existing.
- .3 Clean dust and brick fragments from slot. Before proceeding with work, inspect cleaned surface with NCC Representative.
- .4 Finish joints to match those of existing brickwork.

### **3.4 TOLERANCES**

- .1 Deviation in joint thickness +/- 3mm.

### **3.5 REINFORCING, TYING & ANCHORING**

- .1 Confirm composition of back-up masonry prior to installation of new brick.
- .2 Install anchor in accordance with manufacturer's instructions.
- .3 Make good the hole and seal the surface with mortar of the same colour as the brick.

### **3.6 JOINTING**

- .1 Carry out masonry jointing and tooling as work progresses. Compress mortar firmly into joints.
- .2 Provide tooled joints in walls to follow profile of existing.

### **3.7 MASONRY CLEANING**

- .1 After erection, clean off traces of excess mortar, efflorescence, sealant and dirt stains from walls to remain exposed.
- .2 Do not use acids for masonry cleaning purposes. If required, use a proprietary brand for cleaning compound, following manufacturer's directions.
- .3 Allow mortar droppings to partially dry, then remove by means of trowel, followed by rubbing lightly with small piece of brick and finally by brushing.

**END OF SECTION**

## **Part 1 General**

### **1.1 SECTION INCLUDES**

- .1 Shop fabricated miscellaneous metal items including service platform c/w platform ladder, platform gate, guard and hinged metal panel.
- .2 Access ladder to Access hatch.

### **1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submission procedures

### **1.3 REFERENCES**

- .1 [ASTM A53/A53M-12 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.]
- .2 [CSA-W48-06 (R2011) - Filler Metals and Allied Materials for Metal Arc Welding.]
- .3 [CSA-W55.3-08 - Certification of Companies for Resistance Welding of Steel and Aluminum.]

### **1.4 SUBMITTALS FOR REVIEW**

- .1 Section 01 33 00: Submission procedures.
- .2 Shop Drawings:
  - .1 Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - .2 Indicate welded connections using standard welding symbols. Indicate net weld lengths.
  - .3 Shop drawings shall bear the signed stamp of a professional engineer registered in the Province of Ontario.

### **1.5 QUALITY ASSURANCE**

- .1 Welders' Certificates: Certifying welders employed on the Work, verifying qualification within the previous 12 months to CSA W35.3-08 and CSA W55.3-08.

## **Part 2 Products**

### **2.1 MATERIALS - STEEL**

- .1 Steel Sections and Plates: CSA-G40.20/G40.21, Grade 350W.
- .2 Steel Pipe: ASTM A53/A53M, standard weight extra strong, galvanized finish.
- .3 Bolts, Nuts, and Washers: ASTM A307, [galvanized to ASTM A153/A153M for galvanized components].
- .4 Welding Materials: To CSV W53.
- .5 Shop and Touch-Up Primer: CAN/CGSB-1.40

### **2.2 GUARD**

- .1 PIPE: ASTM A53, Grade B Schedule 40.



- .2 Railings and Posts: HSS sections
- .3 Fittings: Elbows, T-shapes, wall brackets, escutcheons, cast steel.
- .4 Mounting: brackets and flanges, with steel inserts for casting in concrete.
- .5 Galvanizing: To ASTM A123, provide minimum 380 g/sq m galvanized coating.

### **2.3 ACCESS LADDERS**

- .1 Steel side rails: 65, x 10 mm thick.
- .2 Steel Rungs: 20mm diameter, welded to stringers at 300 mm centres maximum. Non-slip surface.
- .3 Attachment and anchor bolts: minimum diameter of 12 mm. Maximum spacing of attachment points is 3 m.
- .4 Prime paint for interior.
- .5 Accessories: Ladder guards
  - .1 Size per drawings
  - .2 20 gauge tick aluminum
  - .3 Mount on ladder side rails with hinges on one side as shown and a clasp and lock on the other side.

### **2.4 PLATFORM GATE**

- .1 Size per drawing.
- .2 Self closing hardware c/w stop.

### **2.5 FINISHES - STEEL**

- .1 Clean surfaces of rust, grease, and foreign matter prior to finishing.
- .2 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .3 Prime paint items with one (1) coat.
- .4 Structural Steel Members: Galvanize after fabrication to CAN/CSA-G164. Provide minimum 600 g/sq m galvanized coating.
- .5 Non-structural Items: Galvanized after fabrication to provide a minimum 380 g/sq m galvanized coating.

### **Part 3 Execution**

#### **3.1 INSTALLATION**

- .1 Install items plumb and level, accurately fitted, free from distortion or defects.
- .2 Field weld components indicated on Shop Drawings.
- .3 Perform field welding to CSA W59 requirements.
- .4 Obtain approval prior to site cutting or making adjustments not scheduled.
- .5 After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

#### **3.2 FABRICATION TOLERANCES**

- .1 Section 01 73 00: Tolerances.
- .2 Maximum Variation From Plumb: 6 mm per story, non-cumulative.
- .3 Maximum Offset From True Alignment: 6 mm.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1    ASTM International
  - .1    ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2    ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .2    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-11.3-M87, Hardboard.
- .3    CSA International
  - .1    CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .2    CSA O121-08, Douglas Fir Plywood.
  - .3    CSA O141-05(R2009), Softwood Lumber.
  - .4    CSA O151-09, Canadian Softwood Plywood.
  - .5    CAN/CSA-Z809-08, Sustainable Forest Management.
- .4    Forest Stewardship Council (FSC)
  - .1    FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .5    National Lumber Grades Authority (NLGA)
  - .1    Standard Grading Rules for Canadian Lumber 2010.

