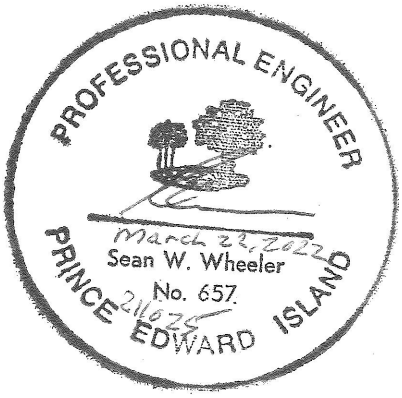
COLES ARCHITECTURE
ENGINEERING
PROJECT MANAGEMENT

201-85 Fitzroy Street
Charlottetown, PE C1A 1R6
(902) 368-2300
www.colesassociates.com

QUEEN ELIZABETH HOSPITAL
MENTAL HEALTH & ADDICTIONS
EMERGENCY DEPARTMENT & SHORT STAY UNIT
CHARLOTTETOWN, PE

SPECIFICATIONS

Volume 1 of 5: Division 00 to Division 12



#211025 / IFT / Mar 22, 2022

Prime Consultant:
Coles Associates Ltd.
In association with Parkin Architects Ltd.

Project #: 211025 **Issued for Tender – March 22, 2022**

This page intentionally left blank

TABLE OF CONTENTS

This page intentionally left blank

1 General

1.1 ARCHITECTURAL DETAIL BOOK (VOLUME 3 OF 5)

.1 AD000 - Table of Contents
.2 AD001 - Code Analysis
.3 AD010 - Material / Finishes Schedule Exterior
.4 AD020 - Room Finish Schedule Notes & Abbreviations
.5 AD021 - Room Finish Schedule
.6 AD022 - Room Finish Schedule
.7 AD023 - Room Finish Schedule
.8 AD024 - Room Finish Schedule
.9 AD030 - Door Schedule Notes & Abbreviations
.10 AD031 - Door Schedule
.11 AD032 - Door Schedule
.12 AD033 - Door Schedule
.13 AD034 - Screen Schedule
.14 AD040 - Door Types
.15 AD050 - Door Frame Types
.16 AD051 - Door Frame Types
.17 AD055 - Screen Frame Types
.18 AD060 - Door Frame Details
.19 AD065 - Screen Frame Details - 1
.20 AD066 - Screen Frame Details - 2
.21 AD070 - Accessory Schedule
.22 AD071 - Accessory Schedule
.23 AD072 - Accessory Schedule
.24 AD073 - Accessory Schedule
.25 AD074 - Accessory Schedule
.26 AD075 - Accessory Schedule
.27 AD090 - Assembly Schedules
.28 AD091 - Assembly Schedules
.29 AD095 - Interior Partition Types
.30 AD096 - Interior Partition Types
.31 AD100 - Connection Detail @ Existing Wall (GL-1a & GL-U) and Adjacent Window Infill
.32 AD101 - Typical Column Wrap @ Exterior Wall
.33 AD102 - Typical Column Enclosures
.34 AD103 - Typical Window Infill @ Existing Exterior Wall GL-18 & GL-5a
.35 AD104 - Column Wrap @ GL 4a-Ba
.36 AD105 - Column Wrap @ GL 5a-Ba
.37 AD106 - Column Wrap @ GL 5a-AA
.38 AD107 - Column Wrap @ GL 1a-AA
.39 AD108 - Door Jamb @ Door 5645
.40 AD109 - Typical Window Jamb Detail
.41 AD300 - Roof Connection Detail @ Existing Parapet (GL-U)
.42 AD301 - Slab Connection Detail @ Unit Entrance
.43 AD302 - Connection Detail @ Existing Parapet (GL-60)
.44 AD303 - Slab Connection Detail @ Existing Wall (GL-60)
.45 AD304 - Slab Connection Detail @ GL-U
.46 AD305 - Roof Connection Detail @ Existing Wall (GL-2a-5a)
.47 AD306 - Typical Parapet Cap Detail
.48 AD307 - Parapet Detail @ GL-1a
.49 AD308 - Base of Wall Detail @ GL-1a
.50 AD309 - Window Base Detail @ W-1 & W-3

.51 AD310 - Roof Connection Detail @ Exist GL-21
.52 AD311 - Slab Connection Detail @ GL-4a
.53 AD312 - Floor Construction @ GL-Ba
.54 AD313 - Truss Enclosure @ GL-1a
.55 AD314 - Section Detail at Bulkhead for Anti-Ligature TV Enclosure
.56 AD315 - Door Head @ Door 5645
.57 AD316 - Door Sill @ Door 5645
.58 AD317 - Typical Window Head Detail
.59 AD318 - Typical Window Sill Detail
.60 AD319 - Typical Section Through Column Base
.61 AD320 - Typical Cross Bracing Wrap @ Level 100
.62 AD321 - Shaft Wall Bulkhead @ Door 5600
.63 AD350 - Typical Railings
.64 AD360 - Typical Wall Protection
.65 AD365 - Corner Guard Types
.66 AD366 - Typical Corner Guard, Railings and Sheet Wall Protection at Corners
.67 AD400 - Hand Hygiene Sinks

END OF SECTION

1 General

1.1 LIST OF DRAWINGS

A000 - COVER SHEET FOR VOLUME 4 OF 5

.1 ***Civil Drawings:***
- .1 C100 – Existing Site Plan
- .2 C101 – New Site Plan
- .3 C102 - Details

.2 ***Structural Drawings:***
- .1 S001 - Foundation Plan
- .2 S002 - Level 200 Framing Plan
- .3 S003 - Roof Framing Plan
- .4 S004 - Elevations & Sections
- .5 S005 - Sections
- .6 S006 - Sections
- .7 S007 - Sections, Details & Notes
- .8 S008 - Sections
- .9 S009 - Sections
- .10 S010 - Sections & Details
- .11 S011 - Truss Details

.3 ***Architectural Drawings:***
- .1 A001 - Context Plan & Project Info
- .2 A002 - Sequencing Plans
- .3 A003 - Sequencing Plans
- .4 A010 - Typical Mounting Heights
- .5 A030 - 3D Views
- .6 A040 - Code Plans & Sections
- .7 A050 - Demolition Floor Plan - Level 100
- .8 A051 - Demolition Floor Plan - Level 200
- .9 A100 - Renovated Floor Plan - Level 100
- .10 A101 - Renovated Floor Plan - Level 200
- .11 A102 - Roof Plan
- .12 A142 - Wall Finishes Plan - Level 200
- .13 A152 - Wall Material Plan - Level 200
- .14 A160 - Reflected Ceiling Plan - Level 200 Demo
- .15 A161 - Reflected Ceiling Plan - Level 100 Reno
- .16 A162 - Reflected Ceiling Plan - Level 200 Reno
- .17 A200 - Exterior Elevations
- .18 A300 - Building Sections
- .19 A301 - Building Sections
- .20 A350 - Wall Sections
- .21 A351 - Wall Sections
- .22 A352 - Wall Sections
- .23 A500 - Blow-Up Plans and Interior Elevations
- .24 A501 - Blow-Up Plans and Interior Elevations
- .25 A502 - Blow-Up Plans and Interior Elevations
- .26 A503 - Blow-Up Plans and Interior Elevations
- .27 A504 - Blow-Up Plans and Interior Elevations
- .28 A505 - Blow-Up Plans and Interior Elevations
- .29 A506 - Blow-Up Plans and Interior Elevations

.30 A510 - WR Blow-Up Plans and Interior Elevations
.31 A600 - Millwork Details
.32 A605 - Full Height Cabinets and Stainless Steel Millwork Details
.33 A902 - Furniture & Equipment Plan - Level 200

A000.1 - COVER SHEET FOR VOLUME 5 OF 5

.4 ***Mechanical Drawings:***
- .1 M100 – Level 100 Plumbing – Domestic Water, Sanitary & Storm
- .2 M101 – Level 120 Plumbing – Sanitary & Storm
- .3 M102 – Roof Level – Storm
- .4 M110 – Level 200 Plumbing – Domestic Water
- .5 M120 – Plumbing Details
- .6 M121 – Plumbing & Sanitary Fire Stopping Details
- .7 M200 – Level 200 Heating
- .8 M201 – Level 200 Heating – In-Floor
- .9 M202 – Level 200 Heating – Sensors & Controls
- .10 M210 – Heating & Cooling Details
- .11 M300 – Level 100 Ventilation
- .12 M301 – Level 200 Ventilation – Supply Air
- .13 M302 – Level 200 Ventilation – Return Air
- .14 M303 – Penthouse & Roof Plan
- .15 M304 – Ventilation Sections
- .16 M305 – Level 100 – Existing Ventilation Modification
- .17 M310 – Ventilation Details
- .18 M311 – Ventilation Details
- .19 M400 – Level 100 Sprinkler
- .20 M401 – Level 200 Sprinkler
- .21 M410 – Fire Protection Details
- .22 M500 – Control Details

.5 ***Electrical Drawings***
- .1 DE01 - Demolition Plan Level 100 Power & Systems
- .2 DE02 - Demolition Plan Level 100 - Lighting
- .3 DE03 - Demolition Plan Level 200 - Power & Systems
- .4 DE04 - Demolition Plan Level 200 - Lighting
- .5 E100 - Level 100 & 200 Key Plans - Electrical Routing & Legend
- .6 E200 - Renovated Floor Plan - Level 100 Power, Communications & Systems
- .7 E300 - Renovated Floor Plan Level 200 - Power
- .8 E301 - Penthouse
- .9 E400 - Renovated Floor Plan Level 200 - Communications
- .10 E500 - Renovated Floor Plan Level 200 - Systems
- .11 E600 - Renovated Floor Plan Level 100 - Lighting
- .12 E601 - Renovated Floor Plan Level 200 - Lighting
- .13 E700 - Access Control Details
- .14 E701 - Electrical Details
- .15 E702 - Electrical Details
- .16 E703 - Electrical Details

END OF SECTION

1 General

1.1 APPENDICES

.1 ***APPENDIX 'A'***
Subsurface Investigation Report
Issued by Jacques Whitford, dated January 14, 2008.

.2 ***APPENDIX 'B'***
Government of Prince Edward Island
Structured Cabling Standards, dated February 26, 2016

.3 ***APPENDIX 'C'***
Preliminary Commissioning Plan
Prepared by Maritech Commissioning Works, dated March 2022

Note: ***Appendices are located at the back of Specifications Volume #1 of 2.***

END OF SECTION

This page intentionally left blank

1 General

1.1 INVITATION - TENDER CALL

.1 The Owner is issuing this tender as follows:
- .1 Sealed tenders will be received as per **TIMING REQUIREMENTS** of this Section.
- .2 Tenders are to be clearly marked with the name of the project and the Bidder's name.
- .3 Tenders documents will need to be received at location of tender closing, prior to the time of tender closing noted and on the date specified in the Tender. No submission will be accepted after that time.
- .4 Location of the Tender closing is as follows:

  Department of Health and Wellness
  Mental Health and Addictions
  Capital Planning Project Management Office
  124 Deacon Grove Lane
  Charlottetown, PE C1A 7N5
- .5 Refer to Section 01 10 00 - Summary, for full summary of work.

1.2 QUERIES / ADDENDA

.1 Direct all questions during the tender period to:

Coles Associates Ltd.
85 Fitzroy Street, Suite 201
Charlottetown, PEI, C1A 1R6
Attention: Nick White, GSC, RSE, C. Tech.
Phone: (902) 368-2300
Email: nwhite@colesassociates.com
cc: tellsworth@colesassociates.com
cc:mcbarlow@gov.pe.ca
cc: waynewalker@gov.pe.ca

Note: all questions directed to Nick White during the tender period are to be copied to the above email addresses.

.2 Addenda may be issued during the bidding period. All addenda become part of the Contract Documents. Include costs in the Bid Price.

.3 Verbal answers are only binding when confirmed by written addenda.

.4 Clarifications requested by bidders must be in writing not less than four days before tender close. The reply will be in the form of an addendum, a copy of which will be issued two days prior to tender close.

.5 Where the bid depository is used for Mechanical and Electrical Trades, Clarifications requested by bidders must be in writing not less than four days before bid depository tender close. The reply will be in the form of an addendum, a copy of which will be issued two days prior to bid depository tender close.

1.3 TENDERING PROCEDURE

.1 General Contractors:
- .1 Submit their tender for the entire work of this Contract, INCLUDING the work of all subcontracts, directly to the Owner in accordance with the requirements of the Invitation to Tender and this specification.

.2 Subcontractors:
- .1 Submit their tenders directly to the General Contract bidders, for incorporation by the General Contractors into their General Contract tenders.

.3 General Contract bidders shall take particular care to ensure that their tender is submitted on the proper tender form.

1.4 TENDERING PROCEDURE BID DEPOSITORY

.1 Mechanical, Sprinkler and Electrical Subcontractors
- .1 Submit their bids to the Bid Depository of Prince Edward Island, and proceed under the rules of the Bid Depository of Prince Edward Island. The rules and regulations of this bid depository, in force on the day of bid submission shall apply.
- .2 Refer to Timing Requirements at the end of this Section.
- .3 Bonding requirements for Mechanical, Sprinkler and Electrical Subcontractors are to be in accordance with Article 12 of the Bid Depository of Prince Edward Island Regulations and Rules of Procedure, latest edition.

1.5 SPECIFICATION EXPLANATION

.1 Whenever the words "as shown," "as noted," "as called for," "indicated," or similar phrases are used, they shall be understood to refer to this specification and/or the accompanying drawings and addenda.

.2 The words "provided", "install" or similar words shall mean the work described shall be completely supplied, and erected or installed by the Contractor, unless otherwise noted.

.3 All materials are to be new unless noted otherwise.

1.6 EXAMINATION OF SITE

.1 All bidders submitting tenders for this work shall first examine the site and all conditions thereon and/or therein, including:
- .1 Existing building conditions visually evident at the time of tender upon which the Work of this Contract will be installed.
- .2 Conditions attached to, abut against or in any other way affected by existing conditions.

.2 All tenders shall take into consideration all such conditions as may affect the work under this Contract.

.3 No extra payment will be made to the Contractor, above the Contract Price, for costs resultant from failure to determine the conditions that affect the Work.

.4 A visit to the project site has been arranged for bidders as noted in the timing requirements of this section.

1.7 EXISTING CONDITIONS

.1 If in the performance of the contract, subsurface or latent conditions at the site are found to be materially different from those indicated by the drawings and specifications, or unknown conditions not usually inherent in work of the character shown and specified, the attention of the Consultant shall be called immediately in writing to such conditions before they are disturbed. Upon such notice or resulting from his own observation of such conditions the Consultant shall promptly make such changes in the drawings and specifications as he finds necessary to conform to the different conditions and any increase or decrease in the cost shall be adjusted as provided under Changes in the Work.

1.8 DOCUMENT INTERPRETATION

.1 The Consultant's interpretation of Contract Documents shall be final.

.2 Should the Bidder find discrepancies in, or omissions from the drawings, specifications or other tender documents, or be in doubt as to their meaning or interpretation, the Bidder should at once notify the Consultant in writing for clarification.

.3 Any instructions or clarifications to Bidders issued during the period of bidding will be in the form of Addenda and are to be included in the tender. Addenda will form part of the Contract Documents.

.4 The Owner, User Groups or Consultant will not be responsible for verbal instructions.

.5 All addenda will be posted to the Province of Prince Edward Island tenders and procurement opportunities website and it is the bidders responsibility to make sure they are in receipt of all addenda. No addenda will be issued by email to bidders.

1.9 PREPARATION AND SUBMISSION OF BIDS

.1 Contractors shall submit their bids on the Tender Form provided, which will be received at the time and place indicated on the Invitation to Tender. Late tenders will not be accepted and will be returned unopened to the bidder.

.2 Bidders shall fill in all information requested on the Tender Form.

.1 This form must be completely filled out in ink, or be typewritten with the signature in longhand. The completed forms shall be without interlineation, alteration or erasure.

.2 Failure to fill in the Tender Form, as provided, in its entirety may result in the rejection of the bid; however, bidders are not obligated to provide alternative prices to products listed on the Appendix provided for that specific purpose, as part of the tender form.

.3 Tender amount shall be stated both in writing and in figures.

.4 Signatures shall be without alteration or erasure.

.5 Receipt of addenda for the project shall be acknowledged by filling in the addendum number and date of issue for each addendum on the appropriate line on the Tender Form. These lines shall be initialed by the person signing the tender after they have been filled in.

.3 Each tender submitted will be accepted on the understanding that it covers all the Work called for in the specifications and on the drawings, regardless of any notations by Bidder that certain parts of the required Work are omitted from their proposal.

.4 Each bid must:

.1 Give the full business address of the Bidder and be signed by him with his usual signature.

.2 Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name of one of the members of the partnership or by some authorized representative, followed by the signature and designation of the person signing.

.3 Bids by corporations must be signed with the legal name of the corporation, followed by the name of the Province of incorporation, and by the signature designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signed shall also be typed or printed below the signature.

.4 A bid by a person who affixes to his signature the word "president," "secretary," or "agent," or other designation, without disclosing his principal, may be held to be the bid of the individual signing on behalf of the corporation.

.5 A bid of any individual or any group of individuals operating as co-partners or the bid of any corporation which may be submitted shall be executed and authorized so that it shall be and it will constitute a legal binding act of the persons, co-partners, or corporate entity making the bid.

.5 Bidders shall include with their tender, in the space designated in Section 00 41 13, Appendix A, the name of each Subcontractor and/or Supplier, as designated, whose price has been included in their tender and who will perform the trade work. Substitution for another Subcontractor in the event that the listed Subcontractor is unable to do the work shall be subject to the approval of the Owner and contingent on evidence satisfactory to the Owner that the original Subcontractor's price was legitimately carried in the Tender, and that the original Subcontractor is now incapable of carrying out the work required under the subcontract, or that he refuses to carry out the work and provides documented reasons for such incapacity or refusal.

.6 The term "Own Forces," as a subcontractor, may be used by a Bidder where the Bidder is equipped to and in fact normally carries out the trade work using employees in the direct employment of the Contractor or a wholly owned subsidiary company. Other designations such as "Own Estimate" are unacceptable and may be cause for rejection of the tender by the Owner.

.7 When a Bidder indicates "Own Forces" as a subcontractor, the Bidder may be required to demonstrate to the Owner that he has the resources, experience and employees necessary, available and qualified to perform the trade work in a manner and quality satisfactory to fulfill the obligations of the Contract Documents and that the trade work is a normal and continual part of his business operation.

.8 A Bidder, whose tender is accepted, that included "Own Forces" for a subcontract will if requested, provide the Owner with payroll records verifying that the employees carrying out the "Own Forces" subcontract work are direct employees of the Contractor or of a wholly owned subsidiary company of the Contractor.

.9 The Owner will evaluate Tenders submitted for this project. The criteria to be considered by the Owner in awarding the Contract will include a combination of:

- .1 Bid price;
- .2 Scheduling;
- .3 Compliance;
- .4 Expertise;
- .5 Qualifications of the Contractor and named Subcontractors / Suppliers and
- .6 Any other such conditions as may be determined by the Owner to be in the best interests of the Owner. A decision on the acceptance of a Tender will be made by the Owner based on the results of the Owner's evaluation.

.10 Bidders may, at their own discretion, submit Alternatives to items identified as "Acceptable Material".

- .1 All proposed Alternatives shall be listed in Appendix "B", ALTERNATIVE PRICES and be identified by name and model number where applicable and each Alternative shall have an associated tender price change "INCREASED BY" $_____ or "DECREASED BY" $_____ or "N/A," as compared with the "Acceptable Material" item carried in the tender amount.
- .2 Alternate prices will include ALL related costs associated with charges from Accepted Material. No additional costs will be accepted for failure of the Contractor to identify the full impact of using alternate systems.
- .3 Alternate prices will NOT be used in determining the tender price or as the basis for awarding the tender.

.11 Bidders are to complete any other appendices forming part of the Tender Form as directed under Section 00 41 13 - Bid Form.

.12 Tender Forms and accompanying documents shall be enclosed in a sealed envelope marked "TENDER" and bearing the following identification.

- .1 Name of project.
- .2 Name of Contractor submitting tender.

.13 Envelope to be addressed to the recipient of tenders indicated in the Invitation to Tender and delivered by hand, registered mail or courier.

.14 Submit one (1) only signed copy of Tender Form.

.15 Accompanying the Tender Form shall be:

- .1 One (1) copy of Bid Guarantee, together with Surety's Letter of Consent, as specified.
- .2 One (1) copy of a preliminary schedule demonstrating the full scope of work to be completed within the identified time for the completion of the contract work.
- .3 One (1) copy of a letter from Bidder's insurance provider identifying a list of any claims made against the Bidder within the last five (5) years.

.16 Tender forms and securities must bear original signatures.

.17 Where the bid amount is shown in both written words and number and the two are in conflict, written words will take precedence.