**1.2                QUALITY ASSURANCE**

- .1    Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2    Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
- .3    Sustainable Standards Certification:
  - .1    Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1    Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2    Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3    Storage and Handling Requirements:
  - .1    Store materials off ground, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2    Store and protect wood from nicks, scratches, and blemishes.
  - .3    Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 FRAMING STRUCTURAL AND PANEL MATERIALS**

- .1 Description:
  - .1 Sustainability Characteristics:
    - .1 Lumber, CAN/CSA-Z809 or FSC or SFI certified.
    - .2 Plywood, urea-formaldehyde free, CAN/CSA-Z809 or FSC certified.
  - .2 Lumber: softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
    - .1 CSA O141.
    - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
    - .1 S2S is acceptable for Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers.
    - .2 Board sizes: "Standard" or better grade.
    - .3 Dimension sizes: "Standard" light framing or better grade.
    - .4 Post and timbers sizes: "Standard" or better grade.
  - .4 Plywood, OSB and wood based composite panels: to CSA O325.
  - .5 Douglas fir plywood (DFP): to CSA O121, standard construction.
  - .6 Canadian softwood plywood (CSP): to CSA O151, standard construction.

### **2.2 ACCESSORIES**

- .1 Nails, spikes and staples: to CSA B111.
- .2 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .4 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Consultant.
- .5 Fastener Finishes:
  - .1 Galvanizing: to ASTM A653, use galvanized fasteners for exterior work and pressure-treated lumber.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of NCC Representative and Consultant.
- .2 Inform NCC Representative and Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative and Consultant.

### **3.2 MATERIAL USAGE**

- .1 Roof sheathing:
  - .1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, square edge, 15.5 mm thick, or to match existing.

### **3.3 INSTALLATION**

- .1 Install members true to line, levels and elevations, square and plumb.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install spanning members with "crown-edge" up.
- .4 Install roof sheathing in accordance with requirements of NBC.
- .5 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .6 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .7 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.
- .8 Install sleepers as indicated.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .10 Countersink bolts where necessary to provide clearance for other work.
- .11 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

### **3.4 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

### **3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by rough carpentry installation.

**END OF SECTION**

## **1 General**

1.1 **This specification section applies to the SBS Roof installation at 161 Middle Street in Ottawa, Ontario. The level three roof will be installed over a new structural steel deck which is replacing the existing concrete deck.**

### **1.2 Scope of Work**

- .1 Install new kraft vapour barrier, adhering all side and end laps.
- .2 Install new Polyisocyanurate insulation loose laid.
- .3 Install mechanically attached asphaltic Insulation Overlay Board.
- .4 Install torch applied SBS base sheet field membrane
- .5 Install Self-Adhesive SBS base sheet flashings.
- .6 Install torch applied cap sheet and cap sheet flashings.
- .7 Complete miscellaneous waterproofing details
- .8 Install new metal flashings.

### **1.3 REFERENCE STANDARD(S)**

- .1 Roofing and sheet metal work will be performed in conformance with the roofing manufacturer's written recommendations as well as the requirements of the Canadian Roofing Contractors Association (CRCA).
- .2 The roofing system offered must meet the requirements of CAN/ULC-S107-10 "Standard Methods of Fire Tests of Roof Coverings Class C."
- .3 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft)-1985, Membrane Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .4 CAN/ULC-S704-2001 Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Fixed.

### **1.4 COMPATIBILITY**

- .1 All waterproofing materials will be single sourced from the same manufacturer.

### **1.5 SUBMITTALS**

- .1 Submit two (2) copies of the most current technical data sheets. These documents must describe the materials' physical properties.

### **1.6 QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT**

- .1 The manufacturer of elastomeric bitumen products will provide proof of ISO 9001 and ISO 14001 Certifications.

### **1.7 CONTRACTOR QUALIFICATION**

- .1 Roofing contractors and sub-contractors must, when tendering and performing work, possess a roofing contractor operating license.

- .2 Roofing contractors must also be registered with MANUFACTURER's certification program and provide the NCC Representative with a MANUFACTURER certificate to this effect as part of tender package.
- .3 Only qualified, certified installers employed by a company with the appropriate equipment may execute the roofing work.
- .4 Roofing Contractor must be a member in good standing with the Canadian Roofing Contractors Association (CRCA).
- .5 Roofing Contractor must demonstrate a corporate history of successful completion of similar projects during the last 5 years.

#### 1.8 **MANUFACTURER'S REPRESENTATIVE**

- .1 The roofing product manufacturer must delegate a representative to visit the work site at the start of roofing installation, upon completion, and at all other times as required to enable them to warrant the completed work. It is incumbent upon the Roof Contractor to ensure this takes place.
- .2 The contractor must at all times enable and facilitate access to the work site by said representative.

#### 1.9 **INSPECTION**

- .1 Roofing installation inspection will be done by the NCC Representative chosen by the owner.
- .2 All inspection fees will be paid by the owner, unless deficient workmanship results in additional and unforeseen inspection requirements. Additional inspections due to poor workmanship or planning may be invoiced to the contractor

#### 1.10 **PRE-INSTALLATION MEETING**

- .1 Hold an on-site pre-installation meeting prior to start of waterproofing works, with the roofing contractor's representative, roofing foreman, and the consultant. The purpose of this meeting is to review installation conditions particular to the project. Establish a report for this meeting.

#### 1.11 **STORAGE AND DELIVERY**

- .1 All materials will be delivered and stored in conformance with the written requirements described in the MANUFACTURER'S MANUAL; they must remain in their original packaging, displaying the manufacturer's name, product name, weight, and reference standards, as well as all other indications or references considered standard.
- .2 At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance. Only materials destined for same-day use can be removed from this storage area.
- .3 In cold weather, these materials should be stored in a heated area at a minimum temperature of +10<sup>0</sup>C and removed prior to application. If rolls cannot be stored in a heated environment, they may be pre-conditioned before installation. For precise description, please consult MANUFACTURER'S "Roofers' Guide" on membrane application procedures.



- .4 Store adhesives and emulsion-based waterproofing mastics at a minimum +5°C. Store adhesives and solvent-based mastics at sufficient temperatures to ensure ease of application.
- .5 Materials delivered in rolls will be carefully stored upright; flashing will be stored to avoid creasing, buckling, scratches or any other possible damage.
- .6 Avoid material overloads which may affect the structural integrity of specific roof areas.

#### 1.12 FIRE PROTECTION

- .1 Prior to the start of work, conduct a site inspection to establish safe working practices and make sure that all procedures and proposed changes are approved to minimize the risk of fires.
- .2 Respect safety measures as required by local authorities, as described in the MANUFACTURER's Specifications Manual as well as CRCA recommendations.
- .3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.
- .4 Never apply the torch directly to old and wood surfaces.
- .5 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 metres of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products. Torches should never be used where the flame is not visible or cannot be easily controlled.

#### 1.13 WARRANTIES

- .1 The membrane manufacturer will issue a written document in the owner's name, valid for a 10 year period, saying that it will repair any leaks in the roofing membrane to restore the roofing system to a dry and watertight condition, to the extent that defects in roofing material or installation methods caused water infiltration. The warranty must cover for the entire cost of the repair(s), excluding removal of overburden, during the entire warranty period. The warranty must be transferable, at no extra cost, to subsequent building owners.
  - .1 Specified Warranty: PLATINUM Warranty by SOPREMA or approved equal
- .2 The contractor will provide a written and signed document to the owner certifying that the work executed will remain in place and free of waterproofing defect for a period of 2 years from the date of acceptance.

## 2 Products

2.1 **The system has been designed using Soprema manufactured products. Product equivalents from other manufacturers will be considered upon submittal and review of technical data sheets and warranty specimen demonstrating product equivalence.**

#### 2.2 VAPOUR BARRIER:

- .1 Kraft Paper Vapour Barrier
  - .1 Description: Vapour barrier composed of two layers of high moisture resistance Kraft paper bonded together with asphalt.

- .2 In conformance with: ASTM E96.
- .3 Specified product: SOPRASTOP by SOPREMA or approved equal.

### 2.3 INSULATION

- .1 Description: Closed-cell, polyisocyanurate foam core integrally laminated to heavy, black (non-asphaltic), fibre-reinforced organic felt facers
- .2 LTTR (long-term thermal resistance) values determined in accordance with CAN/ULC-S770 and ASTM C 1289.
- .3 1.2 m. x 2.4 m (4'x 8'). Thickness 84 mm (3.5") R-20
- .4 Specified product: Sopra-Iso by SOPREMA or approved equal.

### 2.4 INSULATION OVERLAY

- .1 Bituminous panels:
  - .1 Description: Multi-ply, semi-rigid asphaltic roofing substrate board composed of a mineral fortified asphaltic core formed between two asphaltic saturated fibreglass liners. Length 1.2 m. x width 1.5 m x thickness 3.2 mm.
  - .2 Specified product: SOPRABOARD by SOPREMA. or approved equal.

### 2.5 MEMBRANES

- .1 Roof membrane base sheet
  - .1 Description: Roofing membrane with non-woven polyester reinforced and SBS modified bitumen. Both sides are covered with a thermofusible plastic film. The top face must be marked with three (3) distinctive blue chalk lines to ensure proper roll alignment.
  - .2 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft)
  - .3 Specified product: SOPRALENE FLAM 180 by SOPREMA or approved equal.
- .2 Roof membrane base sheet flashing:
  - .1 Description: Roofing membrane with glass mat and SBS modified bitumen. The top face is covered with a thermofusible plastic film. The underface is self-adhesive. The top face must be marked with three (3) distinctive chalk lines to ensure proper roll alignment.
  - .2 Properties:
    - .1 Cold bending at  $-30^{\circ}\text{C}$ : No cracking.
  - .3 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft)
  - .4 Specified products: SOPRAFLASH FLAM STICK by SOPREMA or approved equal.
- .3 Roofing membrane cap sheet and cap sheet flashing
  - .1 Description: Roofing membrane with non-woven polyester reinforced elastomeric bitumen. The top face is protected by coloured granules. The underface is covered with a thermofusible plastic film.
  - .2 Characteristics:
    - .1 Cold bending at  $-30^{\circ}\text{C}$ : No cracking.
    - .2 Softening point:  $\geq 110^{\circ}\text{C}$ .

- .3 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft)
- .4 Specified products: SOPRALENE FIAM 250 GR by SOPREMA, grey in colour, or approved equal.

## 2.6 ACCESSORY MEMBRANES

- .1 Reinforcement membrane:
  - .1 Description: Roofing membrane with non-woven polyester reinforced and SBS modified bitumen. Both sides are covered with a thermofusible plastic film. The top face must be marked with three (3) distinctive blue chalk lines to ensure proper roll alignment.
  - .2 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft)
  - .3 Specified product: SOPRALENE FLAM 180 by SOPREMA or approved equal.
- .2 FLAME-STOP MEMBRANE
  - .1 Description: Self-adhesive membrane composed of a reinforced glass mat and SBS modified bitumen designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.
  - .2 Specified products: SOPRAGUARD tape by SOPREMA or approved equal

## 2.7 PRIMER

- .1 Primer for heat welded membranes:
  - .1 Description: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied waterproofing membranes.
  - .2 Specified product: ELASTOCOL 500 by SOPREMA or approved equal.
- .2 Primer for self-adhesive membranes
  - .1 Description: ELASTOCOL STICK: Composed of SBS synthetic rubber, volatile solvents, adhesive enhancing resins and volatile solvent used to prime porous substrates and non-porous substrates such as wood, concrete or metal to enhance the adhesion of self-adhesive membranes at temperatures above - 10°C.
  - .2 Specified product: ELASTOCOL STICK by SOPREMA or approved equal.