1.10 BID GUARANTEE

.1 Each tender submitted shall be accompanied by the following Security:

.1 For a General Contract Tender less than Three Million Dollars ($3,000,000.00), including Mechanical and Electrical Subcontract values:

.1 A Bid Bond equal to at least ten percent (10%) of the tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount. OR

.2 A security Deposit equal to at least ten percent (10%) of the tender amount.

.2 General Contract Tender more than Three Million Dollars ($3,000,000.00), including Mechanical and Electrical Subcontract values:

.1 A Bid Bond equal to at least ten percent (10%) of the tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount and a Labour and Materials Payment Bond in the amount of fifty percent (50%) of the total contract amount.

.3 Mechanical Sub-Contract Tender less than $400,000 (for bid depository only)

.1 A bid bond equal to at least 10% of the tender amount and a letter of surety from a bonding company guaranteeing to supply a performance bond in the amount of 50% of the sub-contract amount. OR

.2 A Security Deposit equal to at least 10% of the tender amount.

.4 Mechanical Sub-Contract Tender more than $400,000 (for bid depository only)

.1 A bid bond equal to at least 10% of the tender amount and a letter of surety from a bonding company guaranteeing to supply a performance bond in the amount of 50% of the sub-contract amount and a labour and materials payment bond in the amount of 50% of the sub-contract amount.

.5 Electrical Sub-Contract Tender less than $300,000 (for bid depository only)

.1 A bid bond equal to at least 10% of the tender amount or a letter of surety from a bonding company guaranteeing to supply a performance bond in the amount of 50% of the sub-contract amount. OR

.2 A Security Deposit equal to at least 10% of the tender amount.

.6 Electrical Sub-Contract Tender more than $300,000 (for bid depository only)

.1 A bid bond equal to at least 10% of the tender amount and a letter of surety from a bonding company guaranteeing to supply a performance bond in the amount of 50% of the sub-contract amount and a labour and materials payment bond in the amount of 50% of the sub-contract amount.

.7 All Bonds and Letters of Surety supplied by General Contractors, made payable to the Government of Prince Edward Island as represented by the Department of Health and Wellness.

.1 Bonds and Letters of Surety supplied by the General Contractor to the Owner shall be from a recognized surety company, satisfactory to, and approved by the Owner.

.2 If a performance bond is utilized, it shall be maintained in force for a period of not less than twelve (12) months after the issuance of the Substantial Performance of the work.

.3 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a credit Union, payable to the Government of Prince Edward Island as represented by the Minister of Transportation, Infrastructure & Energy.
OR

.4 Bonds of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:

.1 Payable to the bearer, or

.2 Accompanied by a duly executed instrument of transfer to the Government of Prince Edward Island as represented by the Department of Health and Wellness, in the form prescribed by the Domestic Bonds of Canada Regulations, or

.3 Negotiated as to principal or as to principal and interest in the name of the Government of Prince Edward Island as represented by the Department of Health and Wellness, pursuant to the Domestic Bonds of Canada Regulations.

.5 Security deposits submitted by subcontractors, to General Contractors, shall be in a form satisfactory to the General Contractor.

1.11 CONTRACT SECURITY

.1 Upon award of a contract the General Contractor is to provide the following contract security:

.1 General Contract Tender less than Three Million Dollars ($3,000,000.00), including Mechanical and Electrical Subcontract values:

.1 A Performance Bond in the amount of fifty percent (50%) of the total contract amount. OR

.2 A Security Deposit in an amount equal to at least ten percent (10%) of the contract amount.

.2 General Contract Tender more than Three Million Dollars ($3,000,000.00), including Mechanical and Electrical Subcontract values:

.1 A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the total contract amount.

.3 Mechanical Sub-Contract Tender less than $400,000 (for bid depository only)

.1 A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the total contract amount. OR

.2 A Security Deposit in the amount equal to at least 10% of the sub-contract amount.

.4 Mechanical Sub-Contract Tender more than $400,000 (for bid depository only)

.1 A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the total sub-contract amount.

.5 Electrical Sub-Contract Tender less than $300,000 (for bid depository only)

.1 A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the total contract amount. OR

.2 A Security Deposit in the amount equal to at least 10% of the sub-contract amount.

.6 Electrical Sub-Contract Tender more than $300,000 (for bid depository only)

.1 A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the total sub-contract amount.

.7 All Bonds provided by General Contractors, made payable to the Government of Prince Edward Island as represented by the Department of Health and Wellness.

.1 Bonds shall be from a recognized surety company, and approved by the Owner.

.2 If a performance bond is utilized, it shall be maintained in force for a period of not less than twelve (12) months after the issuance of the total performance criteria.

.8 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a Credit Union, payable to Minister of Finance, Province of Prince Edward Island. OR

.9 Bonds of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:

.1 Payable to the bearer, or

.2 Accompanied by a duly executed instrument of transfer to the Government of Prince Edward Island as represented by the Department of Health and Wellness, in the form prescribed by the Domestic Bonds of Canada Regulations, or

.3 Negotiated as to principle or as to principle and interest in the name of the Owner, pursuant to the Domestic Bonds of Canada Regulations, or

.4 Contract security shall be provided at the expense of the Contractor, bonds shall be provided by an established surety company satisfactory to, and approved by the Owner. Certified Cheques or Bank Drafts shall be drawn on an account with a recognized financial institution.

.5 Contract security submitted by subcontractors, to General Contractors, shall be in a form satisfactory to the General Contractor.

.10 If in accordance with the Bid Guarantee requirements the successful Contractor has used a Certified Cheque or Bank Draft as a bid guarantee, the Certified Cheque or Bank Draft will be securely retained and, subject to the progress of the work being acceptable to the Owner and Consultant, will be held without interest until the date of Substantial Performance for the Contract, as defined under Definition 19 of CCDC2-2008, at which time it will be returned to the Contractor.

1.12 RECEIPT AND OPENING OF BIDS

.1 We have developed modifications to the tender process to minimize everyone's potential exposure to COVID-19.

.1 Sealed tenders will be received at the address noted in this section.

.2 Sealed tenders are to be clearly marked with the Bidder's Name and the Project Name.

.3 Tender documents will need to be received **prior to 2:00 PM local time** on the date specified in the Tender. No Tender submission will be accepted after that time.

.4 The tenders will be opened privately with the attendance of the General Manager of the Construction Association of Prince Edward Island or his appointed delegate.

1.13 ADJUSTMENT AND WITHDRAWAL OF BIDS

.1 Bids may be withdrawn or adjusted in writing by mail, delivered in person, or sent via e-mail to the party to whom the bids were submitted, provided such withdrawal or adjustment is prior to the time fixed for the opening of the bids. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal or adjustment of the bid after the expiration of the time within which bids may be submitted.

.1 All withdrawals or adjustments to previously submitted tenders must be e-mailed to procurementservices@gov.pe.ca prior to the time fixed for the opening of bids. E-mailed adjustments must be prominently marked in the subject line by the word “Amendment” with the Tender name and number and the full legal name of the Proponent. Any amendment / adjustment must clearly indicate which part of the proposal the amendment is intended to amend or replace.

.2 Neither the Owner nor Coles Associates Ltd. accepts responsibility for the Bidders’ inability to submit modifications within the allotted time for such circumstances, including but not limited to power and equipment failures, transmission failures, incorrect e-mail addresses, lag in e-mail service, etc.

.3 Adjustments must be signed by the same person who signed the original bid.

.4 Any amendments received after the Submission Deadline will not be accepted.

1.14 AWARD OF CONTRACT

.1 The Contract, if awarded, will be awarded as promptly after the opening of bids as is possible, and at the discretion of the Owner. The award date will not extend beyond the period indicated on the Tender Form following the scheduled time of tender closing, without first obtaining permission of the three (3) low bidders, or low bidder only, at the discretion of the Owner.

.2 The Form of Agreement, (Contract) which the successful Bidder will be required to enter into with the Owner, may be seen on application to the Consultant. The drawings, specifications and any addenda issued during the tender period, will be suitably marked for identification at the time the Form of Agreement is signed by both parties, shall be considered as being included in the Contract, together with the completed Tender form and are hereinafter referred to as the "Contract Documents." All of these documents shall be read together and construed as one document. Following execution of the Contract, the Contractor shall receive from the Owner one (1) complete signed set of Contract Documents.

.3 Final award of Contract shall be subject to approval of all agencies having direct interest in the project.

.4 Where identical bids are received, the low bidder will be selected on the basis of a coin toss by the Owner in the presence of the identical bidders.

1.15 REJECTION OF BIDS

.1 The Owner reserves the right to reject any and all bids.

.2 The lowest or any bid will not necessarily be accepted.

.3 Bids submitted which indicate "own forces" for subcontract work, that in the opinion of the Owner cannot be successfully completed by the Contractor's employees will not be accepted.

.4 Bids not submitted on the required form will be rejected.

.5 Bids which are incomplete or qualified will be rejected.

.6 All Bidders acknowledge that they shall have no claim against, or entitlement to damages from the Owner or Consultant by reason of the Owner's rejection of their individual bids or all bids.

1.16 SUBCONTRACT WORK

.1 Contractor is to ensure that all Subcontractors understand the full extent of their responsibilities in order to complete the entire work of the project. Subcontract work may appear in various Sections of Specifications and on various Drawings.

.2 Contractors and their Subcontractors are advised to become familiar with all specifications and drawings.

1.17 CONDITIONS OF WORK AND EMPLOYMENT IN PEI

.1 All Construction Companies and Contractors and subcontractors submitting tenders for this work, or a portion thereof, are advised, in their own interest, to contact the Construction Association of Prince Edward Island, the accredited association for commercial and industrial sectors of the construction industry, to inquire and determine the terms and conditions of work and employment in the Province of Prince Edward Island.

1.18 COVID-19

.1 The Contractor is required to review and adhere to the following COVID-19 publications:

.1 The Workers Compensation Board of Prince Edward Island (WCBPEI) "*COVID-19: Workplace Health and Safety Information*": http://www.wcb.pe.ca/Information/NewsItem/497

.2 The Construction Association of Prince Edward Island (CAPEI) "*Pandemic Planning for the Construction Industry - A Guide*": https://capei.ca/member_access/LiveEditor/images/pdf/INDUSTRY_GUIDE_COVID_19.pdf

.3 The Construction Association of Prince Edward Island (CAPEI) "*COVID-19 Site Questionnaire and Checklist*": https://www.capei.ca/member_access/user_uploads/capei_files/COVID-19%20Questionaire%20and%20Checklist.pdf

.4 The Canadian Construction Association (CCA) "*COVID-19 - Standardized Protocols for all Canadian Construction Sites*": https://www.cca-acc.com/wp-content/uploads/2020/06/CCA-COVID-19-Standardized-Protocols-for-All-Canadian-Construction-Sites-05-26-20.pdf

1.19 LABOUR

.1 No prospective employee in the Province of Prince Edward Island shall, with relation to his employment or eligibility for employment, be discriminated against or favored by reason of sex, racial origin, religious views, or political affiliations.

.2 Contractors, to the extent possible, are encouraged to maximize the employment of the local labour force for the Work of this Contract.

1.20 TAXES

.1 The Harmonized Sales Tax (HST) shall be EXCLUDED from the tender amount. The Contractor, as per current Provincial Regulations, shall include on all invoices the Harmonized Sales Tax (HST) as an additional line item. This would be in addition to the tender amount which does not include HST.

.2 Vendors are required to charge HST on invoices to Province of PEI Departments, Agencies, Crown Corporations, and Regional Health Authorities.

1.21 ACCEPTABLE PRODUCTS

.1 The Bidder shall carry in his tender the base bid product(s) identified in the specifications as "Acceptable Material", or Approved Equals as they are identified throughout the tender period.

.2 The Bidder is also encouraged to carry the products of other manufacturers, that are not considered equals, as "Alternatives Prices," listing them by name on the Appendix provided for that specific purpose, as part of the Tender Form, together with the price difference compared to the specified products, when such Appendix is identified under Section 00 41 13 - Bid Form.

1.22 APPROVED EQUALS

.1 Submission for an Approved Equal is to contain literature and descriptive information with full specification data. Where the requested item is contained on a printed document with other items, it is to be clearly identified.

.2 The Consultant will not search catalogs, e-mails or websites or contact suppliers to obtain the necessary information for proper evaluation.

.3 Submission by Bidders for evaluation of products requested to be considered as equal must be submitted to Consultant no less than five working days prior to closing of tenders. No consideration will be given to approving equals after the close of tenders, except when the specified product is found to have been discontinued by the manufacturer.

.4 The consideration of a product(s) for Approved Equal status and the acceptance of individual products as approved equals is entirely at the discretion of the Consultant.

.5 When products are given Approved Equal status these products may, at the discretion of bidders, be carried in their tender price, provided that ALL costs related to changes to the contract work required to incorporate the Approved Equal product are included in the tender price.

.6 The acceptance of a product by the Consultant as an "Approved Equal," even where not specifically indicated on the Approved Equals listing in the Addendum, is to be understood as being contingent upon the provision of the particular series, model and/or type, complete with all options to meet the specified requirements of the Acceptable Material product.

.7 Products given approved status that are found, during construction period, to not have all specified options available, or to have discontinued production of same, or to have made other design changes since the time of approval, will not be accepted for use on this project, except when financial compensation has been mutually agreed upon between the Contractor and the Owner and deemed acceptable by the Consultant. Compensation will not be paid to the Contractor for products acknowledged by the Consultant to be superior to the specified products.

1.23 ALTERNATIVES

.1 Alternative products, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "B" provided as part of the Tender Form, and are to be understood as being offered only for the Owner's consideration as substitutes for the specified Acceptable Material products, at the amount of increase or decrease in the tender amount indicated in the Appendix. These products and related prices are not to be included in the tender amount.

.2 Alternative products and their related increase or decrease in the base bid amount are not used as the basis for awarding tenders.

.3 When alternative products are listed in Appendix "B", ALL costs related to changes to the contract work required to incorporate the alternative product into the work are to be included in the amount stated in Appendix "B".

.4 Alternative products may or may not be accepted at the discretion of the Owner at the price difference quoted, without any other monetary consideration. If requested, bidders shall promptly supply full details of any or all Alternatives listed. Specific written direction from the Consultant must be given to the Contractor to substitute an alternative product.

.5 Alternative prices shall include all fees, taxes and markups.

1.24 UNIT PRICES

.1 Unit Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "C", as part of the Tender Form and are to be understood as being offered only for the Owner's consideration; to be accepted or not accepted, at the Owner's discretion in a timely manner during the Work of the Contract, ONLY as a method of adjustment to the Contract Work for changes in the Work, should the Owner opt for the Unit Price Method.

.2 Unit prices shall include all fees, taxes and markups.

1.25 SEPARATE PRICES

.1 Separate Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "D", as part of the Tender Form and are to be understood as being offered only for the Owner's consideration; to be accepted or, not accepted, in whole or in part, at the Owner's discretion. If used the Separate Prices may be incorporated into the Contract Work either at the time of Award of Contract or in a timely manner during the Work of the Contract, at the Owner's discretion.

.2 Separate Prices shall include all fees, taxes (excluding HST) and markups.

1.26 GUARANTEES

.1 The Contractor will be required to guarantee the work of this Contract in accordance with the requirements of GC12.3 of the Agreement.

.2 Not withstanding the above, the bidder's attention is directed to the fact that certain individual items on this project may be required to be guaranteed by the manufacturer for periods in excess of twelve months. These specific requirements are to be found in various Sections of the specifications for this project.

1.27 PAYMENT OF WORKERS

.1 The Contractor shall, in addition to any fringe benefits, pay the workers employed by the Contractor on the work at wage rates, not less than those established by the Minimum Wage Order, issued under authority of the Labour Act, which is in effect. The Contractor shall pay workers employed on the work at intervals of not less than twice per month.

.2 The Contractor shall require each Subcontractor, or person doing any part of the work, to covenant with the Owner that workers are employed at the wage rates and in the manner required by this provision.

.3 Where any person employed by the Contractor or any Subcontractor, or other person engaged on the Work of this Contract, is paid less than the amount required to be paid under the provisions of this Contract, the Owner may deduct from any monies payable to the Contractor, under this or any other Contract, and pay to such person, a sum sufficient to bring the person's wages up to the amount required to be paid under this Contract.

.4 No claim for extra payment from the Contractor will be considered by the Owner concerning any change in the Minimum Wage Order which may occur during prosecution of the Contract.

1.28 CONFIDENTIALITY AND FREEDOM OF INFORMATION

.1 By submitting your bid, you agree to disclosure of the information supplied, subject to the provisions of the Freedom of Information and Protection of Privacy (FOIPP) Act.

.2 Anything submitted in your bid that you consider to be "confidential information" because of its proprietary nature should be marked as "Confidential", and will be subjected to appropriate consideration under the Freedom of Information and Protection of Privacy Act.

.3 During the delivery and installation of goods and/or services, you may have access to confidential or personal information. Should this occur, you must ensure that such information is not released to any third party or unauthorized individual.

.4 Any information provided on this contract may be subjected to release under the Freedom of Information and Protection of Privacy Act. You will be consulted prior to the release of any information.

1.29 TIMING REQUIREMENTS

.1 This project will require the achievement of the following project milestones:

.1	Tender Call	**22 MAR 2022**
.2	Pre-Tender Site Meeting	**29 MAR 2022 @ 2:00 PM** Meet outside at the existing loadings docks where the new addition will be constructed.
.3	Bid Depository Close	**14 APR @ 2:00 PM**
.4	Tender Close	**19 APR @ 2:00 PM** <u>Location of Closing:</u> Refer to item INVITATION - TENDER CALL of this specification section for the address.
.5	Tender Award	**Four (4) weeks following Tender Close.**
.7	Substantial Completion	**29 SEP 2023**
.8	Owner Occupancy	**Refer to Phasing Drawing.**

END OF SECTION

This page intentionally left blank

1 General

1.1 TENDER

.1 SUBMITTED BY:

_____(Name)

_____(Address)

_____(Contact)

DATE: _____

FOR: PROJECT NAME: **Queen Elizabeth Hospital, Mental Health & Addictions Emergency Department / Short Stay Unit (EDSSU)**
LOCATION: **60 Riverside Drive, Charlottetown, PE**

TO: PROJECT OWNER: **Government of Prince Edward Island, as represented by the Minister of Health & Wellness**
LOCATION: **11 Kent Street, Charlottetown, PE**

Having examined ALL the drawings and specifications for this project, as well as any addenda issued, as prepared by Coles Associates Ltd. and/or their consultants; WE HEREBY OFFER to furnish all materials, plant and labour necessary for the full and proper completion of the Contract work for:

PROJECT NAME: **Queen Elizabeth Hospital, Mental Health & Addictions Emergency Department / Short Stay Unit (EDSSU)**
LOCATION: **60 Riverside Drive, Charlottetown, PE**

INCLUDING all prime cost allowances and Government sales or other taxes in force at this date, EXCLUDING Harmonized Sales Tax (HST) but not any other additional or deductible allowances or taxes which may be applicable subsequent to this date, and which shall be payable by or to the Owner, in accordance with the above mentioned Documents, for the bid amount of:

_____(Dollars)
($)

in lawful money of Canada.

In submitting this Tender we recognize the necessity to complete the information requested by any appendices, as well as, the right of the Owner to reject all Tenders or to accept any Tender at the price submitted, on the condition that revised Tenders will not be called for if minor changes are made.

In the event of this Tender being accepted within 60 days of the time stated for the closing of Tenders, and our failing or declining to enter into a Contract, then our Bid Guarantee, submitted with our Tender shall be forfeited to the Owner in lieu of any damages which the Owner may suffer by reason of our failure or refusal to enter into such Contract.

In the event of our Tender not being accepted with 60 days of the time stated for the closing of Tenders, our Bid Guarantee, submitted with our Tender will be returned to us forthwith, unless a satisfactory arrangement is made with us covering its retention for a further stated period.
If we are notified of the acceptance of this Tender within the above specified time, we will:

.1 Enter into a formal Contract Agreement with the Owner.
.2 Furnish the Performance Bond and Labour and Materials Payment Bonds, or other form of Contract Security, when specifically permitted, as Contract Security in accordance with the requirements of the specifications.
.3 Furnish a cost breakdown of the Contract sum, the total aggregating the amount of our Tender, in accordance with the requirements of the specifications.
.4 Furnish a certified copy of all insurance policies.
.5 Complete the entire work on or before the dates stated.
.6 Provide and update as required a Construction Schedule which clearly shows the state of progress required to complete the work on the date specified.
.7 Enter into subcontract agreements where applicable.

1.2 ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

.1 Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

1.3 FORM OF TENDER APPENDICES

.1 Appendix 'A' must be completed by bidders.
.2 Appendix 'B' (only the items indicated) may be completed by bidders, any other items are at the bidder's discretion.
.3 Appendix 'C' must be completed by bidders.
.4 Appendix 'D' must be completed by bidders.
.5 Appendix 'E' must be completed by bidders.

1.4 DOCUMENTS ACCOMPANYING BID FORM

.1 As per Section 00 21 13 **-** INSTRUCTIONS TO BIDDERS:

One (1) copy of Bid Guarantee, together with Surety's letter of consent. _____initial

One (1) copy of preliminary schedule. _____initial

One (1) copy of letter from Bidders Insurance Provider identifying list of claims made against Bidder within last five (5) years. _____initial

1.5 PROJECT MANAGER & SUPERINTENDENT

.1 Name of Project Manager _____.

.2 Name of Superintendent _____.

1.6 CONFLICT OF INTEREST

.1 The Contractor warrants that as at the date of this Agreement, no conflict of interest, or any circumstance that might interfere with independent and objective exercise of judgment, exists or is likely to arise in relation to execution of this Agreement or its subject matter. The Contractor shall immediately notify Government, in writing, if any such actual or potential conflict of interest should arise at any time during the Term. In the event Government discovers or is notified by the Contractor of an actual or potential conflict of interest, Government, in its sole discretion, may either:

.1 Allow the Contractor to resolve the actual or potential conflict to the satisfaction of Government;
OR

.2 Terminate the Agreement in accordance with the Termination section of this Agreement.

1.7 CONTRACTOR'S SIGNATURE

.1 Signed sealed and submitted for and on behalf of:

_____
(Company Name)

_____

_____
(Address)

_____ _____
(Authorized Signature) (Witness)

_____ _____
(Name and Title) (Name and Title)

_____
(Date)

1.8 APPENDIX 'A'

.1 Herewith are identified the Subcontractors we propose to use on this project. Carrying Sub-Contractor options next to identified work, is not acceptable and may be cause for rejection of the Tender by the Owner.

Site Demolition: _____

Excavation Work: _____

Asphalt Paving Work: _____

Concrete Sidewalks / Aprons: _____

Building Concrete Work: _____

Masonry: _____

Structural Steel: _____

Roofing: _____

Metal Stud: _____

Gypsum Wall Board / Ceilings: _____

Millwork / Cabinetwork: _____

Metal Siding: _____

HM Doors and Frames: _____

Wood Doors: _____

Aluminum Storefront Framing: _____

Aluminum Windows / Curtain Wall: _____

Glazing: _____

Door Hardware: _____

Resilient Flooring: _____

Firestopping: _____

Spray Fireproofing: _____

Painting: _____

Mechanical: _____

Controls: _____

Automatic Sprinkler: _____

Electrical: _____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.9 APPENDIX 'B'

.1 ALTERNATIVE PRICES

We herewith submit for consideration by the Owner the following systems or products as Alternatives to the Base Bid items indicated below and identify the increase or decrease, as applicable, in our tender price, for each item should it be selected by the Owner for installation in lieu of the Base Bid item. The change in tender price includes for all necessary modifications to the base bid systems.

NOT APPLICABLE FOR THIS PROJECT.

1.10 APPENDIX 'C'

.1 UNIT PRICE COMPONENT

We submit herewith our Unit Prices for the additions or deletions to the work listed below. The Unit Prices listed apply to performing the Units of Work, in accordance with the requirements of the appropriate specifications herein, only during the time scheduled for such work in the project work schedule.

Unit prices shall include all fees, taxes and markups.

	UNIT OF WORK		**ONE (1) UNIT PRICE ONLY FOR EITHER ADDITION / DELETION**
.1	Asphalt Pavement (100mm Base Coat)	SM	$ _____
.2	Asphalt Pavement (50mm Seal Coat)	SM	$ _____
.3	Excavation, Backfilling (Select Borrow) & Compaction	CM	$ _____
.4	Imported Gravel (Class A) & Compaction	CM	$ _____
.5	Bollard - Steel Pipe filled with Concrete	Each	$ _____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.11 APPENDIX 'D'

.1 SEPARATE PRICES

We submit herewith our Separate Price for the addition of the work listed below and amounts are NOT included in our Stipulated Price. In accordance with the requirements of the appropriate specifications herein, only during the time scheduled for such work in the project work schedule.

NOT APPLICABLE FOR THIS PROJECT.

1.12 APPENDIX 'E'

.1 CASH ALLOWANCES

The undersigned hereby acknowledges that the sum of:

THIRTY-EIGHT THOUSAND DOLLARS, $38,000.00
EXCLUDING Harmonized Sales Tax (HST)

is included in the total tender amount as Cash Allowances, to perform the following work: This money to be expended in accordance with the requirements of CCDC2 2008 General Condition GC4.1 - Cash Allowances, only on consultant's written instructions.

WORK:

.1 Contractor to include for a $38,000.00 cash allowance to cover costs including labour, material and plant associated with the new Nurse Call System throughout the QEH ED Short Stay Unit. This cash allowance includes all devices, wiring, raceway, commissioning, verifications and training as required for a complete and comprehensive Nurse Call System, as well as all associated interconnections with the new hospital wide Nurse Call System, which is expected to be installed early in the Fall of 2022.
This allowance is to be adjusted to actual costs and be supported by invoices from the Supplier. No Contractor mark-ups will be accepted on this item.

Contractors are advised to carry sufficient overhead and administration cost to administer and coordinate this work.

In the event that the Owner decides not to proceed with any or all of this work, we agree to credit the Contract with the unused portion of the full amount of these Cash Allowances, as applicable.

COMPANY: _____

AUTHORIZED SIGNATURE: _____

END OF SECTION

This page intentionally left blank

1 General

1.1 FORM OF AGREEMENT

.1 The Form of Agreement between Contractor and Owner shall be Canadian Construction Documents Committee CCDC2-2008, "Stipulated Price Contract", including the Definitions and General Conditions therein dated 2008 including items GC1.1 inclusive to GC12.3, and the modifications to items GC1.1 to GC12.3 incorporated into Section 00 73 00 - Supplementary Conditions of this Specification.

.2 Document CCDC2-2008 may be examined at the Construction Association office in Charlottetown, PEI.

END OF SECTION

This page intentionally left blank

1 General

1.1 GENERAL

.1 The Definitions and General Conditions governing the Work shall be those specified in the following amendments and supplements to those provisions, and shall apply to all Sections of this Specification.

.2 Where any Article or portion of Article conflicts with the Laws of the Province concerned, such Article or portion of the Article is hereby stricken.

.3 The following amendments shall apply to the Definitions of CCDC2 Stipulated Price Contract 2008.

1.2 DEFINITIONS

.1 Paragraph 4 Consultant, add the following:

.1 The Consultant shall be the Owner's Prime Consultant, Coles Associates Ltd., 85 Fitzroy Street, Charlottetown, PEI.

.2 Paragraph 12 Owner, add the following:

.1 The Owner shall be Government of Prince Edward Island as represented by the Minister of Health and Wellness

.3 Paragraph 19 Subcontractor, add the following:

.1 All dealings with the Subcontractor shall be through the medium of the Contractor, who will be responsible for the proper coordination and execution of the Sub-contractor's work.

.4 New Paragraph 27 Engineer:

.1 This shall mean the designated engineering representative(s) of the Consultant.

1.3 ARTICLE GC1.1 CONTRACT DOCUMENTS

.1 Paragraph 1.1.8 - Delete as written and substitute with the following:

"1.1.8 The Contractor shall receive up to fifteen (15) sets of drawings and specifications at no cost from the Owner. Additional sets of drawings will be supplied at cost of reproduction. The above covers the requirements for all trades.".

.2 Paragraph 1.1.11 - Add new Paragraph as follows:

"1.1.11 The Contract Documents are prepared solely for use by the party with whom the Consultant has entered into a Contract and there are no representations of any kind made by the Consultant to any party with whom the Consultant has not entered into a Contract.".

.3 Paragraph 1.1.12 - Add new Paragraph as follows:

"1.1.12 Electronic documents are and shall remain the Consultant's property. Copies of electronic documents may be made available for the preparations of shop drawings at the Consultant's sole discretion and for a fee.".

1.4 ARTICLE GC3.1 CONTROL OF THE WORK

.1 Paragraph 3.1.1 - add new Sub-Clause 3.1.1.1 as follows:

"3.1.1.1 The Contractor shall co-ordinate his own work and the work of all Subcontractors so as to facilitate and expedite the progress of the work.".

.2 Paragraph 3.1.1 Add new Sub-Clause 3.1.1.2 as follows:

"3.1.1.2 It is the responsibility of the Contractor to immediately notify the Consultant of any signs of distress or any other indications of actual or potential damage to the contract work, without regard to his awareness of any errors, inconsistencies or omissions in the Contract Documents."

.3 Add new Paragraph 3.1.3 as follows:

"3.1.3 Before ordering any materials or doing any Work, Contractor shall verify all compensation has been allowed on account of differences between actual site dimensions and the measurements indicated on the drawings. Any difference, which may be found, shall be submitted to the Consultant for consideration before proceeding with the work.".

.4 Add new Paragraph 3.1.4 as follows:

"3.1.4 The Contractor will be responsible for effecting the removal from the site of any trade, firm, group or person who is delaying the Work, or whose Work is unsatisfactory. The Contractor will arrange for other competent trades people to complete the Work at no expense to the Owner.".

1.5 ARTICLE GC3.6 SUPERVISOR

.1 Add new Paragraph 3.6.3 as follows:

"3.6.3 The Consultant may require the Contractor to inform him, in writing, of the name and experience of the supervisory personnel he intends to use on the project.".

1.6 ARTICLE GC3.8 LABOUR AND PRODUCTS

.1 Add new Paragraph 3.8.4 as follows:

"3.8.4 All manufactured articles, materials and equipment shall be installed, applied, connected, erected, used, cleaned, conditioned and commissioned as directed by the manufacturer unless specified to the contrary.".

1.7 ARTICLE GC3.9 DOCUMENTS AT THE SITE

.1 Add new Paragraph 3.9.2 as follows:

" 3.9.2 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Notice of Change.
.7 Change Orders.
.8 Other Modifications to Contract.
.9 Field Test Reports.
.10 Approved Work Schedule.
.11 Health and Safety Plan and Other Safety Related Documents.
.12 CSA Z317.13-17 - Infection Control Guidelines.
.13 Other documents as specified.".

1.8 ARTICLE GC4.2 CONTINGENCY ALLOWANCE

.1 Article GC4.2 - Delete this article.

1.9 ARTICLE GC5.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Paragraph 5.2.2 - add two new Sentences as follows:

.1 Payment shall be less any holdback release, which may have been made in accordance with the specific terms of this Agreement as dictated by GC 5.6. Any such holdback release by the Owner to the Contractor shall be a payment to the Contractor in trust for the specific Subcontractor in respect of whose work the release is made.

.2 Payments shall be less 15% Mechanics' Lien Holdback amount claimed against each progress claim.

.2 Add new paragraph 5.2.6 as follows:

"5.2.6 Authorized Change Orders shall be listed on the application for payment indicating the amount claimed against each to date of claim.".

.3 Paragraph 5.2.7 - Add new sentences as follows:
"Payment for materials will be considered only if such materials are properly stored on site in a secure enclosure acceptable to the Consultant. Security of materials so stored is the responsibility of the Contractor.".

.4 Add new Paragraph 5.2.8 as follows:
"5.2.8 With the second and all subsequent applications for payment the Contractor shall include a statutory declaration form CCDC 9B, or other similar form acceptable to the Consultant, declaring that all labour and materials entering into the work, including Subcontractors, covered by the previous application, have been paid. With application for release of lien holdback, the Contractor shall include a statutory declaration form CCDC 9A, or other similar form acceptable to the Consultant. With the second and all subsequent applications for payment the Contractor shall include a Letter of Clearance from the PEI Workers Compensation Board.".

1.10 ARTICLE GC5.3 PROGRESS PAYMENT

.1 Paragraph 5.3.1 - Add new Sentence as follows:
"When any claim for payment during the course of construction includes for completed or partially completed Work, which in the opinion of the Consultant is defective or otherwise unacceptable, a sum of monies determined by the Consultant to be two (2) times the value of the defective or unacceptable Work, or two (2) times the value of the Work required to correct the defect or an amount solely at the Consultants discretion, will be withheld from the claim.".

.2 Paragraph 5.3.1 - Add 3 new Sentences as follows:
.1 "Deficiency monies may be held back at any time during the course of the project for Work deemed incomplete or unacceptable.".
.2 "It remains the Contractor's responsibility to undertake his own deficiency reviews and ensure the entire Work conforms to the Contract including quality, completeness and commissioning.".
.3 "Two final deficiency reviews will be conducted by the Consultant. The first review with the Owner and Contractor will identify any minor items which may remain outstanding, and the second review will confirm that these items have been completed. All other deficiency reviews where deficiencies are incomplete or not ready for requested inspections, will be charged at cost to the Contractor. The invoice for the additional reviews will be submitted to the Owner with a corresponding amount deducted from the Contractor's progress payment."

1.11 ARTICLE GC5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

.1 .1 Paragraph 5.5.1, Add new Sub-Clause .3 as follows:
"5.5.1.3 Submit with application for payment letter of clearance from The Workers Compensation Board to the Owner stating that the Contractor is in good standing with the Board.".

1.12 ARTICLE GC5.7 FINAL PAYMENT

.1 Paragraph 5.7.2 - Add new Sentence as follows:
"Any delay in delivering the required Project Record Drawings (As-Builts) as described in Section 01 78 00 - Closeout Submittals will have the effect of delaying the final payment to the Contractor until the Consultant has received them complete and in good condition.".

1.13 ARTICLE GC6.2 CHANGE ORDER

.1 Delete Paragraph 6.2.1 and replace with a new paragraph as follows:

"6.2.1 When a change in Work is proposed or required, the Consultant will provide the Contractor with a written description of the proposed change in the Work. The Contractor shall promptly present, in forms acceptable to the Consultant, a detailed breakdown of the costs associated with the change, if any; and the adjustment in the Contract Time, if any. The breakdown shall include:

.1 Actual (not list) costs of material, as well as Subtrade and Supplier costs.

.2 Labour costs, including fringe benefits and wage levies.

.3 Equipment rental (excluding hand and small power tool).".

.2 Change Orders calling for normal changes or additions to the Work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs and wage levies (including Employment Insurance, Worker's Compensation, Holiday Pay) and actual equipment rental.

.3 Each Change Order will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.

.4 To these prices, the Contractor will add:

.1 For Work less than $2,500, involving the General Contractor only, the General Contractor adds 20% to his costs.

.2 For Work over $2,500, involving the General Contractor only, the General Contractor adds 15% to his costs.

.3 For Work less than $2,500, involving a Subcontractor only, the Subcontractor adds 20% to his costs, submits this price to the General Contractor who adds 10%.

.4 For Work over $2,500, involving a Subcontractor only, the Subcontractor adds 15% to his costs, submits this price to the General Contractor who adds 5%.

.5 For Work less than $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 20% to his costs, submits his price to the General Contractor who adds 10%; to this amount the General Contractor adds the cost of his own Work plus 20% of the cost of his own Work only. The General Contractor does NOT add a further 10% to the cost of his own Work.

.6 For Work over $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.

.7 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders.

.8 Supervision related to Change Orders shall be considered as included in the allowable mark-up, and shall not be added as additional charges for a Change order.

.5 Note: Costs related to management, supervision, estimating, scheduling, bonding, insurance, as built drawings, copying, courier, safety, cleaning, site overhead, site vehicle, hand and small power tools etc. are covered by the mark up indicated and shall not be included on Change Orders.

1.14 ARTICLE GC6.3 CHANGE DIRECTIVE

.1 Delete Paragraphs 6.3.6.1, 6.3.6.2 and 6.3.6.3 and replace with the following:

"The Owner or the Consultant, without invalidating the contract, may make changes by altering, adding to, or deducting from the work, the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the Contract. Where work is required to proceed immediately, work may proceed under a Change Directive. The Contractor will be instructed to proceed on a time and materials basis and maintain accurate accounting records for the cost of the change.".

.2 Change Directives calling for changes to the Work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs and wage levies (including Employment Insurance, Worker's Compensation, Holiday Pay) and actual equipment rental.

.3 Each Change Directive will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.

.4 To these prices, the Contractor will add:

.1 For Work less than $2,500, involving the General Contractor only, the General Contractor adds 20% to his costs.

.2 For Work over $2,500, involving the General Contractor only, the General Contractor adds 15% to his costs.

.3 For Work less than $2,500, involving a Subcontractor only, the Subcontractor adds 20% to his costs, submits this price to the General Contractor who adds 10%.

.4 For Work over $2,500, involving a Subcontractor only, the Subcontractor adds 15% to his costs, submits this price to the General Contractor who adds 5%.

.5 For Work less than $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 20% to his costs, submits his price to the General Contractor who adds 10%; to this amount the General Contractor adds the cost of his own Work plus 20% of the cost of his own Work only. The General Contractor does NOT add a further 10% to the cost of his own Work.

.6 For Work over $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.

.7 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders

.8 Supervision related to Change Orders shall be considered as included in the allowable mark-up, and shall not be included in the labour changes for a Change order.

1.15 ARTICLE GC9.1 PROTECTION OF WORK AND PROPERTY

.1 Add new Paragraph 9.1.5 as follows:

"9.1.5 The Contractor shall be responsible for implementing all necessary security measures required to protect the areas of Work under his control and shall be responsible for damage which may arise from the failure of, or the failure to implement such security measures.".

1.16 ARTICLE GC10.1 TAXES AND DUTIES

.1 Paragraph G.C. 10.1.1 - Revise as follows:

.1 Delete the words ..."at the time of closing except for Value Added Taxes"...and replace with the words ..."at the time of closing including Value Added Taxes"...

1.17 ARTICLE GC10.2 LAWS, NOTICES, PERMITS, AND FEES

.1 Paragraph G.C. 10.2.2 - Delete "the building permit" and add the new sub-clause 10.2.2.1 as follows:

"10.2.2.1 The Owner shall apply for, obtain and pay for the building permit.".

1.18 INSURANCE

.1 Without restricting the generality of GC 12.1 - INDEMNIFICATION, the Contractor shall provide, maintain and pay for the following insurance coverages:

.1 General liability insurance with limits of at least TEN Million Dollars ($10,000,000.00) in the name of the Contractor and include, or in the case of a single, blanket policy, be endorsed to name, the Owner and the Consultant as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the Contractor with regard to the Work. General liability insurance shall be maintained from the date of commencement of the Work until one year from the date of Substantial Performance of the Work. Liability coverage shall be provided for completed operations hazards from the date of Substantial Performance of the Work, as set out in the certificate of Substantial Performance of the Work, on an ongoing basis for a period of 6 years following Substantial Performance of the Work.

.2 Automobile Liability Insurance with limits of at least TWO Million Dollars ($2,000,000.00) from the date of commencement of the Work until one year after the date of Substantial Performance of the Work.

.3 Aircraft or Watercraft Liability Insurance with limits of at least FIVE Million Dollars ($5,000,000.00) when owned or non-owned aircraft or watercraft are used directly or indirectly in the performance of the Work. The term Aircraft includes drones and other unmanned aircraft.

.4 Broad Form" property insurance (also known as Builders Risk) in the joint names of the Contractor, the Owner and the Consultant. The policy shall include as insureds all Subcontractors. The "Broad Form" property insurance shall be provided from the date of commencement of the Work until the earliest of:

.1 Ten calendar days after the date of Substantial Performance of the Work.

.2 On the commencement of use or occupancy of any part or section of the Work unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the Work.

.3 When left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more that 30 consecutive calendar days.

.5 Boiler and machinery insurance in the joint names of the Contractor, the Owner and the Consultant. The policy shall include as insureds all Subcontractors. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until ten calendar days after the date of Substantial Performance of the Work. The policies shall include any periods of testing prior to full acceptance of the project as required by this Contract, but including coverage for risks arising out of such part of the Work. Coverage to extend to 36 months after the date of Final Completion of the last component of the project.

.6 The "Broad Form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the Owner and the Contractor as their respective interests may appear. In the event of loss or damage:

.1 The Contractor shall act on behalf of the Owner for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the Work. Loss or damage shall not affect the rights and obligations of either party under the Contract except that the

.1 Contractor shall be entitled to such reasonable extension of Contract Time relative to the extent of the loss or damage as the Consultant may recommend in consultation with the Contractor.

.2 The Contractor shall be entitled to receive from the Owner, in addition to the amount due under the Contract, the amount which the Owner's interest in restoration of the Work has been appraised, such amount to be paid as the restoration of the Work proceeds in accordance with the progress payment provisions. In addition the Contractor shall be entitled to receive from the payments made by the insurer the amount of the Contractor's interest in the restoration of the Work; and to

.3 The Work arising from the work of the Owner, the Owner's own forces or another contractor, the Owner shall, in accordance with the Owner's obligations under the provisions relating to construction by Owner or other contractors, pay the Contractor the cost of restoring the Work as the restoration of the Work proceeds and as in accordance with the progress payment provisions.