## 2.8 COMPLEMENTARY WATERPROOFING PRODUCTS

- .1 Waterproofing mastic:
  - .1 Description: Mastic made of synthetic rubbers, plasticized with bitumen and solvents. Aluminum pigments are added to SOPRAMASTIC ALU to provide greater resistance to U.-V.
  - .2 Specified product: SOPRAMASTIC ALU by SOPREMA or approved equal.
- .2 Sealing product
  - .1 Description: Composed of a bitumen/polyurethane waterproofing mono-component and polyester reinforcements. Designed to finish upstands and details.
  - .2 Specified product: ALSAN FLASHING by SOPREMA or approved equal.

## 2.9 FASTENERS

- .1 Insulation fasteners
  - .1 Description: Pre-assembled, #12 fasteners with galvanized metal insulation plate
  - .2 Meets Factory Mutual corrosion-resistance Standard 4470.
  - .3 Fastener length to allow minimum penetration 19mm (3/4") depth into substrate as per manufacturer's recommendations
  - .4 Specified Product: Dekfast #12 by SFS Intec or approved equal.

## 2.10 ROOF ANCHOR FLASHINGS

- .1 Description: Pre-fabricated stack jack flashings consisting of a spun aluminum flashing sleeve with integral flange, pre-molded urethane insulation liner, EPDM Triple Pressure Grommet Seal and EPDM Base Seal.
- .2 Specified Product: SJ-37 Stack Jack by Thaler Metals or approved equal

## 3 EXECUTION

### 3.1 SURFACE EXAMINATION AND PREPARATION

- .1 Surface examination and preparation must be completed in conformance with recommendations in the MANUFACTURER Specifications Manual, particularly for fire safety precautions.
- .2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood blocking) as well as upstands and parapets, construction joints, roof drains, plumbing vents, ventilation outlets and others. The start of roofing work will mean roofing conditions are acceptable for work completion.
- .3 Do not begin any work before surfaces are smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other work has been duly completed.
- .5 No materials will be installed during rain or snowfall.

### 3.2 SET-UP

- .1 Advise consultant of set-up schedule.
- .2 Set-up dumpster and rooftop access at designated areas.

### 3.3 SITE PROTECTION

- .1 Protect finished work to avoid damage during roof installation and material transportation. Install protective boardwalks over installed roofing materials to enable passage of people and products. Assume full responsibility for any damage.

### 3.4 CLEANING

- .1 The work site must be routinely cleared of rubbish and other materials which may hinder roof installation, performance, or present a fire hazard.

### 3.5 EQUIPMENT FOR WORK EXECUTION

- .1 Maintain all roofing equipment and tools in good working order.

### 3.6 REMOVALS

- .1 Remove all existing roofing membrane and metal flashings down to structural deck.
- .2 Prepare existing roof membrane to receive new roofing system.

### 3.7 METHOD OF INSTALLATION

- .1 Roofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.
- .2 It's preferable to seal all seams that are not covered by a cap sheet membrane in the same day. The cap sheet cannot be installed if any moisture is present at/in the base sheet seams.
- .3 Whenever membranes are torch-applied, a continuous and even bead of molten bitumen must be visible as the membrane is unrolled and heat welded.
- .4 Ensure waterproof conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents, drains, etc.).
- .5 Complete all work (temporary supports for equipment and bases, disconnection and connection of equipment as needed, moving and lifting of bases, etc.) required for waterproofing beneath equipment and bases as shown on drawings; use qualified trade persons as required. Temporary supports for waterproofing beneath air-conditioning units must be designed to hold unit loads and distribute these loads to avoid structural damage. Avoid unplanned interruption of functioning equipment during roofing. Unavoidable interruptions must be planned with the owner and may be scheduled outside normal working hours.

### 3.8 INSTALLATION OF KRAFT-LAMINATED VAPOUR RETARDER

- .1 Unroll the vapour retarder to substrate and seal joints with recommended adhesive in conformance with manufacturer's recommendations.

### 3.9 INSULATION INSTALLATION

- .1 Install boards loose-laid on vapour barrier, butting ends snugly and without warping.
- .2 Cut boards as required to fit snugly around all roof penetrations, curbs and parapets
- .3 Install only as much insulation as can be covered in the same day.
- .4 Around the drains, install pre-manufactured sumps 8' x 8' sumps reducing insulation thickness from 3" to 2" at all drains.

### 3.10 INSTALLATION OF INSULATION OVERLAY

- .1 Install fasteners as per membrane manufacturer's requirements, minimum 6 fasteners per 4'x5' board in the field. Fastener spacing and density and spacing must correspond to manufacturer's requirements for tested system. Respect FM Global standards pertaining to number and placement of fasteners, namely Bulletin 1-28 for additional fastening to roof perimeters and corners. Fasteners must be attached to steel deck's **upper** flutes.
- .2 All vertical joints between boards and insulation will be staggered.
- .3 Apply only as many boards as can be covered in the same day.