.7 The Insurer shall acknowledge that the policies are primary and any other insurance policies that may be in effect or any other sources of recovery including Government of Prince Edward Island's Self Insurance and Risk Management Fund shall not contribute in any way to any judgments, awards, payments, or costs or expenses of any kind whatsoever made as a result of actual or alleged claims.

.2 Prior to commencement of the Work and upon placement, renewal, amendment, or extension of all or any part of the insurance, the Contractor shall promptly provide the Owner with confirmation of coverage in the form of certificates of insurance by an authorized representative of the insurer together with copies of any amending endorsements applicable to the Work.

.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the Contract.

.4 If the Contractor fails to provide or maintain insurance as required by the Contract Documents, then the Owner shall have the right to provide and maintain such insurance and give evidence to the Contractor and the Consultant. The Contractor shall pay the cost thereof to the Owner on demand or the Owner may deduct the cost from the amount which is due or may become due to the Contractor.

.5 All required insurance policies shall be with insurers licenced to underwrite insurance in the jurisdiction of the Place of Work.

.6 Indemnification:

.1 The Contractor shall indemnify and hold harmless the Government of Prince Edward Island, its agents, representatives and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings of every nature and kind whatsoever arising out of or resulting from the performance of work (herein called the "claims"), provided that any such claim is caused in whole or in part of any act, error or omission, including but not limited to those of negligence of the Contractor, or anyone directly or indirectly employed by the Contractor anyone for whom the Contractor may be liable.

1.19 ARTICLE GC12.3 WARRANTY

.1 Add new Paragraph 12.3.7 as follows:

"12.3.7 When a part of the work is occupied by the Owner, directly or for the use intended prior to Substantial Performance, the warranty for the Work directly related to the construction and normal operation of that part of the Work, shall start on the date of occupancy.".

.2 Add new paragraph 12.3.8 as follows:

"12.3.8 The Contractor shall ensure that his subcontractors are bound to the requirements of GC12.3 insofar as their work is concerned.".

END OF SECTION

This page intentionally left blank

1 General

1.1 SCOPE OF WORK

.1 The Contractor is to provide each item, and properly execute all work as specified herein, indicated by drawings, addenda, or change orders issued with respect to this project.

.2 The Contractor shall coordinate, administer, and supervise all work, material acquisition and labour.

.3 Contractor shall coordinate with Owner and facilitate installation of Owner provided equipment.

.4 The scope of work will include the following:

.1 Select interior and exterior demolition including site work.

.2 Interior renovations and construction of the new addition over an active loading dock and other shipping and receiving operations.

.3 Multi phase project within an operational hospital. All infection control procedures must be followed.

.4 All in accordance with the requirements of the specifications and drawings listed on their respective Index of Specifications and Drawings.

1.2 WORK BY OTHERS

.1 Co-operate and coordinate with other Contractors in carrying out the respective works and carry out instructions from Consultant.

.2 Schedule the Work of this Contract in consultation and cooperation with the Work of other Contractors and/or Owners own forces to produce a coordinated construction schedule.

1.3 COORDINATION

.1 All Trades on site are responsible to co-operate and co-ordinate with each other.

.2 Coordination prior to installation of all building components is mandatory.

.3 Where work must be modified or reinstalled to be properly coordinated, the cost to do so will be paid by the Trades involved. The Owner will not pay for uncoordinated work nor will the Owner pay to resolve uncoordinated work.

.4 If resolution cannot be achieved among the involved Trades, the Construction Manager and Consultant will assess Trade involvement and assign costs accordingly.

1.4 DAMAGE

.1 Where damage is done to work in progress or existing areas of the building and is unclaimed by a Trade, the cost to repair the damage will be assessed by the Consultant and assigned on a pro-rated tender cost basis to all Trades on site at the time the damage occurred.

.2 The Owner will not participate in paying for such damage.

1.5 DEDUCTIONS FOR UNCORRECTED WORK

.1 If, in the opinion of the Consultant, it is not expedient to correct defective work or work not done in accordance with the Contract documents, the Owner may deduct from the Contract price the difference in value between the work as done and that called for by the Contract, the amount of which shall be determined in the final instance by the Consultant.

1.6 CORRECTION AFTER COMPLETION

.1 Subject to any special provisions in the Contract documents, the Contractor shall remedy any defects due to faulty materials or workmanship appearing within a period of one (1) year from the date of substantial completion of the work and shall pay for any damage to other work resulting there from which appears within such period and neither the final certificate nor payment there under shall relieve the Contractor from responsibility hereunder. The Owner shall give notice of observed defects promptly. Questions arising under this Article may be decided as provided in Article 43.

1.7 EMERGENCIES

.1 The Consultant has authority in an emergency to stop the progress of the work whenever in his or her opinion, such stoppage may be necessary to ensure the safety of life, or of the structure, or neighbouring property. This includes authority to make such changes and to order, access and award the cost of such work extra to the Contract or otherwise as may in his or her opinion be necessary.

1.8 WORK SEQUENCE

.1 Construct Work to accommodate Owner's continued use of existing premises during construction.
.2 Construct Work in stages during the construction period, coordinate construction schedule and operations with Owner and Consultant.
.3 Required stages:
  .1 Refer to Drawings A002 for sequence or work and limitations.
.4 Construct Work to provide for continuous public usage. Do not close off public usage of facilities.
.5 Maintain fire access/control.

1.9 PARTIAL OWNER OCCUPANCY

.1 Schedule and complete designated portions of Work for Owner's occupancy prior to Substantial Performance of entire Work. There will only be one Substantial Performance.
.2 Consultants and the Authority Having Jurisdiction will have to review and sign off on the areas being sequentially provided for Owner's occupancy.
.3 On occupancy, Owner will provide for occupied areas:
  .1 Operation of HVAC and electrical systems.
  .2 Security.

1.10 EXECUTION

.1 Execute work with least possible interference or disturbance to building operations, public and normal use of premises.
.2 Elevators may NOT be used for moving workers and material.

1.11 MITIGATION OF IMPACT ON EXISTING BUILDING

.1 This Contractor will recognize that the existing facility must remain fully functional with minimal disruption during the course of the Work, and that the existing facility, its operation, and its occupants may be very sensitive to dirt, dust, air-borne particulate, smoke, fumes, etc. generated as a result of the Work. Any disruption in services must be brought to the attention of the Consultant and receive prior approval before commencement.
.2 This Contractor is responsible to ensure that the existing building is kept free from any contamination that may result from any of the Work.
.3 The life safety and security systems in the existing building are required to remain functional during construction. This Contractor is responsible to ensure that such systems are not inadvertently activated or deactivated during construction.

.4 The Contractor is financially responsible for all measures required to minimize the potential for any contamination that could occur. Such measures include, but are not limited to, temporarily masking sensors in non-occupied areas, providing fans, working off hours (nights), performing work outside, sealing off localized work areas, etc. All such measures to be confirmed and approved by the Consultant prior to undertaking.

.5 The scheduling of all Work, which has the potential to cause contamination to the existing building, is to be approved by the Owner.

.6 This Contractor is responsible to immediately mitigate any discomfort, disruption, damage or condition, to the existing occupants, operations, space or building systems as deemed necessary by the Consultant.

1.12 DOCUMENTS

.1 The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all.

.2 Descriptions of materials or work which have well known technical or trade meanings shall be held to refer to such recognized standards.

.3 Should the specifications conflict with the drawings, the specifications shall govern.

.4 In the case of discrepancies between drawings, those of larger scale, or if the scale are the same, those of later date shall govern.

.5 All drawings and specifications shall be interpreted in conformity with the agreement.

1.13 PROTECTION OF WORK AND PROPERTY

.1 The Contractor shall maintain continuously adequate protection of all their work from damage and shall take reasonable precautions to protect the Owner's property from all injury arising in connection with this Contract. The Contractor shall make good any damage or injury to their work and shall make good any damage or injury to the property of the Owner resulting from the lack of reasonable protective precautions. The Contractor shall not be responsible, however, for any damage or injury to their work and to the property of the Owner which may be directly due to errors in the Contract documents or caused by the Owner, their agents, or employees, or from any work or risk which the Owner has agreed to insure, provided the Contractor has taken reasonable protective precautions. The Contractor shall adequately protect adjacent property as required by law and the Contract documents.

1.14 COMMUNICATION

.1 All submissions and inquiries shall be directed to the Consultant for review.

.2 All direction will be transmitted to the Contractor by the Consultant.

1.15 CODES AND REGULATIONS

.1 Perform work in accordance with National Building Code of Canada (NBC) 2015 and any other code of provincial or local application, provided that in any case of conflict or discrepancy the more stringent requirements shall apply.

.2 Meet or exceed requirements of contract documents and specified standards.

.3 References to standards, including manufacturer's direction for installation shall be the latest edition.

.4 All materials, components and equipment as well as construction methods shall comply with the NBC (2015) and all other applicable Provincial codes or regulations.

.5 The latest edition of the Canadian Electrical Code shall govern all electrical work, whether pre-wired and/or assembled remote from the site or not.

.6 All equipment supplied or installed shall be CSA approved for the intended use.

.7 The latest edition of the PEI Occupational Health and Safety Act and Regulations shall govern safe construction practices.

.8 Provide a copy of all certificates of acceptance issued by Provincial or local authorities.

1.16 WORK SCHEDULE AND PROGRESS REPORTS

.1 The Contractor will prepare and maintain a consolidated schedule in weekly increments showing scheduled work versus actual work. The schedule shall indicate the contract commencement and completion date for the total project.

.2 The Contractor is to develop a detailed schedule identifying specific components of the mechanical, sprinkler, refrigeration and electrical trades. A single line items for each is not acceptable.

.3 Provide updated schedule information every two weeks showing the progress of the work or more frequently as the Consultant may require.

.4 The Contractor shall furnish monthly progress reports from the date of commencement. These reports shall show the percentage of completion of the various divisions of work and contain comments on the general progress of the project.

1.17 CONTRACTOR'S USE OF SITE

.1 Do not unreasonably encumber site with materials or equipment.

.2 Move stored products or equipment, which interfere with operations of Consultant or other Contractors.

.3 Obtain and pay for use of additional off site storage or work areas needed for operations.

.4 The work related to modifying the site roadways must be carried out so that one half of the roadway is open to vehicle traffic at all times.

1.18 PROJECT MEETINGS

.1 Hold weekly project meetings at the site, in the Contractor's site office and at a time approved by Consultant. In addition hold any additional meetings as the need arises or as directed by the Consultant.

.2 Notify all parties concerned of such meetings.

.3 The Contractor will record minutes of meetings and distribute to all parties within three days of meeting.

.4 Failure of the Contractor to accurately record minutes or distribute the minutes in a timely manner will result in the Consultant taking over the duties invoicing the owner and deducting an equal amount from the progress claims as compensation.

1.19 OWNER'S SITE INSPECTOR

.1 There will be an Inspector representing the Province of PEI. No work is to be covered without having received approval from the Inspector. The Inspector will have the authority to cause any part of the work to cease, should, in his or her opinion, there be cause to do so.

.2 This work shall be examined by the Inspector and approval granted to resume when a satisfactory solution has been found out.

.3 The Inspector does not have authority to authorize changes to work. He or she shall confer with the Consultant who, if necessary will authorize any change.

.4 The fact that the Inspector does not reject any work shall not remove the irresponsibility for completing all work as specified from the Contractor.

1.20 SITE INSPECTOR

.1 No work is to be covered without having received approval from the Consultant. The Consultant will have the authority to cause any part of the work to cease, should, in his or her opinion, there be cause to do so.

.2 This work shall be examined by the Consultant and approval granted to resume when a satisfactory solution has been found out.

.3 The Owner does not have authority to authorize changes to work. He or she shall confer with the Consultant who, if necessary will authorize any change.

.4 The fact that the Owner or Consultant does not reject any work shall not remove the responsibility for completing all work as specified from the Contractor.

1.21 SETTING OUT OF WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations.
.2 Provide all equipment, materials and devices needed to lay out and construct work.
.3 Supply such devices as straight edges and templates required to facilitate Consultant's inspection of work.

1.22 CONCEALMENT

.1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.23 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
.3 Inform Consultant of impending installation and obtain his approval for actual location.
.4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.24 CUTTING, FITTING AND PATCHING

.1 Execute cutting, core drilling, fitting and patching, required to install and make new work under this contract fit properly.
  .1 Includes all cutting and patching in building for connection of new mechanical and electrical services to service lines.
.2 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

1.25 BLOCKING AND BACKING

.1 Provide all blocking, backing, hangers, etc. used for support of all built-in work.

1.26 EXISTING SERVICES

.1 Before commencing work, establish the location and extent of service lines and notify Consultant of findings if in conflict with information or intent shown.
.2 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
.3 Contractor shall pay for any or all repairs to existing services that have been damaged due to the Contractor's negligence in the course of his work.
.4 Notify Consultant and utilities of intended interruption of services and obtain permission.
.5 Where Work involves breaking into or connecting to existing services, give Consultant two weeks notice for necessary interruption. Minimize duration of interruptions. Carry out Work at times as directed by governing authorities or Owner with minimum disturbance.
.6 Provide temporary services when directed by Consultant to maintain critical building and tenant systems.
.7 Provide alternative routes for personnel and vehicular traffic.
.8 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by Authorities Having Jurisdiction.
.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.27 ACCESS AND SECURITY

.1 Access and security on the entire job site will be the responsibility of the Contractor.

1.28 ADDITIONAL DRAWINGS

.1 The Consultant may furnish as necessary for the execution of the work, additional instructions, by means of drawings or otherwise. All such additional instructions shall be consistent with the contract documents. In giving such additional instructions the Consultant shall have authority to make minor changes in the work, consistent with the Contract.

1.29 RELICS AND ANTIQUITIES

.1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during the work, shall remain property of the Owner. Protect such articles and request directives from Consultant.

.2 Give immediate notice to Consultant if evidence of archaeological finds are encountered during construction, and await Consultant's written instructions before proceeding with work in this area.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 10 00 - Summary.

1.2 ACCESS AND EGRESS

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

1.3 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Consultant to facilitate work as stated.
.2 Maintain existing services to building and provide for personnel and vehicle access.
.3 Where security is reduced by work provide temporary means to maintain security.
.4 Contractor will provide sanitary facilities for use by Contractor s personnel. Keep facilities clean.
.5 Do Not use existing elevators in building for moving workers and material.
.6 Closures: protect work temporarily until permanent enclosures are completed.
.7 The existing cafeteria / food premises cannot be used.
.8 Work clothes / work boots are not permitted within the building. Street clothes are only permitted outside of construction hoarding / dust control barriers.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to public, building operations, occupants, and normal use of premises. Arrange with Consultant to facilitate execution of work.

1.5 EXISTING SERVICES

.1 Notify, Consultant and utility companies of intended interruption of services and obtain required permission.
.2 Where Work involves breaking into or connecting to existing services, give Consultant two weeks of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends. Formal approval from the Hospital (QEH) must be received prior to proceeding with any such work.
.3 Provide for personnel, pedestrian and vehicular traffic.
.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 SPECIAL REQUIREMENTS

.1 Carry out noise generating Work Monday to Friday and Weekends from 07:00 to 17:00 hours.
.2 All work that is intensely loud or work that causes vibration to the hospital operations requires 72 hours notice prior to doing the work. The look ahead schedule from the Contractor will inform these works to the Consultant team, Owner's Representative and Hospital Maintenance personnel.
.3 Submit schedule in accordance with Section 01 32 16 - Construction Progress Schedule.
.4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
.5 Keep within limits of work and avenues of ingress and egress.
.6 Ingress and egress of Contractor vehicles at site is limited to
.7 Deliver materials outside of peak traffic hours, coordinate times with Owner.

.8 The work is taking place is adjacent to an active Helicopter pad and all Transport Canada limitations must be followed by the Contractor. The limitations / parameters will be discussed in the construction start up meeting following Tender Award.

1.7 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

.2 Security clearances:

.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.

.2 Obtain requisite clearance, as instructed, for each individual required to enter premises.

.3 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

.4 Contractor s personnel will require satisfactory RCMP initiated security screening in order to complete Work in premises and on site.

1.8 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not permitted on property.

END OF SECTION

1 General

1.1 REFERENCES

.1 Owner/Contractor Agreement.
.2 Canadian Construction Documents Committee (CCDC).
  .1 CCDC 2-2008, Stipulated Price Contract.
.3 Section 00 73 00 - Supplementary Conditions.

1.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Make applications for payment on account as provided in Agreement as Work progresses.
.2 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work at that date.
.3 Submit to Consultant, at least 14 days before first application for payment, Schedule of Values for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment.

1.3 SCHEDULE OF VALUES

.1 Make schedule of values out in such form and supported by such evidence as Consultant may reasonably direct and when accepted by Consultant, be used as basis for applications for payment.
.2 Include statement based on schedule of values with each application for payment.
.3 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Consultant may reasonably require to establish value and delivery of products.
.4 Provide, minimum 14 days before submitting first application for payment, a Schedule of Values, aggregating the Total Contract Price. After approval by the Consultant the Schedule of Values will be used as a basis for the application for progress payments.
.5 Contractor shall submit with the Schedule of Values, an itemized list of all trades and applicable labour rates for each, which will be used as a basis for labour rates in changes to contract Work.
.6 The schedule of values is to indicate separate line items each for mechanical commissioning, electrical commissioning, mechanical operation & maintenance manuals and electrical operations ' maintenance manuals.

1.4 PREPARING SCHEDULE OF UNIT PRICE TABLE ITEMS

.1 Submit separate Schedule of Unit Price items of Work requested in Bid form.
.2 Make form of submittal parallel to Schedule of Values, with each line item identified same as line item in Schedule of Values. Include in unit prices only:
  .1 Cost of material.
  .2 Delivery and unloading at site.
  .3 Sales taxes.
  .4 Installation, overhead and profit.
.3 Ensure unit prices multiplied by quantities given equal material cost of that item in Schedule of Values.

1.5 PROGRESS PAYMENT

.1 Consultant will issue to Owner, no later than ten days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Consultant determines to be properly due. If Consultant amends application, Consultant will give notification in writing giving reasons for amendment.

1.6 SUBSTANTIAL PERFORMANCE OF WORK

.1 Refer to Section 00 73 00 - Supplementary Conditions.

.2 Prepare and submit to Consultant comprehensive list of items to be completed or corrected and apply for a review by Consultant to establish Substantial Performance of Work or substantial performance of designated portion of Work when Work is substantially performed if permitted by lien legislation applicable to Place of Work designated portion thereof which Owner agrees to accept separately is substantially performed. Failure to include an item on list does not alter responsibility to complete Contract.

.3 No later than ten days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than seven days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.

.4 Consultant shall state date of Substantial Performance of Work or designated portion of Work in certificate.

.5 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.7 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

.1 After issuance of certificate of Substantial Performance of Work:

.1 Submit an application for payment of holdback amount.

.2 Submit sworn statement that all accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Owner might in any way be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.

.2 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of holdback amount.

.3 Where holdback amount has not been placed in a separate holdback account, Owner shall, ten days prior to expiry of holdback period stipulated in lien legislation applicable to Place of Work, place holdback amount in bank account in joint names of Owner and Contractor.

.4 Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in lien legislation applicable to Place of Work. Owner may retain out of holdback amount any sums required by law to satisfy any liens against Work or, if permitted by lien legislation applicable to Place of Work, other third party monetary claims against Contractor which are enforceable against Owner.

1.8 FINAL PAYMENT

.1 Submit an application for final payment when Work is completed.

.2 Consultant will, no later than ten days after receipt of an application for final payment, review Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than seven days after reviewing Work.

.3 Consultant will issue final certificate for payment when application for final payment is found valid.

END OF SECTION

1 General

1.1 APPOINTMENT AND PAYMENT

.1 The Contractor will arrange and pay for the services of an independent Consultant to carry out the following tests:
- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .4 Mill tests and certificates of compliance.
- .5 Tests specified to be carried out by Contractor under the supervision of Consultant.
- .6 Additional tests specified in Article 1.3.7 below.
- .7 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work.

1.2 CONTRACTOR'S RESPONSIBILITIES - GENERAL

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

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

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

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

.5 Provide Consultant with two (2) sets of fully documented test reports, submitted immediately following the testing operations.

1.3 CONTRACTOR'S RESPONSIBILITIES - INSPECTION & TESTING REQUIREMENTS

.1 Testing of all soil material types at source, including collection of sample material by testing firm, to verify compliance with material specifications.

.2 Follow up testing of all soil material types delivered to site.

.3 Monitoring placement and verifying compaction densities.

.4 Monitoring of upgrading work.

.5 Verifying the new compaction densities.

.6 Concrete:
- .1 Slump tests.
- .2 Compressive strength tests.

.7 Asphalt Paving:
- .1 Review of asphalt mix design submitted by Contractor.
- .2 Monitoring placement and compaction of seal course.
- .3 Testing of asphalt for compliance with material specifications from asphalt core samples taken by testing firm.

.8 Torquing of Structural Steel Bolted Connections
- .1 If tension control bolts (TCB) not used.
- .2 Random testing of torqued bolted connections.

.9 Spray Fireproofing:

.1 Thickness and density of sprayed-on fire-resistive materials on the following substrates.
  .1 Steel columns.
  .2 Steel beams.
  .3 Underside of steel decking.

.10 All Flooring
  .1 Moisture vapour transmission levels.
    .1 Moisture tests.
    .2 PH levels tests.
    .3 Bonding tests.

.11 Testing work may occur under various Sections of the Specification.

1.4 OWNERS RESPONSIBILITIES: TESTING REQUIREMENTS

.1 Testing of the following will be undertaken and paid for by the Owner.
  .1 Concrete tests.
  .2 Soil compaction tests.
  .3 Asphalt tests.

1.5 FINAL REPORT

.1 Submit to the Owner at completion of job, two (2) bound hard copies and one (1) electronic copy of inspection report. This report to include:
  .1 All copies of test results, indexed to correspond with testing requirements of this Section.

.2 Written report from the testing firm carrying out the work of this Contract stating that the work as itemized under Par. 4 of this Section has been performed in strict accordance with the requirements of the Contract documents.

.3 The report will be signed and sealed by a Professional Engineer registered to practice in the Province of Prince Edward Island and practicing in the field of materials testing.

END OF SECTION

1 General

1.1 SUBMITTALS

.1 Ten working days after award of contract and prior to commencement of Work, submit to Consultant the following work management documents:
- .1 Work Schedule as specified herein. Work Schedule to include a critical path methodology.
- .2 Shop Drawing Submittal Schedule specified in Section 01 33 00 - Submittal Procedures.
- .3 Health and Safety Plan specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.
- .4 Dust Control Plan specified in Section 01 56 00 - Temporary Barriers and Enclosures.
- .5 List of workers requiring security clearance and those to be placed on Site Security Control list as specified in Section 01 35 53 - Security Procedures.
- .6 Infection Control plan is required prior to any work on site.

1.2 WORK SCHEDULE

.1 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted tender.

.2 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of Work on time and permit effective monitoring of Work progress in relation to established milestones.

.3 Work schedule content to include as a minimum the following:
- .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
- .2 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
- .3 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.

.4 Work schedule must take into consideration and reflect the required sequence of Work, special conditions and operational restrictions as specified below.

.5 Schedule Work in cooperation with the Consultant. Consultant's decision is final in regards to time and order of Work. Incorporate within Work Schedule, items identified by Consultant during review of preliminary schedule.

.6 Completed schedule shall be to the Consultant's approval. When schedule has been approved by Consultant, take necessary measures to complete work within scheduled time. Do not change schedule without Consultant's approval.

.7 It is the Contractor's responsibility to ensure all subtrades and subcontractors are made aware of the work restraints and operational restriction specified.

.8 Schedule Updates:
- .1 Submit every 2 weeks or more frequently when requested by Consultant.
- .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
- .3 Identify problem areas, anticipated delays, impaction schedule and proposed corrective measures to be taken.

.9 Consultant will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Consultant. Address and take corrective measures on items of work as identified by reviews and as directed by Consultant. Update schedule accordingly.

.10 In every instance, change or deviation from work scheduling, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Consultant.

1.3 PROJECT PHASING

.1 Be aware that Building must be kept operational for the full duration of work of this contract. Building services to areas under use by tenants must also be maintained at all times during the Facility's operational hours and as specifically defined in operational restrictions specified in this section.

1.4 OPERATIONAL RESTRICTIONS

.1 The Contractor must recognize that building occupants will be affected by implementation of this contract. The Contractor must perform the work with utmost regard for the safety and impact on building occupants and users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any other portion of the building without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas

.2 Contractor to meet with the Consultant on a weekly basis to identify intended work areas, activities and scheduling for the coming week. Contractor to provide a 2-week look ahead schedule of activities that is updated and submitted to Consultant and Owner on a weekly basis.

.3 To assure that construction work may proceed productively without risk to safety of building occupants and the public, and due to the nature of the tenant's operation be aware that certain work of this contract must be carried out during "Off-Hours".

.4 Off-Hours: for the purposes of this contract, "off-hours" are defined as follows:

.1 Weeknight Hours: between the hours of 18:00pm and 7:00am for each weekday Monday to Thursday inclusive.

.2 Weekend Hours: between the hours of 18:00pm Friday evening to 7:00am Monday morning.

.3 Dependent on the nature and location of the construction activity, the day of the week and the time of the year, "off-hours" could be subject to redefinition to start or end at adjusted time periods. Scheduling of "off-hours" work will be subject to approval by the Consultant.

.5 The following work shall be performed during Off-Hours:

.1 Erection and dismantling of dust barriers, hoarding or other protective devices to separate areas of Facility occupied and under use by public and tenants from work areas;

.2 Asbestos abatement;

.3 Demolition of any masonry or concrete inside building;

.4 All work involving saw curing or boring of openings through masonry and concrete walls, floors, ceilings or roof;

.5 Work which requires the use of products controlled by WHMIS and for which MSDS sheets indicate toxic or hazardous materials requiring special handling and application procedures;

.6 Use of materials having high solvent content or other content emitting strong noxious fumes or odors;

.7 Painting;

.8 Removal of demolition debris from the building including cleaning of premises;

.9 Cleaning and preparing of occupied areas for daytime use by tenants immediately following an off-hour work shift;

.10 Work which requires the temporary disconnection of power and communication services to occupied areas;

.11 Testing of fire alarms and other emergency annunciating system;

.12 Delivery of materials and equipment from exterior to the interior of building when access routes are located in tenant occupied spaces.

.13 Work which creates excessive noise or vibration creating interference with tenant operations.

.6 Consultant reserves the right to stop certain daytime work activities, if the nature of that activity generates excessive noise or dust and have Contractor re-schedule that particular work to be performed during the Off-Hour period.

.7 Ensure that all trades are aware of the "Off-Hour" requirements of this contract and ensure that any extra costs incurred as a result is included in the Contractor's bid price for the work. No extra cost will be paid by Owner due to failure by General Contractor or his sub-contractors to recognize the off-hour requirements and other restrictions specified herein and to include all necessary allowances within their prices.

.8 See Section 01 35 53 in regards to:

.1 Special security requirements which must be observed in the course of work.

.2 Provisions of security personnel by Contractor as part of the work.

.9 Limited Maneuvering Space on Site:

.1 Coordinate with Consultant for loading/off loading. Parking is not available on-site.

.10 Facility circulation maintained:

.1 Ensure that entrances, corridors, stairwells, exits and other circulation routes are maintained free and clear providing safe and uninterrupted passage for facility users and public at all times for duration of work.

.2 Maintain those areas clean and free of construction materials and equipment during operational hours of Facility. Provide temporary and adequate devices to ensure users are not exposed to construction hazardous conditions and are protected from exposure to dust, noise and hazardous materials.

.3 Provide temporary corridors, walkways, passageways, access to offices, etc., when required due to nature of work. Such circulation routes must be constructed to barrier free requirements unless approved otherwise by Consultant.

.4 Maintain fire escape routes accessible and fire fighting access open all times for the duration of the project. Do not under any circumstances block fire exit doors and do not leave construction materials or debris in corridors, stairwells and in building entrances and exits.

.11 Safety Signage:

.1 Provide on site, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning the public and building occupants of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility, and directing building occupants through any detours which may be required.

.2 Signage to be professionally printed and mounted on wooden backing, colored and to express messages as directed by the Consultant.

.3 Generally maximum size of sign should be in the order of 1.0 square meter. Number of signs required will be dependent on number of areas in facility under renovation at any one time.

.4 Include cost for the supply and installation of these signs in the tender price.

.12 Dust and Dirt Control:

.1 See Section 01 50 00 - Facilities and Controls and Section 01 74 11 - Cleaning and Waste Management for dust control and cleaning requirements.

.2 Effectively plan and implement dust control measures and cleaning activities as an integral part of all construction activities. Review all measures with the Consultant before undertaking work, especially for major dust generating activities.

.3 Do not allow demolition debris and construction waste to accumulated and contribute to the propagation of dust.

.4 As work progresses, maintain construction areas in a tidy condition at all times. Remove gross dust accumulations by cleaning and vacuuming immediately following the completion of any major dust generating activity.

.5 Immediately remove all debris and dust from within occupied areas as generated by work therein during a given work shift.

.6 Disconnect and seal-off ductwork of HVAC servicing the construction area to stop spread of dust into other areas of Building.

.7 Avoid situation and practices which results in dust and dirt being brought from the construction areas or from the exterior and tracked inside the building into occupied areas used by tenants or public.

.8 Stop workers with soiled clothing and/or footwear from entering building. This includes roofing mechanics and heavy civil workers.

.9 Inform workers and make them sensitive to the need for dust and dirt control. Stringently enforce rules and regulations, immediately address non-compliance.

.10 Keep access doors to work areas closed at all times. Use only designated doors for entry or egress.

.13 Work in Occupied Areas:

.1 Where work must be carried out in an occupied area beyond the boundaries of the enclosed construction site, perform such work during the non-operational off-hour periods of the Facility.

.2 Ensure that all dust, dirt, debris, construction waste, materials, tools and equipment are completely removed at the end of each work shift. Clean and reinstate area ready for daytime use by tenant.

.3 Provide temporary dust barriers around immediate work areas and place fabric drop sheets over workstations, equipment and other furnishings located immediately adjacent to such work.

.4 Conduct work in such a way as to minimize the creation of dust and to avoid contaminating areas beyond the immediate location.

.5 Discuss and obtain Consultant's approval beforehand on the type and extent of dust barriers, protective devices and measures needed.

.6 Be responsible for temporarily moving office furnishings, workstations, computer equipment and other objects as needed to gain access and conduct work. Reinstall all dislocated items at end of each work shift making the area operational again.

.7 Disconnect and reconnect any power and communications systems feeding workstations as required.

.8 Clean such areas as well as those corridors and routes used to gain entry and access.

.14 Cleaning of tenant occupied areas used by Contractor:

.1 Clean lobbies, corridors, stairs and other circulation routes used by workers to gain access to work by conducting cleaning, vacuuming and washing of floors, walls and other soiled surfaces.

.2 Obtain and pay for the services of a professional cleaning company to perform this cleaning. Cleaning staff shall remain on site one hour beyond the end of each off-hour work shifts to address any Tenant complaint or concerns and carryout additional cleaning functions as directed by Consultant or by a pre-designated person(s) representing the tenant(s).

.3 Meager attempts at controlling dust and ineffective unprofessional cleaning procedures will not be tolerated.

.4 Failure to provide effective dust control, allowing construction dust and dirt to escape beyond construction areas and contaminate occupied areas and building circulation areas will result in Contractor being ordered to immediately provide professional cleaning services without delay to remedy the situation and conduct all cleaning to the extent as determined by Consultant. Alternatively, Consultant may at certain times and at his own discretion obtain the services of an independent building cleaning agency when cleaning being provided by Contractor is ineffective or tardy in response. Costs of such services will be charged against Contractor in the form of financial penalties or holdback assessments against the Contract.

.15 Ensure that all sub-trades are made aware of and abide by the contents of this section and in particularly the work restrictions specified herein due to tenant operational requirements.

1.5 PROJECT MEETINGS

.1 Schedule and administer project meetings, held on a minimum weekly basis, for entire duration of work and more often when directed by Consultant as deemed necessary due to progress of work of particular situation.

.2 Prepare agenda for meetings.

.3 Notify participants in writing four days in advance of meeting date.

.1 Ensure attendance of all subcontractors.

.2 Consultant will provide list of other attendees to be notified.

.4 Hold meetings at project site or where approved by Consultant.

.5 Preside at meetings and record minutes.

.1 Indicate significant proceedings and decisions. Identify action items by parties.

.2 Distribute to participants by mail or by facsimile within three calendar days after each meeting.

.3 Make revisions as directed by Consultant.

.4 Consultant will advise whether submission of minutes by email is acceptable. Decision will be based on compatibility of software among participants.

1.6 WORK COORDINATION

.1 The General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.

.1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.

.2 The General Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.

.1 Provide each trade with the plans, specifications, approved shop drawings and other documents of the interfacing trade as required to assist them in properly planning and carrying out their respective work.

.2 Develop coordination drawings when deemed required illustrating potential interference between work of various trades and distribute to all affected parties including structural trade.

.1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.

.2 Coordination drawings to identify all building elements, service lines, rough-in points and indicate from where various services are coming.

.3 Review coordination drawings at purposely called meetings. Have subcontractors sign-off on drawings and publish minutes of each meeting.

.4 Plan and coordinate work in such a way to minimize quantity of service line offsets.

.5 Submit copy of coordination drawings and meeting minutes to Consultant for information purposes.

.3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.

.4 Work Cooperation:

.1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.

.2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.

.5 Owner will not be responsible for or held accountable for any extra costs incurred as a result of the failure to carry out coordination work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor and shall be resolved by him at no extra cost to the Contract.

END OF SECTION

1 General

1.1 DEFINITIONS

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

.2 Bar Chart (GANTT Chart). A graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

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

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

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

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

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

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

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

1.2 REQUIREMENTS

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

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

.3 Limit activity durations to maximum of approximately ten working days, to allow for progress reporting.

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 MASTER PLAN

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

.2 Consultant will review and return revised schedules within five working days.

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

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

1.5 PROJECT SCHEDULE

.1 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

- .1 Award.
- .2 Shop Drawings, Samples.

.3 Permits.
.4 Mobilization.
.5 Excavation.
.6 Backfill.
.7 Building footings.
.8 Slab on grade.
.9 Structural Steel.
.10 Siding and Roofing.
.11 Interior Architecture (Walls, Floors and Ceiling).
.12 Millwork.
.13 Plumbing.
.14 Lighting.
.15 Electrical.
.16 Piping.
.17 Controls.
.18 Heating, Ventilating, and Air Conditioning.
.19 Fire Systems.
.20 Testing and Commissioning.
.21 Supplied equipment long delivery items.
.22 Owner supplied equipment required dates.
.23 Substantial Completion.
.24 Deficiency Completion.
.25 Total Completion.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress. Provide one day before each construction meeting.
.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site / construction meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
.2 Weather related delays with their remedial measures are to be identified and are the contractors responsibility.

END OF SECTION

1 General

1.1 GENERAL

.1 All submittals are to be delivered within 30 days of award of Contract.

.2 Make specified submittals to the Consultant at commencement of Contract, before beginning work on site (and no later than ten days after award). Include:

- .1 Contract Security
- .2 Proof of Insurance
- .3 Workers' Compensation clearance letter
- .4 Cost Breakdown
- .5 Permits as required
- .6 Construction schedule
- .7 Corporate Safety Plan
- .8 Site specific safety plan
- .9 Shop drawing schedule
- .10 Infection Control Plan

.3 During Construction provide:

- .1 Updated construction schedule
- .2 Shop drawings as required
- .3 Inspection and test reports
- .4 Request for Information
- .5 Submission required for payment purposes

.4 At completion of Work provide

- .1 Submission at completion of work as specified in Project Close Out, Commissioning, and Operations and Maintenance Data Sections.

1.2 ADMINISTRATIVE

.1 Refer to GC 3.10 Shop Drawings

.2 Submit to Consultant submittals listed for review. Submit ten working days after award of contract 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.

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

.4 Present shop drawings, product data, samples and mock-ups in SI Metric units.

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

.6 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated 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.

.7 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.8 Verify field measurements and affected adjacent Work are coordinated.

.9 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.

.10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.

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

1.3 SUBMITTAL SCHEDULES:

.1 Within ten days following award of contract, prepare and submit a summary of all submittals required.

.2 Submittal schedule shall be formatted as follows:

SECTION NUMBER	ITEM / EQUIP	SHOP DWG DELIVERY DATE	ORDER DATE	ITEM DELIVERY DATE

.3 The initial submission shall include completion of the first 3 columns of the above table example. Once approved shop drawings are received by the Contractor, the balance of the summary shall be updated and submitted accordingly.

1.4 SHOP DRAWINGS AND PRODUCT DATA

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

.2 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow ten days for Consultant's review of each submission.

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

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

.6 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.

.7 After Consultant's review, distribute copies.

.8 Submit digital copy of all shop drawings, product data sheets, reports, MSDS sheets and other traditional paper submissions.

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

.10 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.

.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 3 years of date of contract award for project.

.11 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant.
.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.

.12 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant.
.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.

.13 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.
.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.14 Submit two (2) hard copies of Operation and Maintenance Data for requirements requested in specification Sections, plus one (1) electronic copy and as requested by Consultant.

.15 Delete information not applicable to project.

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

.17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, transparency 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.

1.5 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 Consultant's business address.

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

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

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

.6 Make changes in samples which Consultant 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.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

This page intentionally left blank

1 General

1.1 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 Prince Edward Island
  .1 Occupational Health and Safety Act, R.S.P.E.I.1988 (including any amendments to and regulations).
.4 CSA C22.1-21 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
.5 CSA C22.3 No. 7-94 (R2005) - Underground Systems
.6 COSH, Canada Occupational Health and Safety Regulations (SOR/86-304)
.7 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:
  .1 FCC No. 301 - June 1982 Standard for Construction Operations.(or latest edition)
  .2 FCC No. 302 - June 1982 Standard for Welding and Cutting. (or latest edition)

1.2 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, Occupational Health and Safety Act Regulations PEI (including any amendments to and regulations).
.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
.3 Perform lockouts in compliance with:
  .1 Canadian Electrical Code
  .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
  .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
.4 In event of conflict between any provisions of above Authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Consultant will advise on the course of action to be followed.

1.3 CONSTRUCTION SAFETY MEASURES

.1 Observe and enforce construction safety measures required by latest National Building Code, Part 8, Provincial Government, Worker's Compensation Board and municipal statues and authorities.
.2 Provide and maintain first aid equipment appropriate to the work and its location in accordance with the First Aid Regulations. Implement recommendations from Occupational Health and Safety Division specific to the project work site.
  .1 Have minimum 2 years site-related working experience specific to activities associated with Construction.
  .2 Having working knowledge of occupational health and safety 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.

1.4 HEALTH AND SAFETY COORDINATOR

.1 Employ and assign to work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
  .1 Have minimum 2 years site-related working experience specific to activities associated with Construction.
  .2 Having working knowledge of occupational health and safety 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.

1.5 SAFETY ASSESSMENT

.1 Perform site specific hazard assessment related to project.
.2 Perform on-going hazard assessments during the progress of Work identifying new or potential health risks and safety hazards not previously known. As a minimum, hazard assessments shall be carried out when:
  .1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of work.
  .2 The scope of work has been changed by Change Order.
  .3 Potential hazard or weakness in current health and safety practices are identified by Consultant or by an authorized safety representative.
.3 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of Work. Upon request, make available to Consultant for inspection.

1.6 SUBMITTALS

.1 Upon request, submit within ten days to the Consultant, one copy electronically and one hard copy of the site-specific Health and Safety Plan.
.2 Upon request, submit within seven days to the Consultant, one copy electronically and one hard copy of the Contractor's authorized representative's worksite health and safety inspection reports.
.3 Upon request, submit within seven days to the Consultant, one copy electronically and one hard copy of the construction safety tool box meetings and formal contractor safety meetings.
.4 In the event of an incident/accident, immediately submit to the Consultant one copy electronically and one hard copy of the incident/accident report.

1.7 SITE CONTROL AND ACCESS

.1 Control worksite and entry points. Grant and allow entry to only workers and other persons so authorized. Immediately stop non-authorized persons from circulating within construction areas and remove from site.
.2 Prior to gaining access to the site, all contractors, subcontractors and suppliers shall file with the General Contractor their proof of Workers Compensation coverage, proof of required Insurance and proof of contract. Upon request, proof of these documents will be provided to the Owner and Consultant.
.3 Delineate and isolate construction areas from other areas of site by use of appropriate means. Erect barricades, fences, hoarding and temporary lighting as required.
.4 Erect signage at entry points and at other strategic locations around site, clearly identifying construction areas(s) as being "off limits" to non-authorized persons. Signage must be professionally made.
.5 Ensure persons granted access is fitted and wear appropriate personal protective equipment (PPE).

1.8 PROTECTION

.1 Provide temporary facilities for protection and safe passage of building occupants, public pedestrian and vehicular traffic around and adjacent to work site.
.2 Provide safety barricades, lights and signage within work site as required to provide a safe working environment for workers.

1.9 MEETINGS

.1 Prior to commencement of work hold a Health and Safety meeting. Have Contractor's Site Superintendent in attendance.

.2 Provide site safety orientation session to all workers and all workers new to the site and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the site safety rules in force at site.

.3 Conduct site specific occupational health and safety meetings during the entire work as follows and submit minutes as requested.

.1 Formal meetings on a minimum monthly basis.

.2 Informal tool box meetings on a regular basis from a predetermined schedule.