### 3.11 INSTALLATION OF FLAME-STOP MEMBRANES

- .1 Adhere the membrane directly onto the joints in the insulation overlay board by peeling back the silicone release film. SOPRAGUARD TAPE is designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes]

### 3.12 **INSTALLATION OF TORCH APPLIED BASE SHEET**

- .1 Unroll base sheet at drain level with first side lap lined up with drain centre (parallel to roof edge).
- .2 Cut off corners at end laps to be covered by the next roll.
- .3 Heat weld base sheet membrane onto the asphaltic protection board.
- .4 Overlap side laps by 75 mm. along lines provided for this purpose, and overlap end laps by 150 mm. Stagger end joints by a minimum of 300 mm.
- .5 Install to avoid wrinkles, air pockets or fishmouths.

### 3.13 **BASE SHEET FLASHING INSTALLATION (SELF ADHERED)**

- .1 Apply base sheet flashing only after primer coat is dry.
- .2 Before applying membranes, always remove the plastic film on the section to be covered if there is an overlap (inside and outside corners and field surface).
- .3 Position the pre-cut membrane piece. Peel back 100 mm to 150 mm. (4 in. to 6 in.) of the silicone release paper to hold the membrane in place at the top of the parapet.
- .4 Then, gradually peel back the remaining silicone release paper, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the upstand and the field surface. Smooth the entire membrane surface with a roller for full adhesion.
- .5 Cut off corners at end laps to be covered by the next roll.
- .6 Install a reinforcing gusset in all inside and outside corners.
- .7 Always seal overlaps at the end of the workday.

### 3.14 **INSTALLATION OF REINFORCED GUSSETS**

- .1 Install gussets at every angle, on inside and outside corners.
- .2 Install the thermofusible gussets after installing the self-adhesive base sheet membrane.

### 3.15 **INSTALLATION OF REINFORCEMENT MEMBRANES**

- .1 Install reinforcement membrane as per the illustrated details in the technical documentation of the membrane manufacturer

### 3.16 **INSTALLATION OF TORCH-APPLIED CAP SHEET**

- .1 Unroll cap sheet at drain level with first side lap lined up with drain centre (parallel to roof edge).
- .2 Torch base sheet entirely onto prepared substrate. Overlap side laps by 75 mm. along lines provided for this purpose, and overlap end laps by 150 mm. Stagger end joints by a minimum of 300 mm.

- .3 Torch sufficiently and continuously to avoid wrinkles, air pockets or fishmouths. In cold weather, adjust welding time to obtain homogenous seam (it may be necessary to slow down in certain cases.)
- .4 Cut off corners at end laps to be covered by the next roll.

**3.17 INSTALLATION OF CAP SHEETS ON UPSTANDS AND PARAPETS (HEAT-WELDED)**

- .1 This cap sheet must be installed in one-metre-wide strips.
- .2 The side joints must overlap by 75mm and must be staggered by at least 100 mm. with respect to the joints of the cap sheet on the field surface, to avoid areas of excessive membrane thickness. The overlaps on the field surface must be 150 mm.
- .3 At end laps, angle-cut the corners that will be covered by the following roll.
- .4 Use a chalk line to draw a straight line on the field surface 150 mm. from the upstands and parapets.
- .5 Use a propane torch and round-nose trowel to embed the surface granules in the layer of hot bitumen on the granulated vertical surfaces that are to be overlapped.
- .6 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top. This technique softens both membranes in order to obtain even, continuous weld.
- .7 During installation, be careful not to overheat the membrane or to create excessive bitumen bleed-out at the joints.

**3.18 WATERPROOFING FOR VARIOUS DETAILS**

- .1 Install waterproofing membranes in conformance with various roofing details illustrated in the manufacturer' installation manual.
- .2 Ensure all mechanical and electrical penetrations are completed using wire outlet posts, insulated doghouse detail with side penetrations 200mm (8" ) above finished roof membrane. Pitch Pocket details are not acceptable.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 The Aluminum Association Inc. (AAI)
  - .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
  - .2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .3 ASTM A606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
  - .4 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .5 ASTM A792/A792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - .6 ASTM B32-04, Standard Specification for Solder Metal.
  - .7 ASTM B370-03, Standard Specification for Copper Sheet and Strip for Building Construction.
  - .8 ASTM D523-89(1999), Standard Test Method for Specular Gloss.
  - .9 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA)
  - .1 Roofing Specifications Manual 1997.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
  - .2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
  - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
  - .2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.
  - .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .6 Green Seal Environmental Standards
  - .1 Standard GS-03-93, Anti-Corrosive Paints.
  - .2 Standard GS-11-97, Architectural Paints.
  - .3 Standard GS-36-00, Commercial Adhesives.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .8 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.



- .9 Product Data:
  - .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets
- .10 Shop Drawings:
  - .1 Shop drawings: submit drawings requested by NCC Representative.
- .11 Samples:
  - .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.
- .12 Quality assurance submittals: submit following in accordance with Section 01 33 00.
  - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

## 1.2 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with contractor's representative and NCC Representative, and Engineer to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building sub trades.
  - .4 Review manufacturer's installation instructions and warranty requirements.

## 1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturers' instructions.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for recycling.

## 2 Part 2 Products

### 2.1 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied silicone modified polyester, Class F1S, Series 8000.
- .2 Colour selected by Owner/ The NCC Representative from manufacturer's standard range.
- .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
- .4 Coating thickness: to be not less than 25 micrometres.
- .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate than 20% to ASTM D822 as follows:
  - .1 Outdoor exposure period 1000 hours.
  - .2 Humidity resistance exposure period 1000 hours.
  - .3 Base metal thickness 0.58 mm (24 gauge) unless indicated otherwise. Base metal to be hot-dipped galvanized steel with coating designation Z7275 (G90).