.4 Attend Health and Safety meetings as directed by the Contractor.

1.10 HAZARDOUS MATERIALS

.1 Should material resembling hazardous materials (other than those identified within the Contract Documents) be encountered in the course of work, stop work immediately. Do not proceed until written instructions have been received from the Consultant.

.2 Any material which contains asbestos, lead paint or PCB's that is disturbed or removed during construction work shall be removed in accordance with the regulations set out by the Occupational Health and Safety Act.

1.11 WHIMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) Regulations regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of Safety Data Sheets.

.2 Have a copy of WHMIS Safety Data Sheets available at the workplace on delivery of hazardous products.

1.12 SITE CLEANING

.1 Except where special permission is obtained, maintain clean access on public sidewalks and roads.

.2 Maintain walks and roads clear of construction materials and debris, including excavated material. Clean walks and roads as frequently as required to ensure that they are cleared of materials, debris and excavated material.

.3 Remove snow and ice from areas as required to execute the work.

1.13 FIRE SAFETY REQUIREMENTS

.1 Comply with requirements of latest standard for Building Construction Operations issued by the Fire Commissioner of Canada and Fire Safety Regulations of Local Authority. (latest editions)

.2 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code, (latest edition)

.2 Fire Protection Standards FCC 301 and FCC 302, (latest edition).

.3 Federal and Provincial Occupational Health and Safety Acts and Regulations.0

.3 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirements, Consultant will advise on the course of action.

1.14 EMERGENCY MANAGEMENT PLAN

.1 Must include response for medical and fire emergencies.

.2 Know the location of the nearest fire alarm box and telephone (if no cell phone available), including the emergency phone number.

.3 Know where the "Civic Address" of worksite is posted to report to emergency personnel.

.4 Report immediately all fire incidents to the fire department as follows:
- .1 Activate nearest fire alarm box.
- .2 Telephone 911.
- .3 Where fire alarm box is exterior to building, the person activating the fire alarm box shall remain at the box to direct Fire Department to scene of the fire.
- .4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

.5 Notify the Owner of any emergency.

1.15 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

1.16 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by Authority having Jurisdiction or by Consultant.

.2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.

1.17 OPEN EXCAVATIONS

.1 If open foundations or demolition areas are to be left at the end of a work day, a protective barrier must be placed around the entire perimeter of the open excavation or demolition areas to limit access by others. Barrier to be approved by the requirements established in the OH&S Regulations.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Fire Safety Requirements.
.2 Hot Work Permit.
.3 Existing Fire Protection and Alarm Systems.

1.2 REFERENCES

.1 National Fire Code 2010.
.2 National Building Code 2010.

1.3 DEFINITIONS

.1 Hot Work defined as:
  .1 Welding work.
  .2 Cutting of materials by use of torch or other open flame devices.
  .3 Grinding with equipment which produces sparks.
  .4 Use of open flame torches such as for roofing work.

1.4 SUBMITTALS

.1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.
.2 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.5 FIRE SAFETY REQUIREMENTS

.1 Implement and follow fire safety measures during Work. Comply with following:
  .1 National Fire Code 2010.
  .2 National Building Code 2010.
  .3 Federal and Provincial Occupational Health and Safety Acts and Regulations.
.2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.6 HOT WORK AUTHORIZATION

.1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site.
.2 To obtain authorization submit to Departmental Representative:
  .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
  .2 Description of the type and frequency of Hot Work required.
  .3 Sample Hot Work Permit to be used.
.3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
  .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
  .2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.
.4 Requirement for individual authorization will be based on:
  .1 Nature or phasing of work;
  .2 Risk to Facility operations;
  .3 Quantity of various trades needing to perform hot work on project or;

.4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.

.5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

.6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow Departmental Representative's directives in this regard.

.7 Submit requests in sufficient time so as not to delay work.

1.7 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Hot Work Procedures to include:

.1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in Section 01 35 29 - Health and Safety Requirements.

.2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.

.3 Permit required for each Hot Work event.

.4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 30-60 minutes immediately following the completion of the Hot Work.

.5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.

.6 Site specific rules and procedures in force at the site as provided by the Facility Manager.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.

.4 Procedures shall clearly establish responsibilities of:

.1 Worker performing hot work,

.2 Person issuing the Hot Work Permit,

.3 Fire Safety Watcher,

.4 Subcontractor(s) and Contractor.

.5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

1.8 HOT WORK PERMIT

.1 Hot Work Permit to include the following:

.1 Project name and project number;

.2 Building name and specific room or area where hot work will be performed;

.3 Date of issue;

.4 Description of hot work type needed;

.5 Special precautions to be followed, including type of fire extinguisher needed;

.6 Name and signature of permit issuer.

.7 Name of worker to which the permit is issued.

.8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.

.9 Worker's signature with time/date of hot work completion.

.10 Stipulated time period of safety watch.

.11 Fire Safety Watcher's signature with time/date.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.9 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:
- .1 Obstructed.
- .2 Shut-off, unless approved by Departmental Representative.
- .3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.10 DOCUMENTS ON SITE

.1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.

.2 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

END OF SECTION

This page intentionally left blank

1 General

1.1 SECTION INCLUDES

.1 Procedures to isolate and lockout electrical facility and other equipment from energy sources.

1.2 REFERENCES

.1 CSA C22.1-21, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
.2 CAN/CSA-C22.3 No.1-06, Overhead Systems.
.3 CSA C22.3 No.7-06, Underground Systems.
.4 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

1.3 DEFINITIONS

.1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
.2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment has been isolated.
.3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
.4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.
.5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
.6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.4 COMPLIANCE REQUIREMENTS

.1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
  .1 Canadian Electrical Code.
  .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
  .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
  .4 Procedures specified herein.
.2 In event of conflict between any provisions of above authorities the most stringent provision will apply.

1.5 SUBMITTALS

.1 Submit copy of lockout procedures, sample of lockout permit and lockout tags proposed for use in accordance with Section 01 33 00 - Submittal Procedures. Submit within 14 calendar days of acceptance of bid.

1.6 ISOLATION OF EXISTING SERVICES

.1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.

.2 To obtain authorization, submit to Departmental Representative the following documentation:
  .1 Written request to isolate the particular service or facility and;
  .2 Copy of Contractor's Lockout Procedures.
.3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, as follows:
  .1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;
  .2 Where no form exist, make written request indicating:
    .1 The equipment, system or service to be isolated and it's location;
    .2 Duration of isolation period (ie: start time & date and completion time & date).
    .3 Voltage of service feed to system or equipment being isolated.
    .4 Name of person making the request.
.4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorization to proceed with the work.
  .1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.
.5 Conduct safe, orderly shutdown of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.
.6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.
.7 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard.
.8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29 - Health and Safety Requirements.

1.7 LOCKOUTS

.1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.
.2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.
.3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.
.4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.
  .1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.
  .2 Duties of person managing the permit system to include:
    .1 Issuance of permits and lockout tags to workers.
    .2 Determining permit duration.
    .3 Maintaining record of permits and tags issued.
    .4 Making a Request for Isolation to Departmental Representative when required as specified above.
    .5 Designating a Safety Watcher, when one is required based on type of work.
    .6 Ensuring equipment or facility has been properly isolated.
    .7 Collecting and safekeeping lockout tags returned by workers as a record of the event.
.5 Clearly establish, describe and allocate responsibilities of:
  .1 Workers.

.2 Person managing the lockout permit system.
.3 Safety Watcher.
.4 Subcontractor(s) and General Contractor.

.6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.
.1 Incorporate site specific rules and procedures in force at site as provided by Facility Manager through the Departmental Representative.
.2 Clearly label the document as being the Lockout procedures applicable to work of this contract.

.7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.

.8 Use industry standard lockout tags.

.9 Provide appropriate safety grounding and guards as required.

1.8 CONFORMANCE

.1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.

1.9 DOCUMENTS ON SITE

.1 Post Lockout Procedures on site in common location for viewing by workers.

.2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.

.3 Upon request, make available to Departmental Representative or to authorized safety representative for inspection.

END OF SECTION

This page intentionally left blank

1 General

1.1 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 Prince Edward Island
  .1 Occupational Health and Safety Act, R.S.P.E.I. 1988.
.4 CSA C22.1-2021 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
.5 CSA C22.3 No. 1-M87 (R2001) - Overhead Systems.
.6 CSA C22.3 No. 7-94 (R2000) - Underground Systems.
.7 CSA - S269.1 - [1975] Falsework for Construction Purposes.
.8 CAN/CSA - S269.2 - [M87] Access Scaffolding for Construction Purposes.
.9 COSH, Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
.10 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:
  .1 FCC No. 301 - June 1982 Standard for Construction Operations.
  .2 FCC No. 302 - June 1982 Standard for Welding and Cutting.
  .3 FCC standards, may be viewed at the Regional Fire Protection Services' office (previously known as the Fire Commissioner of Canada) located at 99 Wyse Road, 8th Floor, Dartmouth, NS, Tel: (902) 426-6053.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit site-specific Health and Safety Plan: Within seven days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  .1 Part 1: List of individual health risks and safety hazards identified by hazard assessments.
  .2 Part 2: List specific measures to control or mitigate each hazard and risk identified in part one of Plan. State engineering controls, personal protective equipment and safe work practices to be used for work having identified hazard(s) or risk(s).
  .3 Part 3: Emergency and Communications Measures as follows:
    .1 Emergency Procedures: standard operating procedures, evacuation measures and emergency response implemented on site during an accident or incident. State step by step procedures, applicable to each identified hazard.
    .2 Emergency Communications: list names and telephone numbers of officials, to be contacted if incident, accident or emergency situation occurs, including:
      .1 General Contractor and all Subcontractors.
      .2 Provincial Departments and resources from local emergency organizations, based on type of hazard, incident or accident which might occur and as stipulated in applicable laws and regulations.
.3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant.
.4 Submit copies of incident and accident reports.
.5 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.
.6 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within two days after receipt of comments from Consultant.

.7 Consultant'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.
.8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
.9 Maintain Worker's Compensation Coverage for duration of contract. Submit Letter of Good Standing to Consultant.

1.3 DEFINITIONS

.1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
.2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment is isolated.
.3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
.4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.
.5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
.6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.4 PERMITS

.1 Obtain permits, licenses and compliance certificates, at appropriate times and frequency as stipulated by authorities having jurisdiction.
.2 Post all permits on site. Submit copies to Consultant.

1.5 FILING OF NOTICE

.1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.

1.6 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 Consultant.

1.7 CORRECTION OF NON-COMPLIANCE

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

1.8 MEETINGS

.1 Preconstruction Conference:

.1 The safety officer shall attend and chair the preconstruction conference and prepare a comprehensive agenda for the conference.

.2 Meeting On Work Procedures:
- .1 Meet with Contracting Officer to discuss work procedures and safety precautions. Ensure the participation of the Contractor's superintendent, the quality control, officer and representatives of each subcontractor or trade performing work at the site.

.3 Weekly Safety Meetings:
- .1 Hold weekly at the project site. Prepare minutes showing contract title, signatures of attendees, a list of topics discussed and meeting minutes.

.4 Work Phase Meetings:
- .1 The appropriate activity hazard analysis shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection.

.5 Prior to commencement of work hold Health and Safety meeting. Have Contractor's Site Superintendent in attendance.

.6 Provide site safety orientation session to all workers, all workers new to the site and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the minimum site safety rules in force at site. Maintain records of orientation on site.

.7 Conduct site specific occupational health and safety meetings for the duration of the work as follows:
- .1 Formal meetings on a minimum monthly basis.
- .2 Informal tool box meetings on a regular basis from a predetermined schedule.

.8 Keep workers informed of anticipated hazards, on safety practices and procedures to be followed and of other pertinent safety information related to:
- .1 Progress of Work;
- .2 New sub-trades arriving on site and;
- .3 Changes in site and project conditions.

.9 Record and post minutes of meetings. Make copies available to Consultant upon request.

1.9 SITE SAFETY OFFICER (SSO)

.1 Employ and assign to Work, competent and authorized representative as Site Safety Officer (SSO). The SSO must:
- .1 Have minimum 2 years site-related working experience specific to activities associated with Construction.
- .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.

.2 The selection of the SSO will be subject to the approval of the Consultant, and changes shall be made as requested by the Consultant.

.3 The SSO shall be responsible for ensuring that all provisions of the Health and Safety Plan and relevant legislation are implemented.

.4 The SSO shall ensure that all monitoring and testing, as specified and at the direction of the Consultant, are conducted.

.5 The SSO shall maintain records of all readings that are taken by the Contractor report and any abnormal or dangerous situation to the Consultant and the Municipality, after having implemented emergency measures, as required, work shall not continue or proceed until the situation has been rectified.

.6 The Safety Officer shall be at the work site at all times whenever work or testing is being performed, shall conduct daily safety inspections.

.7 The SSO shall be authorized to act on behalf of the Contractor on all matters related to Health and Safety.

.8 Qualifications of Site Safety Officer:
- .1 Ability to manage the on-site Contractor safety program through appropriate management controls.
- .2 Ability to identify hazards and have the capability to expend resources necessary to abate the hazards.
- .3 Must have worked on similar types of projects that are equal to or exceed the scope of the project assigned with the same responsibilities.
- .4 Shall, as a minimum, have attended a recognized training qualification program including at least 40 hours of classroom instruction.

.9 Qualifications of Qualified Person, Confined Space Entry:
- .1 The qualified person shall be capable (by educations and specialized training) of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and protective action to ensure worker safety.

1.10 RECORD KEEPING

.1 ALL activities associated with Health and Safety shall be recorded daily in a bound notebook. Include as a minimum: activity date, time, location of occurrence, mitigation action taken and results. Records shall be assessed by the Consultant.

1.11 SUSPENSION OF ACTIVITIES

.1 Exposure to contaminants shall be controlled so that no worker is exposed to contaminants at a concentration greater than the Time Weighted Average (TWA) concentration for the contaminant, for up to a 10 hour workday, 40 hour work week.

.2 The Contractor will halt activities immediately during unsafe conditions. All costs relating to suspension of work for Contractor's failure to maintain Health and Safety procedures shall be borne by the Contractor.

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

1.12 HEALTH AND SAFETY PLAN

.1 Prior to commencement of the work, submit to the Consultant a detailed Health and Safety Plan for review. The Health and Safety Plan shall comply with the provisions of this section, and shall illustrate the Contractor's knowledge and understanding of health and safety aspects of the work, the Contractor's intention to maintain a high level of safety on-site, and shall include, but not be limited to:
- .1 Description of Work.
- .2 Description of Site-specific Hazards:
  - .1 Physical
  - .2 Chemical
  - .3 Environmental
- .3 Protective Equipment:
  - .1 Respiratory
  - .2 Contact
- .4 Decontamination Procedures:
  - .1 Personal protective equipment (PPE)
  - .2 Equipment
  - .3 Infection Control personal protective equipment required by CSA Z317.13-03.
- .5 Medical - Monitoring:
  - .1 Workers medical profile and suitability to work at the site.
- .6 Air - Monitoring Procedures:
  - .1 Action levels
  - .2 Site monitoring
  - .3 Perimeter monitoring

.7 Emergency Procedures:
  .1 Emergency Equipment
  .2 Contingency Plans:
    .1 Spill control
    .2 Fire
    .3 Ventilation
    .4 Medical Emergency
.8 General Safety:
  .1 Designation of site-safety officer
    .1 Safety log
  .2 Trenching, digging, excavations
  .3 Storage of flammables, compressed gases
  .4 Safety inspections
.9 Site Training:
  .1 Initial hazard
  .2 Daily safety

.2 All workers shall be trained and be familiar with the Health and Safety Plan and the use of personal protective equipment.

.3 Safety Document Submission:
  .1 Ensure Safety Document Submission applies to Work of this specific project and site.
  .2 Submit two (2) copies of Safety Document at the Pre-Construction Meeting. Do not commence Work nor deliver material on-site prior to submission.
  .3 Included in Safety Document submission specific information detailing the methods and procedures to be implemented ensuring adherence to the acts, regulations, codes and policies specified in this section and to:
    .1 Ensure the health and safety of persons at or near the Work; including, but not limited to, the Public.
    .2 Ensure the measures and procedures of the regulatory agencies specified are carried out.
    .3 Ensure every employee, self-employed person and employer performing Work under this contract complies with the regulatory agencies specified.
    .4 Where changes to the methods and procedures in the execution of work change submitted safety methods and procedures, modify submitted Safety Documentation and submit modifications, in writing to the Consultant and Minister prior to implementation.
  .4 Safety Document Organization:
    .1 Organize information in the form of an instructional manual as follows:
      .1 Place in binders of commercial quality, 8-1/2" x 11" x 3" maximum ring size.
      .2 Cover: Identify binder with typed or printed title "Project Safety Document" and list the title of the project.
      .3 Provide tabbed fly leaf for each separate heading, with typed heading on tab.
      .4 Where drawings are within the safety document, provide with reinforced punched binder tab. Bind in with text; fold in larger drawings to size text pages.
      .5 Arrange content under Safety Document headings specified herein.
  .5 Safety Document Headings:
    .1 Employee Safety Training:
      .1 Place, under this heading, a statement indicating employees working on this specific project have met specified training requirements.
    .2 Company Safety Policy

.1 Place, under this heading, information pertaining to the company's policy and commitment to Occupational Health and Safety, including the responsibilities of management, supervisors and works.

1.13 SAFETY ASSESSMENT

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

.2 Perform on-going hazard assessments during the progress of Work identifying new or potential health risks and safety hazards not previously known. As a minimum hazard assessments shall be carried out when:

- .1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of work.
- .2 The scope of work has been changed by Change Order.
- .3 Potential hazard or weakness in current health and safety practices are identified by Consultant or by an authorized safety representative.

.3 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of Work. Upon request, make available to Consultant for inspection.

.4 Contractor to conduct a hazard assessment in conjunction with the Owner's maintenance staff as part of the planning process including isolating existing equipment where applicable and identification of hidden services where anchoring is required. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.14 COMPLIANCE REQUIREMENTS

.1 Observe and enforce construction safety measures required by National Building Code, latest edition, National Fire Code, Provincial Building Code Act, Worker's Compensation Act and Municipal Statutes and Authorities.

.2 Comply with Canada Labour Code and Canada Occupational Health and Safety Act.

.3 Latest edition of the Occupational Health & Safety Act Statutes of Prince Edward Island (including any amendments to and regulations).

.4 Fire Prevention Act.

.5 Dangerous Goods Transportation Act.

.6 Industrial Best Practices for Equipment Isolation and Lockout Policy.

.7 In case of conflict or discrepancy the more stringent requirement shall apply.

.8 Maintain clear emergency exit paths.

.9 Ensure that employees working on this specific project have met training requirements as legislated by the Prince Edward Island Occupational Health and Safety Act and its regulations.

.10 Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of the building and workplace.

.11 Provide Consultant with Material Safety Data Sheets (MSDS).

.12 Provide and maintain first aid equipment, supplied and medications appropriate to the work and its location in accordance with the First Aid Regulations. Obtain and implement recommendations from Occupational Health and Safety Division specific to the project work site.

1.15 WHMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada and Provincial Department of Labour.

.2 Submit WHMIS data sheets to Consultant in accordance with Section 01 33 00 - Submittal Procedures.

.3 Maintain WHMIS information station and ensure designated personnel are trained in its use.

.4 Submit copies of all Tool Box or Safety Meeting notes.
.5 Submit copies of all Worksite Safety Inspections.

1.16 SMOKING, ALCOHOL & RESTRICTED SUBSTANCES

.1 Worksites are inherently dangerous, including travelling to and from the site.
.2 Alcohol, medical and recreational cannabis are restricted substances governed by Federal and Provincial laws as are other forms of illegal drugs.
.3 The smoking of, or use of tobacco products, including e-cigarettes, the use of alcohol and restricted substances including cannabis in any form in the building or on the work site is strictly prohibited.
  .1 There is no smoking in job trailers, vehicles, equipment, etc. that are located anywhere on the QEH property. Individuals who violate the smoking ban will be subject to removal from the project.
.4 Where workers have a prescription for medical cannabis, or other prescription drugs that may cause drowsiness, they are to advise their supervisor and discuss with their supervisor safe and appropriate task(s) while under the influence of these prescriptions on the worksite.
.5 Workers who violate this requirement will be removed from the worksite.

1.17 SITE CONTROL AND ACCESS

.1 Control work site and entry points. Grant and allow entry to only workers and other persons so authorized. Immediately stop non-authorized persons from circulating within construction areas and remove from site.
.2 Prior to gaining access to the site, all contractors, subcontractors and suppliers shall file with the General Contractor their proof of Workers Compensation coverage, proof of required Insurance and proof of contract. Upon request, proof of these documents will be provided to the Owner and Consultant.
.3 Delineate and isolate construction areas from other areas of site by use of appropriate means. Erect barricades, fences, hoarding and temporary lighting as required. See Section 01 50 00 - Facilities and Controls for minimum type of barriers acceptable.
.4 Erect signage at entry points and at other strategic locations around site, clearly identifying construction area(s) as being "off limits" to non-authorized persons. Signage must be professionally made.

1.18 PROTECTION

.1 Provide temporary facilities for protection and safe passage of building occupants, public pedestrian and vehicular traffic around and adjacent to work site.
.2 Provide safety barricades, lights and signage on work site as required to provide a safe working environment for workers.
.3 Use personal protection equipment as required by Occupational Health and Safety Act and as required by this site.
.4 Training of workers in the proper use, fitting, inspection and storage of personal protective equipment shall be done prior to use of the equipment.

1.19 UNFORESEEN 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 Consultant verbally and in writing.

1.20 TESTING AND MONITORING

.1 Test and monitor for hazardous conditions, as required to demonstrate compliance with provincial regulations.

.2 If multiple locations are being worked simultaneously, provide monitoring at all locations where work is being carried out, including providing additional monitoring instruments.

1.21 ISOLATION OF EXISTING SERVICES

.1 Obtain Consultant's written authorization prior to conducting work on an existing active, energized service or facility required as part of the work and before proceeding with lockout of such services or facility.

.2 To obtain authorization, submit to Consultant following documentation:

.1 Written Request two weeks in advance of work for Isolation of the service or facility and;

.2 Copy of Contractor's Lockout Procedures.

.3 Make a Request for Isolation for each event, unless directed otherwise by Consultant, and as follows:

.1 Fill-out standard forms in current use at the Facility when so directed by Consultant or;

.2 Where no form exist at Facility, make request in writing identifying:

.1 Identification of system or equipment to be isolated, including it's location;

.2 Time duration, indicating Start time & date and Completion time & date when isolation will be in effect.

.3 Voltage of service feed to system or equipment being isolated.

.4 Name of person making the request.

.3 Document to be in typewritten format.

.4 Do not proceed until receipt of written notification from Consultant granting the Isolation Request and authorization to proceed with the isolation of designated equipment or facility. Consultant may designate other individual at the Facility as the person authorized to grant the Isolation Request.

.5 Conduct safe, orderly shut down of equipment or facilities, de-energize and isolate power and other sources of energy and lockout items in accordance with requirement of clause 1.8 below.

.6 Plan and schedule shut down of existing services in consultation with the Consultant and the Facility Manager. Minimize impact and downtime of facility operations.

.7 Determine in advance, as much as possible, in cooperation with the Consultant, the type and frequency of situations which will require a Request for Isolation. Follow Consultant's directives in this regard.

.8 Conduct hazard assessment as part of the planning process of isolating existing equipment and facilities. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.22 LOCKOUTS

.1 Perform lockouts in compliance with:

.1 Canadian Electrical Code

.2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.

.4 Procedures specified herein.

.2 Isolate and lockout electrical facilities, mechanical equipment and machinery from all potential energy sources prior to starting work on such items.

.3 Develop and implement lockout procedures to be followed on site as an integral part of the Work.

.4 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.

.5 Use industry standard lockout tags.
.6 Provide appropriate safety grounding and guards as required.
.7 Prepare Lockout Procedures in writing. Describe safe work practices, work functions and sequence of activities to be followed on site to safely isolate all potential energy sources and lockout/tagout facilities and equipment.
.8 Include within procedures a system of worker request and issuance of individual lockout permit by a person, employed by Contractor, designated to be "in-charge" and being responsible for:
  .1 Controlling issuance of permits or tags to workers.
  .2 Determining permit duration.
  .3 Maintaining record of permits and tags issued.
  .4 Submitting a Request for Isolation to Consultant when required by Contractors and / or Owners safety plan.
  .5 Designating a Safety Watcher, when one is required based on type of work.
  .6 Ensuring equipment or facility has been properly isolated, providing a Guarantee of Isolation to worker(s) prior to proceeding with work.
  .7 Collecting and safekeeping lockout tags, returned by workers, as a record of the event.
.9 Clearly establish, describe and allocate, within procedures, the responsibilities of:
  .1 Workers.
  .2 Designated person controlling issuance of lockout tags/permits.
  .3 Safety Watcher.
  .4 Subcontractors and General Contractor.
.10 Procedures shall meet the requirements of Provincial and Federal Codes and Regulations.
.11 Generic procedures, if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the procedures applicable to this contract.
  .1 Incorporate site specific rules and procedures established by Facility Manager and in force at site. Obtain such procedures through Consultant.
.12 Procedures to be in typewritten format.
.13 Submit copy of Lockout Procedures to Consultant, in accordance with submittal requirements, prior to commencement of work.

1.23 CONFORMANCE

.1 Ensure that lockout procedures, as established for project on site, are stringently followed. Enforce use and compliance by all workers.
.2 Brief all persons working on electrical facilities, mechanical and other equipment fed by an energy source on requirements of this section.
.3 Failure to perform lockouts in accordance with regulatory requirements or follow procedures specified herein may result in the issuance of a Non-Compliance Notification at Consultant's discretion with possible disciplinary measures imposed as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.24 FIRE SAFETY REQUIREMENTS

.1 Comply with requirements of latest standard for Building Construction Operations issued by the Fire Commissioner of Canada and Fire Safety Regulations of Local Authority.
.2 Enforce fire protection methods, good housekeeping and adherence to local and underwriter's fire regulations including, but not limited to, Fire Protection Act and the Provincial Building Code Act. Provide UL approved fire extinguishers, and other fire fighting services and equipment, except where more explicit requirements are specified as the responsibility of individual Sections.
.3 Implement and follow fire safety measures during Work. Comply with following:
  .1 National Fire Code, 2010.
  .2 Fire Protection Standards FCC 301 and FCC 302.

.3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Consultant will advise on the course of action.

.5 Advise the Fire Chief in the area of Work of any work that would impede fire apparatus response, including but not limited to violation of minimum overhead clearance prescribed by the fire chief, erecting of barricades and digging of trenches.

.6 Fire Separations:

.1 Ensure that fire separations are installed to maintain total integrity and that they are not breached by Work following their installation.

.2 Replace fire separations which have suffered a lessening of their required rating during construction.

.7 Ensure nothing subverts the integrity of fire protection provided for the building structure.

.8 Coordinate work of all sections so that they do not encroach on space required for fire protection and its installation. Ensure that fire protection damage during construction is totally replaced.

1.25 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut-off, unless approved by Consultant.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.

.3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.26 FIRE SAFETY

.1 The Sub-Contractors are to participate on the Fire Safety Committee under the Joint Health and Safety Committee. The Fire Safety Committee under the direction of the Contractor is responsible for implementation and maintenance of the Construction Fire Safety Plan.

.2 Construction Fire Safety Plan:

.1 The Construction Fire Safety Plan will include the following:

.1 Introduction of plan and purpose

.2 Fire Safety Committee

.3 Terms of reference.

.2 Committee composition.

.3 Emergency Procedures.

.4 Fire protection equipment.

.5 Building description.

.6 Provisions for fire fighting.

.7 Portable extinguishers.

.8 Exits.

.9 Emergency Lighting.

.10 Reduced drawings.

.11 Fire safety maintenance schedule:

.1 General.

.2 Maintenance levels.

.3 Skill categories.

.4 Frequency.

.5 Checklists.

.12 Other information:

.1 Instruction on use of fire extinguishers.
.2 Emergency Fire Drill procedures.

.3 Portable Fire Extinguishers:
.1 During construction, Contractor is to provide and maintain on the site at all times, ULC listed 25 lb ABC dry chemical type portable fire extinguishers.

.4 Blockage of Roadways:
.1 The Fire Department shall be advised of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by the Fire Department, erecting of barricades and the digging of trenches.

.5 Rubbish and Waste Materials:
.1 Rubbish and waste materials are to be kept to a minimum.
.2 The burning of rubbish is prohibited.
.3 Removal:
.1 All rubbish shall be removed from the work site at the end of the workday or shift or as directed by Consultant.
.4 Storage:
.1 Extreme care is required where it is necessary to store oily waste in work areas to ensure maximum possible cleanliness and safety.
.2 Greasy or oily rags or materials subject to spontaneous ignition shall be deposited and kept in an approved receptacle and removed as required in 1.7.3.1.

.6 Flammable Liquids:
.1 The handling, storage and use of flammable liquids are to be governed by the current National Fire Code of Canada.
.2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 liters provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 liters for work purposes, requires the permission of the Fire Department.
.3 Transfer of flammable liquids having a flash point below 38ºC is prohibited within buildings.
.4 Transfer of flammable liquids shall not be carried out in the vicinity of open flames or any type of heat-producing devices.
.5 Flammable liquids having a flash point below 38ºC, such as naphtha or gasoline, shall not be used as solvents or cleaning agents.
.6 Flammable waste liquids, for disposal, shall be stored in approved containers located in a safe ventilated area. Quantities are to be kept to minimum and the Fire Department is to be notified when disposal is required.

.7 Fire Inspection:
.1 The Fire Department shall be allowed unrestricted access to the work site.
.2 The Contractor shall cooperate with the Fire Department during routine inspections of the work site.
.3 The Contractor shall immediately remedy all unsafe fire situations observed by the Fire Department.

.8 Reporting Fires:
.1 Know the location of the nearest fire alarm box and telephone, including the emergency phone number.
.2 Report immediately all fire incidents to the fire department as follows:
.1 Activate nearest fire alarm box, or
.2 Telephone 911.
.3 Where fire alarm box is exterior to building, the person activating the fire alarm box shall remain at the box to direct Fire Department to scene of the fire.

.4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

1.27 WELDING AND CUTTING

.1 Use noncombustible shields for electric and gas welding or cutting executed within two (2) meters of combustible material or in occupied space.
.2 Place tanks supplying gases as close to work as possible. Fix in upright position, free from exposure to sun or high temperatures.
.3 Locate fire extinguishing equipment near all welding and cutting operations.

1.28 OPEN FLAMES, SPARKS, EXPLOSION PROTECTION

.1 Keep open flames and sparks to minimum. When flame or sparks are required, follow proper procedures to prevent fire or explosion.

1.29 BLASTING

.1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Consultant.

1.30 POWER ACTUATED DEVICES

.1 Use power actuated devices only after receipt of written permission from Consultant.

1.31 HANDLING AND TRANSPORTATION OF DANGEROUS GOODS

.1 Observe and enforce all measures required by the regulatory agencies including but not limited to Environment Canada, Prince Edward Island Department of Environment, and Transport Canada.
.2 Most current regulatory guidelines and Acts will apply to the work.
.3 In case of any conflict, the more stringent requirements will apply.

1.32 OPEN EXCAVATIONS

.1 If open foundations or demolition areas are to be left at the end of a work day, protective fencing must be placed around the entire perimeter to limit access by others. Fencing to be self-supporting, approved by the Department of Labour and the Construction Safety and Industrial Safety Regulations.

1.33 POTENTIAL HAZARDS

.1 Hazards include, but are not limited to, toxic, flammable and explosion hazards associated with cleaning solvents.
.2 The Contractor shall become familiar with all potential hazards associated with the work, and shall take necessary measures to avoid injury or damage of any kind.

1.34 HAZARDOUS MATERIALS

.1 Should material resembling hazardous materials, other than those identified with the Contract Documents, including but not limited to spray or trowel applied asbestos, be encountered in course of work; stop work immediately. Do not proceed until written instructions have been received from Consultant.
.2 Any material which contains asbestos that is disturbed or removed during construction work, shall be removed in accordance with the regulations set out by the Occupational Health and Safety Act. All costs for proper cutting, removal and disposal of all asbestos indentified in this contract shall be included in Tender.
.3 Where work entails use, storage, or disposal of toxic or hazardous materials, chemicals and/or explosives, or otherwise creates a hazard to life, safety, health, or the environment; work shall be in accordance with the Authority Having Jurisdiction (AHJ).

1.35 ENVIRONMENTAL PROTECTION

.1 Ensure that pollution and environmental control of construction activities are exercised during the Work to requirements of the federal and provincial environmental acts; including, but not limited to, the Prince Edward Island Environmental Protection Act.

1.36 SANITATION / DECONTAMINATION PRACTICES

.1 After each use, all disposable protective equipment shall be collected in a dedicated container for disposal.
.2 All respiratory equipment shall be decontaminated daily after use.
.3 All tools, pumps and equipment used during cleanup should be dedicated to the handling of contaminants and labeled as such and thoroughly decontaminated at the completion of the project.
.4 Contaminated work clothing shall not be worn outside of regulated areas.
.5 Workers shall wash their hands and exposed skin before eating, drinking, smoking or using toilet facilities during work shift, and at the completion of a work shift.
.6 Food, drink and tobacco products shall not be permitted in regulated areas.

1.37 WORK PRACTICES AND ENGINEERING CONTROLS

.1 Access to work areas shall be regulated and limited to authorized persons. A daily roster shall be kept of persons entering such areas.
.2 Handling Contaminants and General Work Practices.
  .1 Transportation and handling of contaminants to meet applicable local, provincial and federal regulations.
  .2 Emergency respiratory equipment shall be located in readily accessible locations which will remain minimally contaminated with contaminants in an emergency.
  .3 Containers and systems shall be handled and opened with care. Approved protective clothing shall be worn by all employees engaged in regulated areas.
  .4 All wastes and residues containing contaminants shall be collected in appropriate containers.
.3 Confined or Enclosed Spaces
  .1 Entry into confined or enclosed spaces, where there is limited egress, shall be controlled by a permit system. Permits shall be signed by an authorized representative of the employer and shall certify that appropriate measures have been taken to prevent adverse effects on the worker's health as a result of his or her entry into such space.
  .2 Confined or enclosed spaces which have contained contaminants shall be thoroughly ventilated to assure an adequate supply of oxygen, tested for contaminants, and inspected for compliance with these requirements prior to each entry. Adequate ventilation shall be maintained while workers are in such spaces. Each individual entering such confined or enclosed space shall be furnished with appropriate personal protective equipment and clothing and be connected by a lifeline harness to standby worker stations outside of the space. The standby worker shall also be equipped for entry with approved personal protective equipment and clothing and have contact with a third person. The standby person shall maintain communication (visual, voice, signal line, telephone, radio, or other suitable means) with the employee inside the confined or enclosed space.
  .3 Workers entering confined spaces and standby workers shall be trained at a recognized confined space training program.

1.38 PRE-CONSTRUCTION CONTRACTOR SAFETY CHECKLIST

.1 Use this text as a guideline for completing the following checklist. This checklist is a general, pre-construction review of the Contractor safety program, as well as an information session to identify what the Owner requires of the Contractor. Where the item requires a submission, ensure that it is received. If the item does not apply, enter N/A for not applicable.

.2 The following information will assist in establishing what will be reviewed in each section:

- .1 Safety Policy: Each employer is required by law (in Prince Edward Island) to have a safety policy and program and to implement that policy. The Owner will ask for a copy of that program.
- .2 Safety Representative: Each Contractor is required to advise the Owner who their safety representative is. That representative has duties as described in the Occupational Health and Safety Act.
- .3 Emergency Procedure: Each Contractor must have a site specific layout and emergency plan complete with emergency phone numbers.
- .4 Employee Orientation: Each and every person working for a Contractor, including Sub-Contractors, will be given an orientation to familiarize them with the site safety program. Unless otherwise specified, each Sub-Contractor is responsible for the orientation of their workers.
- .5 Safe Work Plan: Most Contractors are involved in tasks that subject workers to hazards. In order to ensure that these workers are secured from hazard, the Contractor will supply the Owner with a written safe work plan which affords protection against the hazards. This plan must be signed by a company representative and communicated to the workers involved in the task.
- .6 Personal Protective Equipment Review: Advise that all workers require CSA Class "B" hard-hat, CSA "Green Patch" (eight inch) footwear, eye, ear and respiratory protection as required (boots and hats at all times).
- .7 Fall Protection: Fall restraint or fall arrest protection required where a fall of 2.4 meters or more is possible. NO EXCEPTIONS.
- .8 Housekeeping: Advise of daily, or as needed, clean-up requirements.
- .9 Tool Box Talks: Each Contractor is required to conduct weekly safety meetings with their forces and advise the Owner they have been done.
- .10 Material Handling / Storage: Advise Contractor about storage areas and handling of material so as not to endanger their worker or another worker. Stacked material to be banded, chained, blocked or otherwise secured.
- .11 Landing Platform: Advise Contractor about movement of material on or off platforms. All material to be secured. Platform gates or chains to be kept closed at all times workers are on platform. If not possible, worker to be tied off with fall restraint system independent of platform.
- .12 WHMIS Training: Receive verification that all workers are trained and that the Contractor submits their MSDS.
- .13 GFCI: Advise Contractor that all tools are required to have ground fault circuit interrupters (where electricity is supplied by Contractor).
- .14 Accident Investigations: Any injury to any of their workers must be investigated and reported to the Owner.
- .15 Verbal, Written, Gone: Explain Zero Tolerance Program.
- .16 Joint / Worker Safety Committee: Sites of over 20 workers must establish a safety committee; over 50 workers, an additional worker committee. Workers required to attend committee meetings will do so and not be prevented by employers.
- .17 Fire Protection: All trades involved in performing hot work of any kind are required to provide fire protection at the work location.
- .18 Guardrails: Advise Contractor that where temporary removal guardrails required, guardrails must be replaced as soon as possible.

.19 First Aider: Each Contractor is required to have a first aid kit and trained first aider. Employer must name their first aider.

.20 Visitors: Advise Contractor that any visitors to site must be suitably protected from hazard. They must wear hard hat, safety vest, and proper safety footwear while on site.

.21 Task Lighting: Review responsibilities of task specific lighting (who provides it).

.22 Swamper / Rigger Competency: Where cranes are used, the Contractor must use a swamper / rigger. They shall provide the Owner with a written statement identifying, by name(s) their rigger and that the named person is a competent work as described in the Construction regulation.

.23 Scaffolds: Review scaffold building requirement: - Use all braces required by design. - Access ladder for platform over 1.5 meters. - Full width platform if height over 3 meters. PEI Regulations require double planks. - Tied in three time base dimension or use of outriggers. - Engineered over 16 meters in height (standard frame type).

.24 Elevating Work Platforms: - All boom and scissors lifts required to be CSA approved and have approval on machine. - Operators manual required on machine at all times. - Maintenance record on machine at all times. - Operator must receive training in operation of equipment. - Fall protection must be used at all times on a boom lift. - Fall protection required to be used on scissors lift when unit is being moved.

.25 Protruding Rebar:Installers of reinforcing steel must protect the protruding hazard or make arrangements to have it protected. Removal of protective coverings for task purposes only is allowed, however, protective covering must be replaced as soon as possible.

.26 WCB Clearance Certificates:Advise Contractor that the Owner will not release any funds for payment until Workers Compensation Board Clearance Certificate has been received by the Owner.

.3 The following checklist is a general pre-construction review of the Contractor's safety program as required by the Owner.

PROJECT: _____ DATE: _____

CONTRACTOR: _____

WORK BEING PERFORMED: _____

Checkmark means YES / X means NO

.1 ____ Safety Policy Submitted
.2 ____ Safety Representative
.3 ____ Emergency Procedure Review
.4 ____ Employee Orientation
.5 ____ Written Safe Work Plan
.6 ____ Personal Protective Equipment Review
  .1 ____ Hard Hat & Footwear
  .2 ____ Safety Glasses & Hearing
.7 ____ Dust & Fumes
.8 ____ Fall Protection
.9 ____ Housekeeping
.10 ____ Tool Box Safety Talks (Weekly)
.11 ____ Material Handling / Storage
.12 ____ Landing Platforms
.13 ____ WHMIS Training Verification
.14 ____ GFCI Requirements
.15 ____ Accident / Incident Investigations Notification

.16 ____ Verbal, Written, Gone
.17 ____ Joint / Worker Safety Committee
.18 ____ Fire Protection
.19 ____ Guardrails
.20 ____ First Aider on Staff - Name Supplied
.21 ____ Visitors & Safety Equipment
.22 ____ Task Lighting
.23 ____ Swampers / Riggers Competency (in writing)
.24 ____ Scaffolds
.25 ____ Elevating Work Platforms
.26 ____ Protruding Rebar Protection - MSDS Received
.27 ____ WCB Clearance Certificate.

_____	_____
(Print name and title)	(Print name and title)
_____	_____
Owner Representatives (Signature)	Contractor Representatives (Signature)
_____(Date)	_____(Date)

END OF SECTION

1 General

1.1 SCOPE

.1 It is the responsibility of the Contractor to ensure that the Work of their Contract is carried out in a manner that meets the requirements of "CSA Z317.13-17-Infection Control During Construction, Renovation and Maintenance of Health Care Facilities" so as to implement the precautionary and remedial measures, including quality system requirements, for preventing exposure to agents released or augmented because of actions undertaken during health care facility construction, renovation, maintenance, and repair work.

.2 The Contractor is to have a copy of the current CSA Z317.13-17 document on site.