## **2.2 ACCESSORIES**

- .1 Sealing Compound: one component polyurethane base caulking compound to CGSB 19.13-M87. Standard of Acceptance shall be Tremco Dymonic, Sikaflex 1a by Sika, or Sternson RC-1. Sealing compound to be installed in accordance with manufacture's recommendations.
- .2 Cleats and Continuous Starters: of same material and temper as sheet metal, minimum 50.8 mm (2") wide. Thickness of continuous starter to be 24 gauge.
- .3 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .4 Exposed fasteners: Prefinished steel screws, hexagonal head with colour to match metal flashing colour, with neoprene washers.
- .5 Touch-up paint: as recommended by metal flashing and trim manufacturer.

## **2.3 FABRICATION**

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series specifications as indicated.
- .2 For pieces in 2400 mm (96") maximum lengths.
- .3 Make allowances for expansion at joints.
- .4 Hem exposed edges on underside 12 mm (1/2").
- .5 Mitre and seal corners with sealant.
- .6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

## **2.4 METAL FLASHINGS**

- .1 Form flashings, copings and drip edges to profiles indicated on drawings, from 0.58 mm thick (24 ga,) prefinished steel.
- .2 Provide slip-lock type joints for vertical faces and coping. Provide 76.2 mm (3") lap joints at horizontal drip edges.

## **3 Execution**

### **3.1 INSTALLATION**

- .1 Install sheet metal and metal siding in accordance with CRCA, SMACNA and manufacturer's specifications, and as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Lock end joints and caulk with sealant.
- .4 Install surface cut reglets true and level, and caulk top of reglet with polyurethane sealant.
- .5 Prime all metal edges to be in contact with membrane as per manufacturers recommendations.
- .6 Provide a sheet metal flashing mock-up for review and approval by the NCC Representative and the Owner prior to fabrication.

**END OF SECTION**

---

---

## **Part 1 General**

### **1.1 SECTION INCLUDES**

- .1 Prefabricated roof hatches complete with component requirements for installation.

### **1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submission procedures.
- .2 Section 07 55 50 – Modified Roof Assembly Concrete Deck
- .3 Section 07 62 00 – Sheet Metal Flashing & Trim
- .4 Section 07 92 00 – Joint Sealant

### **1.3 REFERENCES**

- .1 FM (Factory Mutual) - Roof Assembly Classifications.

### **1.4 SUBMITTALS FOR REVIEW**

- .1 Shop Drawings: Provide data on unit construction, sizes, configuration, jointing methods and locations when applicable, and attachment method.

### **1.5 SUBMITTALS FOR INFORMATION**

- .1 Manufacturer's Installation Instructions: Indicate special installation criteria, interface with adjacent components.

### **1.6 CLOSEOUT SUBMITTALS**

- .1 Submit routine inspections intervals and maintenance procedures.

## **Part 2 Products**

### **2.1 ROOF HATCH**

- .1 Manufacturers: Bilco Type E Roof Hatch or approved equivalent.
- .2 Substitutions: Refer to Section 01 00 00, Art. 3.1.
- .3 Unit: 914 x 914 mm size, single leaf type.
- .4 Integral Steel Curb: 305 mm galvanized steel with 25 mm rigid glass fibre insulation; integral cap flashing to receive roof flashing; extended flange for mounting.
- .5 Flush Steel Cover: 2 mm galvanized steel; 25 mm glass fibre insulation; 0.8 mm steel interior liner; continuous neoprene gasket to provide weatherproof seal.
- .6 Hardware: Cadmium plated finish:
- .7 Compression spring operator and shock absorbers;
- .8 Steel manual pull handle for interior and exterior operation;
- .9 Steel hold open arm with vinyl covered grip handle for easy release;
- .10 Hinges: Manufacturer's recommended type.
- .11 Accessories:

- .1 Safety Bar, 38 mm steel tubing, externally mounted, by Lexcor or approved equivalent.
- .2 Bil-Guard hatch railing system Model RL – E by Bilco to meet OSHA 29 CR 1910.23 and to provide a self closing and latching gate to protect the opening at all times.
- .3

## **2.2 FABRICATION**

- .1 Fabricate components free of visual distortion or defects. Weld corners and joints.
- .2 Provide for removal of condensation occurring within components or assembly.
- .3 Fit components for weather tight assembly.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install roof hatch to manufacturer's written instructions.
- .2 Coordinate with installation of roofing system and related flashings for weather tight installation.
- .3 Apply bituminous paint on surfaces of units in contact with cementitious materials or dissimilar metals.
- .4 Adjust hinges for smooth operation.

**END OF SECTION**

**Part 1 GENERAL**

**1.1 SCOPE OF WORK**

- .1 This Section contains requirements for the installation of sealants and related caulking materials components and accessories.
- .2 Work of this section includes cleaning and/or cutting of reglet joints where shown on the Drawings.

**1.2 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
- .2 CGSB 19-GP-14M-[1984], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

**1.3 SUBMITTALS**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
  - .1 Caulking compound.
- .3 Cured samples of exposed sealants for each color where required to match adjacent material.
- .4 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Instructions to include installation instructions for each prod

**1.4 QUALITY ASSURANCE/MOCK-UP**

- .1 Construct mock-up to show location, size, shape and depth of joint [s] complete with back-up material, primer, caulking and sealant.
  - .2 Mock-up will be used:
    - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
  - .3 Locate where directed.
  - .4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with sealant work.
  - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work. Remove mock-up and dispose of materials when no longer required and when directed by Consultant.
-

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, handle, store and protect materials in accordance with manufacturer's recommendations.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with snow or ice; do not store directly on ground or rooftop

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .4 Unused material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .5 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Consultant.
- .6 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .7 Fold up metal banding, flatten, and place in designated area for recycling.

**1.7 PROJECT CONDITIONS**

- .1 Environmental Limitations:
  - .1 Do not proceed with installation of joint sealants under following conditions:
    - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
    - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
  - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
  - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

**1.8 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
  - .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
-

- .3 Ventilate area of work as directed by Engineer by use of approved portable supply and exhaust fans as required.

## **1.9 WARRANTY**

- .1 Defective joint sealant installation covered under the warranty shall include but not be limited to: joint leakage, hardening, craze cracking, crumbling, melting, bubbling, shrinkage, runs, and sags, change of colour, loss of adhesion and staining of adjoining or adjacent material surfaces.
- .2 Provide replacement of defective work prior to the end of the warranty period according to the Consultant's recommendations at no additional cost to the Owner.
- .3 Inspect the sealant installation 60 days before expiry of warranty and correct defects within 15 days of inspection. This inspection shall be performed at no additional cost to the Owner.

## **Part 2 PRODUCTS**

### **2.1 COMPATIBILITY**

- .1 Compatibility between components of roofing system is essential. All roofing components which are to be incorporated into the system must be compatible with the designed roofing system.
- .2 At request of the Consultant, provide written declaration from the manufacturer that components/materials to be installed as part of roofing system are compatible and will not reduce the performance of the roofing system or void the Warranty.

### **2.2 MATERIALS**

- .1 Elastomeric Sealants: One part elastomeric, non-sag urethane based sealant.  
Acceptable products:
  - .1 Dymonic as manufactured by Tremco Ltd.or approved equal;
  - .2 Colour or colours of sealants shall be selected to match the substrate and shall be approved by the Consultant.
- .2 Primers of Surfaces to Receive Sealants: As recommended by the Manufacturer of the sealant.
- .3 Joint Backing: Polyethylene, urethane, neoprene or vinyl, extruded foam recommended by the sealant manufacturer. Circular shape with diameter 25% greater than joint width before installation.

## **Part 3 EXECUTION**

---

### **3.1 PROTECTION**

- .1 Protect installed Work of other trades from staining or contamination.

### **3.2 SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

### **3.3 PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

### **3.4 BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

### **3.5 MIXING**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

### **3.6 APPLICATION**

- .1 Sealant.
  - .1 Apply sealant in accordance with manufacturer's written instructions.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.



- .2 Do not cover up sealants until proper curing has taken place.
- .3 Clean-up.
  - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealant.

**END OF SECTION**

## Part 1 General

### 1.1 GENERAL REQUIREMENTS

- .1 Comply with the conditions of the Contract and Division 1 - General Requirements.

### 1.2 SECTION INCLUDES

- .1 Work of this section includes the design, supply and installation of a fall arrest system and equipment.

### 1.3 RELATED SECTIONS

- |    |                                   |                                  |
|----|-----------------------------------|----------------------------------|
| .1 | Structural Steel                  | – see specifications on drawings |
| .2 | Steel Deck                        | – see specifications on drawings |
| .3 | Modified Roof Assembly Metal Deck | Section 07 55 50                 |
| .4 | Sheet Metal Flashing and Trim     | Section 07 62 00                 |
| .5 | Joint Sealants                    | Section 07 92 00                 |

### 1.4 REFERENCES

- .1 All Products or equipment listed herein to conform to:
  - .1 CAN/CSA-Z259.2.1-98 (R2011) - Fall Arresters, Vertical Lifelines and Rails
  - .2 Ontario Occupational Health and Safety Act Window Cleaning Regulation 859/90 as amended by 523/92, and 213/91 as amended by 631/94 (Construction Projects).
  - .3 CSA S16.1 “Steel Structures for Buildings”.
  - .4 CSA S136 “Design of Steel Structural Members, Light Gauge”.
  - .5 CISC 2 “Standard Practice for Steel, Structural, for Buildings”.
  - .6 CSA W59 “Welded Steel Construction,” and CSA W47 “Certification of Companies for Fusion Welding of Steel Structures”.
  - .7 CAN3-S157-M83 “Strength Design in Aluminum”.
  - .8 CAN3-S244-1969 “Welded Aluminum Design”.
  - .9 CSA-W47.2 – 1967 “Aluminum Welding Qualification Code”.
  - .10 CSA G164 “Galvanizing, Hot Dip, of Irregularly Shaped Articles”.

### 1.5 SYSTEM REQUIREMENTS

- .1 All systems herein to conform to the Ontario Building Code 2012, 4.4.4. Anchor Systems on Building Exterior — to be provided where any portion of the roof is more than 8 m (26'-3”) above adjacent ground level, for both suspended maintenance and fall protection.

### 1.6 DESIGN REQUIREMENTS

- .1 Design maintenance system to suit building and in accordance with plans, specifications, standards, and regulations/codes contained in sections 1.4 and 1.9.
- .2 Locate anchorages to suit equipment that will be used on the building with respect to items such as reach, rigging, spacing, roof edge condition, and similar items.
- .3 Design all anchor components to provide adequate attachment to the building and suited to current maintenance practices. Ensure compatibility with industry standard equipment.
- .4 Ensure all anchor components conform to proper engineering principles and have been designed by a Professional Engineer qualified in the design of maintenance equipment, its application and safety requirements.
- .5 Design system fall arrest safety anchors and equipment supports to comply with the following structural requirements:
  1. Fall Arrest Safety Anchors: designed to a maximum fall arresting force of 8.0 kN (1800 lbs) when wearing a body harness with a safety factor of 2 without any permanent deformation and to 22.24 kN (5000 lbs) against fracture or detachment.

#### **1.7 SHOP DRAWINGS AND ENGINEERING CERTIFICATION**

- .1 Submit shop drawings showing complete layout and configuration of complete maintenance system, including all components and accessories. Clearly indicate design and fabrication details, and installation details.
- .2 Shop drawings to include installation and rigging instructions and all necessary Restrictive and Non-Restrictive Working Usage Notes and General Safety Notes.
- .3 Shop drawings to be reviewed by a professional engineer, and upon request, complete with calculations and/or test reports.

#### **1.8 QUALIFICATIONS**

- .1 Manufacturer: Work of this Section to be executed by manufacturer specializing in the design, fabrication and installation of a fall arrest system and equipment having a minimum of 5 years documented experience.
- .2 Loading and safety assurance: Work of this Section to meet the requirements of governing codes and jurisdiction and to comply with properly engineered loading and safety criteria for the intended use.
- .3 Insurance: Manufacturer to carry specific liability insurance (products and completed operations) in the amount of \$10,000,000.00 to protect against product/system failure.
- .4 Welding to be executed by certified welders in accordance with CSA W59 and CSA W47.2 requirements.

#### **1.9 MAINTENANCE DATA**

- .1 Submit 1 copy of system Equipment Manual & Inspection Log Book, with “Initial Inspection - Certification for Use” and “Inspection Sign-Off” forms completed.
- .2 Submit 2 copies of a reduced plastic laminated as-built shop drawing showing equipment locations and details. This drawing is to be posted near exits onto the roof.

## 1.10 REGULATORY REQUIREMENTS

- .1 Comply with the following regulations:
  - .1 Ontario Occupational Health and Safety Act Window Cleaning Regulation 859/90 as amended by 523/92, and 213/91 as amended by 631/94 (Construction Projects).
  - .2 Ontario Building Code 2012, 4.4.4. Anchor Systems on Building Exterior – to be provided where any portion of the roof is more than 8 m (26'-3") above adjacent ground level, for both maintenance and window cleaning operations.
  - .3 CAN/CSA-Z259.2.1-98 (R2011) - Fall Arresters, Vertical Lifelines and Rails

## Part 2 Products

### 2.1 MANUFACTURER

- .1 This specification is based on systems currently being manufactured by PRO-BEL ENTERPRISES LTD. Toll free: 1-800-461-0575. Telephone: 905-427-0616, Fax: 905-427-2545, info@pro-bel.ca.
- .2 Other manufactured products meeting this specification may be substituted provided that manufacturers show proof of product insurance. Equipment details to be approved by the architect and/or consultant. Companies, such as miscellaneous metal fabricators, who are not normally engaged in the design and manufacture of fall arrest systems and equipment are not permitted to bid.

### 2.2 EQUIPMENT

- .1 HLL-DL3-55 Double Lanyard System or approved equivalent

### 2.1 HORIZONTAL CABLE LIFELINE SYSTEM

#### *Horizontal Cable Supports.*

- .1 Hollow steel (HSS) pier supports: galvanized mild steel as above with yield strength of 300 MPa (50 Ksi). Wall thickness to suit application.
- .2 Base plate and all other sections: galvanized mild steel as above with yield strength of 300 MPa (44 Ksi). Thickness and securement to suit application.
- .3 Securement bolts: mild steel, Type 300W with yield strength of 300 MPa (44 Ksi), hot dipped galvanized to CSA G164.
- .4 Safety U-bars: Type 304 stainless steel with yield strength of 240 MPa (35 Ksi). U-bar to be not less than 19 mm (3/4") diameter material with 38 mm (1-1/2") eye opening.
- .5 Seamless spun aluminum flashing (for steel pier supports): Type 6061-T6 alloy to ASTM B221 with deck flange flashed in to CRCA recommendations. Seal top of aluminum flashing with conformable mastic tape and torch applied heat-shrink rubber collar flashing.
- .6 Miscellaneous bolts, nuts and washers: mild steel, Type 300W with yield strength of 300 MPa (44 Ksi), hot dipped galvanized to CSA G164 or Type 304 stainless steel with yield strength of 240 MPa (35 Ksi).

#### *Double Lanyard (DL) Horizontal Lifeline*

- .7 Cable: 8 mm (5/16”) dia. galvanized steel with minimum breaking strength of 85 kN (19,125 lbs.), complete with matching permanently swedged or mechanically swedged cable ends.
- .8 Data plate: cable system entry points to be equipped with prominently displayed non-corrosive data plate clearly stating Maximum Service Capacity and Number of Users.
- .9 Tensioner: steel turnbuckle, same material as cable.
- .10 Harness: manufacturer’s standard full body harness with double lanyard and shock absorbers.
- .11 Shock Absorber: At one end of cable system to reduce loads to a maximum of 1,530lbs.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Examine surfaces and areas upon which the work of this section depends. Report to the Contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions, which would cause defective installation of products, or cause latent defects in workmanship and function.
- .2 Verify site dimensions.
- .3 Commencement of work will imply acceptance of prepared work.

#### **3.2 INSTALLATION**

- .1 Install equipment in accordance with approved shop drawings and manufacturer’s recommendations.
- .2 Co-ordinate installation with work of related trades.
- .3 Install all work true, level, tightly fitted and flush with adjacent surfaces as required.
- .4 Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal or vandalism.
- .5 Structural steel to receive safety anchors to have adequate bearing surface as indicated on shop drawings and/or to ensure 100% weld.

#### **3.3 FINAL ADJUSTING AND INSPECTION**

- .1 Adjust and leave equipment in proper working order.
- .2 Complete “Initial Inspection – Certification for Use” form included in Equipment Manual & Inspection Log Book.

#### **3.4 TESTING**

- .1 All anchors relying upon chemical adhesive fasteners to be 100% tested on site using load cell test apparatus in accordance with manufacturer’s recommendations.

**END OF SECTION**