.3 The Contractor is responsible to provide the physical facilities, monitoring and overall management for the Infection Control Procedures.

.4 Notwithstanding the Contractor's responsibility to overall management for the Infection Control procedures, the Site Foreman / Site Supervision as a minimum for all Trades is required to show proof of completion of the "Infection Control During Construction and Renovation Awareness Course" based on CSA Z317-17 before any work may begin on site for their Trade.

1.2 INTRODUCTION

.1 This specification section is an outline of the procedures to follow when using the CSA Z317.13-17 standard.

.2 These procedures must be maintained for the duration of the project.

.3 This specification shall be used as a guiding document for interpretation and application of the CSA standard.

.4 All individuals involved in the construction within health care facilities are directly involved in helping people to get well.

.5 It has been determined that excessive dust, which may have no ill effect on a healthy individual, could very well endanger a patient's life. Therefore, it is necessary to implement protective measures and create barriers between patients and the dust and contaminants created / disturbed during construction.

.6 Indoor air quality problems may occur as a result of construction or renovation projects that take place in or around occupied spaces. Examples include:

- .1 Improper isolation of the construction areas.
- .2 Damaged or open sections of the ventilation systems.
- .3 Construction materials left in or near occupied spaces.
- .4 Poor housekeeping during the project.
- .5 Indiscriminate use and poor ventilation of solvents, paints, adhesives, etc. during the project construction.
- .6 Improper removal and disposal of existing materials.

.7 Special precautions must be taken to prevent construction dust and vapors from entering either the ventilation system and/or from migrating to adjacent occupied rooms and corridors.

.8 There are several sources of potential contamination during a construction / renovation project. These include:

- .1 Demolition Activities:
  - .1 Demolition activities release dust, biological contaminants, and fibrous materials into the air. Insulation in ceilings and walls, wall coverings, and ceiling tile all have a high fiber content which may produce substantial air borne fibrous materials during demolition.
  - .2 Total suspended particulate levels may be very high with a significant portion of the total being of the respirable particle sizes.
- .2 Construction:
  - .1 Construction introduces additional dust and fibrous materials.

.2 Many construction materials used today emit a range of volatile organic compounds, VOC's especially formaldehyde.
.3 Glues, vapors, and gases rise from solvents used to prepare surfaces for bonding.
.4 Emissions from welding and soldering can introduce a range of gasses and metals into the air.

.3 Finish Work and Materials:
.1 Final finishing and decorating of renovated spaces can introduce strong odors and more VOCs.
.2 Solvents, paints and varnishes, adhesives and glues all add to the accumulation of these irritating compounds.

.4 Excavation:
.1 Excavation activities can release dust and fibrous materials.
.2 There could be unknown substances in the area to be excavated.
.3 Dust created by such activities may create substantial increases in the levels of suspended particulate.

1.3 REFERENCES

.1 Canadian Standards Association (CSA).
.2 CSA Z317.13-17-Infection Control During Construction, Renovation and Maintenance of Health Care Facilities. For the purposes of this Specification section, the term "Standard" shall be synonymous with CSA Z317.13-17.
.3 American Society of Heating Refrigeration and Air-Conditioning Engineers
.1 ASHRAE 52.2-1999: Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size.
.2 ASHRAE 62-2001: Ventilation for Acceptance Indoor Air Quality.

2 Products

2.1 MATERIALS

.1 MSDS sheets to be provided where applicable.
.2 The Contractor is responsible for their own Personal Protection Equipment required for CSA Z317.13-17 activities.

2.2 EQUIPMENT

.1 Air scrubber: Provide portable air filtration and isolation control equipment with multi-stage filtration and minimum peak airflow based on room size and required air volume to be exhausted. The Owner will provide these for the contractors use. Contractor to provide replacement filters and to bill Owner directly on a monthly basis for material cost of the filters with back up invoices.
.2 Multi-stage filtration as follows:
.1 First stage - coarse particulate pre-filter.
.2 Second stage - pleated pre-filter.
.3 Third stage - carbon filter for odors, as required.
.4 Final stage - 99.97% at 0.03 um level HEPA filter.
.3 Acceptable Material:
.1 Hepa-Air PA2000 HC as manufactured by Abatement Technologies, Inc. (800-827-6443) or approved equal.
.2 Provide fans, filters and ductwork to provide air movement and maintain negative pressure as indicated.
.4 Monitoring:
.1 The Contractor will install an alarmed magnahelic gauge to continuously record the pressure differential at the job site. The unit will alarm if pressures falls below an acceptable differential.

.2 Contractor is to be aware of readings to ensure infection control measures maintain required pressure differential.
.3 Contractor is to take immediate action to restore pressure differential should the system alarm.

3 Execution

3.1 GENERAL

.1 Become familiar with and implement infection prevention and control measures, specified access routes, waste disposal routes and procedures.
.2 Contractors planning to submit a tender for this project shall familiarize themselves with the CSA Z317.13-17 Standard before submitting their bid and before construction work begins.
.3 The Contractor and people under their control shall strictly enforce the appropriate procedures therein.
.4 Hospital building areas will remain occupied during the work. Services and occupancies adjacent to the work site are to maintain a clean environment at all times.
.5 The Contractor is responsible for strictly enforcing infection control preventive measures and indoor air quality precaution procedures.

3.2 BEFORE CONSTRUCTION

.1 Attend a pre-construction meeting with the Owner, Consultant, Queen Elizabeth Hospital, Infection Control Officer and User Group Representative to establish clear lines of communication and clarify expectations.
.2 Attend training and ensure that all personnel working on the project site, including those of all subcontractors have full understanding of their roles, responsibilities and preventative measure requirements and procedures.
.3 Ensure that all demolition and construction activities are reviewed and approved by the Consultant prior to the start of work and periodically throughout the duration of the project.

3.3 DURING CONSTRUCTION

.1 The work under this project is classified as Group 3, Type C, Class lll/lV.
.2 The Consultant in consultation with the Owner shall identify routes for Contractor access to and from the work areas within the building. Egress corridors and stairways serving the area must remain clean, clear and accessible at all times.
.3 The construction crew shall not use other routes, unless given specific approval by the Consultant. No access will be permitted directly between the work area and the hospital building except by permission of the Consultant with the permission of Owner through a fully sealed containment, and only after decontamination as recommended by the referenced standard.
.4 The Contractor shall establish the following precautions at entrance to work space, as per the requirements of CSA-Z317:
    .1 Clean the Contractor's construction area daily.
    .2 Establish sealed, zipper access, vestibules (minimum 2400mm x 2400mm) and tack mats between work area and hospital.
    .3 Establish vestibules at work areas and tack mats.
    .4 Establish perimeter infection control barriers.
    .5 Establish construction caution signs.
    .6 Establish negative air system vented to exterior.
.5 Materials/debris transported to and from the workplace shall be transported in covered carts. Prior to leaving the work site exterior surfaces on all carts shall be wiped clean to prevent dust from leaving the worksite.
.6 Workers are to vacuum excessive dust from themselves and their work clothes prior to exiting the work area. If this measure proves ineffective in controlling dust outside the work area then all workers will be required to wear protective clothing as referenced in Standard.

.7 Control dust by water-misting surface while cutting.
.8 Remove infection control measures upon completion of project.

END OF SECTION

1 General

1.1 FIRES

.1 Fires and burning of rubbish on site not permitted.

1.2 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site.
.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties.
.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
.3 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
.4 Minimize stripping of topsoil and vegetation.
.5 Restrict tree removal to areas indicated or designated by Consultant.

1.5 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.
.2 Do not use waterway beds for borrow material.
.3 Do not dump excavated fill, waste material or debris in waterways.
.4 Design and construct temporary crossings to minimize erosion to waterways.

1.6 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.
.2 Control emissions from equipment and plant to local authorities emission requirements.
.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 SMOKING RESTRICTIONS

.1 Smoking is not permitted anywhere on the property of the Queen Elizabeth Hospital Property.

.1 There is no smoking in job trailers, vehicles, equipment, etc. that are located anywhere on the QEH property. Individuals who violate the smoking ban will be subject to removal from the project.

1.8 ENVIRONMENTAL PERMIT APPROVAL

.1 Comply with requirements contained in the Dept. of Transportation and Infrastructure Environmental Management Division's environmental approval permit for the project.

END OF SECTION

1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2015 including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: Demolition of spray or trowel-applied asbestos is hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of demolition work, immediately stop work and notify Consultant.

.2 Should material suspected of containing PCB's be encountered in the course of demolition work, immediately stop work and notify Consultant.

END OF SECTION

This page intentionally left blank

1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-2008, Stipulated Price Contract.

1.2 INSPECTION

.1 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
.4 Consultant may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies are to be engaged by Owner for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Owner.
.2 Provide equipment required for executing inspection and testing by appointed agencies.
.3 Employment of Inspection/Testing Agencies does not relax responsibility to perform Work in accordance with Contract Documents.
.4 If defects are revealed during inspection and/or testing, appointed agency may request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re inspection.

1.4 PROCEDURES

.1 Notify appropriate agency and Consultant in advance of requirement for tests, in order that attendance arrangements can be made.
.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

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

1.6 REPORTS

.1 Submit digital copies of inspection and test reports to Consultant.
.2 Provide digital copies to Subcontractor of work being inspected or tested.

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.
.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

1.8 MOCK-UPS

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

1.9 MILL TESTS

.1 Submit mill test certificates as requested.

1.10 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

END OF SECTION

1 General

1.1 INSTALLATION AND REMOVAL

.1 Contractor to provide temporary utilities identified in this Section, in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.2 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

.2 Filter water containing silt through geofabric prior to discharge into municipal storm water system or water course.

1.3 WATER SUPPLY

.1 Water supply is available on site and will be provided for construction usage at no cost. Make arrangements for the use and transportation of such services to work area through the Consultant.

1.4 TEMPORARY POWER

.1 Power is available on site and will be provided for construction usage at no cost for operating of power tools, lighting, infection control fans to a maximum supply of 208 Volts, three phase, 60 Amps.

.1 Request and make arrangements for the use of such services in writing through the Consultant.

.2 Consultant will designate and approve locations of existing (normal) power sources to which connections can be made to obtain temporary power service, and the feeder routing for this power supply.

.3 Connect temporary power supply for construction activities in accordance with Canadian Electrical Code (CSA 22.1-21).

.1 Temporary power service for construction is to be connected to existing 120/280V three phase, four wire surface mounted Square-D #QB series panelboard located in the north east corner of the QEH New Main Electrical Room #1909. Supply and install new 60A/3P circuit breaker in existing panelboard and connect construction panel with 3c#4 teck cable temporarily strapped along ceiling of QEH services spaces. Coordinate exact routing onsite with Consultant and Departmental Representative prior to rough-in.

.2 Provide and pay all costs to supply and install temporary cabling, panel boards, switching devices and other equipment as required to connect into existing normal power source, provide adequate ground fault protection and extend power supply from existing source to work areas. Connection to essential power sources will not be permitted.

.3 Perform work and make all connections in accordance with the CSA 22.1-21, and in compliance with the federal and provincial Occupational Health and Safety Regulations and to lockout requirements specified in Section 01 35 29 - Health, Safety and Emergency Response Procedures.

.4 Electrical power and lighting systems installed under this Contract can be used for construction requirements only with prior approval of Consultant and provided that facility operations are not affected. Make good damage circuits or services impacted by this work.

.5 Temporary power for infection control pressurization fans is to be provide from construction panel and temporary construction power supply.

1.5 TEMPORARY LIGHT

.1 Provide and maintain temporary lighting throughout project. Ensure level of illumination is not less than 160 lx.

.2 Connect to existing power supply in accordance with CSA 22.1-21 and provide switching.

.3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant and provided that facility operations are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.6 TEMPORARY HEATING AND VENTILATION

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

.2 Construction heaters used inside building must be flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.5 Maintain temperatures of 19-21 degrees C in areas where finis work is being performed.

.6 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.7 Permanent heating system of building, may be used when available. Be responsible for damage to heating system if use is permitted. Use of permanent system will not affect warranty.

.8 On completion of Work for which permanent heating system is used, replace filters.

.9 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.

.10 Pay costs for maintaining temporary heat, when using permanent heating system.

.11 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

- .1 Conform with applicable codes and standards.
- .2 Enforce safe practices.
- .3 Prevent abuse of services.
- .4 Prevent damage to finishes.

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

1.7 FIRE PROTECTION

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

END OF SECTION

This page intentionally left blank

1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-2008, Stipulated Price Contract.
.2 Canadian General Standards Board (CGSB)
  .1 CGSB 1-GP-189M-84, Primer, Alkyd, Wood, Exterior.
  .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
.3 Canadian Standards Association (CSA International)
  .1 CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete.
  .2 CSA-0121-M1978, Douglas Fir Plywood.
  .3 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.
  .4 CSA 5269.1-16, Falsework and Formwork.
.4 Fall Protection and Scaffolding Regulations, Province of Prince Edward Island.

1.2 INSTALLATION AND REMOVAL

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

1.3 OVERLOADING

.1 Ensure no part of work is subjected to a load that will endanger its safety or cause permanent deformation.

1.4 FALSEWORK

.1 Design and construct falsework in accordance with CSA s269.2.

1.5 SCAFFOLDING AND FALL ARREST

.1 Provide and maintain scaffolding.
.2 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CAN/CSA-S269.2.
.3 Erect scaffolding independent of walls. Remove when no longer required.
.4 Comply with the requirements of the Fall Protection and Scaffolding Regulations, Province of Prince Edward Island.
.5 Each user of scaffolding shall examine scaffolding for sufficiency before using it. Make scaffolding secure or notify Contractor.

1.6 HOISTING

.1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
.2 Hoists and cranes shall be operated by qualified operator.
.3 Maintain current inspection certificate.
.4 Qualifications of crane operator must be submitted to Consultant for approval and must be authorized to operate the crane.

1.7 ELEVATORS

.1 Designated elevators may NOT be used by construction personnel and transporting of materials. Co-ordinate use with Consultant.

1.8 SITE STORAGE/LOADING

.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.

1.9 CONSTRUCTION PARKING

.1 Parking will not be permitted on site.
.2 Provide and maintain adequate access to project site.
.3 Clean all areas where used by Contractors equipment.
.4 Parking for delivery and service vehicles for the supply and removal of construction materials and debris will be restricted to within the limit of contract and site fencing.

1.10 SECURITY

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

1.11 OFFICES

.1 Provide office heated to 21 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
.2 Provide marked and fully stocked first-aid case in a readily available location.
.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
.4 Maintain in clean condition.

1.12 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.
.3 Provide adequate weather tight, heat and ventilation appropriate for the use and storage of equipment, tools and materials.
.4 Each user of equipment or tools shall be appropriately trained and be responsible to examine for sufficiency before use. Make equipment and tools safe if necessary, or notify the Contractor in writing that user will not commence work with such tools until it is made safe.

1.13 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 New and Existing permanent facilities may not be used.
.5 Keep sanitary facilities clean and fully stocked with the necessary supplies at all times.

1.14 CONSTRUCTION SIGNAGE

.1 Provide and erect, within three weeks of signing Contract, a project sign in a location designated by Consultant.
.2 No other signs or advertisements, other than warning signs, are permitted on site.
.3 Provide project identification site sign comprising foundation, framing, and one 2.4m x 2.4m signboard as detailed and as described below.
    .1 Foundations: 15 MPa concrete to CAN/CSA-A23.1 minimum 200 mm x 900 mm deep.
    .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.

.3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
.4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CGSB 1-GP-189.
.5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
.6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay.

.4 Locate project identification sign where directed and construct as follows:
.1 Build concrete foundation, erect framework, and attach signboard to framing.
.2 Paint all surfaces of signboard and framing with one coat primer and two coats enamel. Color white on all signboard faces.
.3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.

.5 Signage:

_____
Image of Front Elevation
(Consultant to provide digital image to sign company - allow for 300 letters).

OWNER:
"Logo and Name"_____. (Allow for full company name)

CONSULTANT:
"Logo and Name "COLES ASSOCIATES LTD". (Allow for full company name)

SUB CONSULTANT
"Logo and Name" _____. (Allow for full company name)

SUB CONSULTANT
"Logo and Name"_____. (Allow for full company name)

GENERAL CONTRACTOR
"Logo and Name"_____. (Allow for full company name)

MECHANICAL SUBCONTRACTOR
"Logo and Name"_____. (Allow for full company name)

ELECTRICAL SUBCONTRACTOR
"Logo and Name"_____. (Allow for full company name)

.6 Signs and notices for safety and instruction shall be in English; Graphic symbols shall conform to CAN3-Z321.
.7 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Consultant.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.
.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Consultant.
.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.
.4 Protect traveling public from damage to person and property.
.5 Contractors traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
.7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
.8 Dust control: adequate to ensure safe operation at all times.
.9 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
.10 Provide snow removal during period of Work.

1.16 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.
.2 Clean dirt or mud tracked onto paved or surfaced roadways.
.3 Store materials resulting from demolition activities that are salvageable.
.4 Stack stored new or salvaged material not in construction facilities.

1.17 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.3

END OF SECTION

1 General

1.1 REFERENCE STANDARDS

.1 Manual of Uniform Traffic Control Devices for Streets and Highways - 2009 Edition with 2012 Revisions.

.2 Prince Edward Island Transportation and Public Works

.1 Temporary Workplace Traffic Control Manual - 2016.

1.2 PROTECTION OF PUBLIC TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 Review with City Public Works Manager all precautions to be taken and safety measures to be put in place and obtain acceptance before proceeding with work.

.3 When working on traveled way:

.1 Place equipment in position to present minimum of interference and hazard to traveling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of traveled way.

.3 Do not leave equipment on traveled way overnight.

.4 Do not close any lanes of road without approval of City Public Works Manager. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of UTCD.

.5 Keep traveled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.

.1 Provide minimum 7 m wide temporary roadway for traffic in two-way sections through Work and on detours.

.2 Provide minimum 5 m wide temporary roadway for traffic in one-way sections through Work and on detours.

.6 As indicated, provide graveled detours or temporary roads to facilitate passage of traffic around restricted construction area.

.7 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of Consultant.

1.3 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of UTCD manual.

.3 Place signs and other devices in locations recommended in UTCD manual.

.4 Meet with Consultant prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Consultant.

.5 Continually maintain traffic control devices in use by:

.1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Removing or covering signs which do not apply to conditions existing from day to day.

1.4 CONTROL OF PUBLIC TRAFFIC

.1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD manual in the following situations:

.1 When public traffic is required to pass working vehicles or equipment that block all or part of traveled roadway.
.2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
.3 When workmen or equipment are employed on traveled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
.4 Where temporary protection is required while other traffic control devices are being erected or taken down.
.5 Provide full time flag person during daylight hours to control both construction activities and public traffic and to permit pedestrians safe passage.
.6 For emergency protection when other traffic control devices are not readily available.
.7 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
.8 Delays to public traffic due to contractor's operators: maximum 10 minutes.
.9 Flag person to have two-way radio communications at all times.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
  .1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.
  .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
.2 Canadian Standards Association (CSA International)
  .1 CSA-O121-M1978, Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.
.2 Remove from site all such work after use.

1.3 SITE FENCING

.1 Contractor to provide site safety fencing around entire construction site to separate construction zone from public.
.2 Size of compound to be determined by Contractor, but must contain all construction and construction related activities within the compound, except parking for workers.
.3 Contractor to provide freestanding metal fence panels, 2440mm high x 3050mm long. Cover fence panels with filter fabric to control dust. Panels to have 8-gauge wire mesh with an approx. 50mm x 100mm opening. Provide interlocking steel caps. Provide T-style interlocking bases.
.4 Contractor to provide double truck entrance gates and at least one pedestrian gate. Equip gates with chain / pad locks.
.5 Contractor to lock gate after every days activities are completed.
.6 Contractor to post notices for both construction zone and personal protective equipment requirements.
.7 Provide owner with key access to fencing.

1.4 DUST CONTROL BARRIERS - HOARDING

.1 Provide full dust control barriers, sealed at floor, walls and underside of floor deck / roof deck between renovation spaces and remaining areas of the building. Do not damage finishes that are to remain or that cannot be repaired.
.2 The dust control barrier can be built from floor to underside of ceiling assembly if the negative air can be maintained.
.3 All dust control barriers shall meet the requirements of the CSA Z317.13-17.
.4 Provide tack mats at access points between construction zone and active building.
.5 Provide negative air machine to maintain negative pressure in construction zone exhausted to exterior.
.6 Dust control barrier assembly:
  .1 5/8" / 16mm GWB on both sides of the wall, non painted, taped joints. Acceptable material: Flame Fighter Fire Tape
  .2 Metal stud framing at 16" o.c.
  .3 Provide 45 minute fire rated metal door and frame for access. Door to be lockable.
  .4 Seal off duct work that passes through the hoarding line.
  .5 Contractor to allow for relocating the barrier as required for construction sequencing.

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs, and other areas where a change in elevation of greater than 900mm exists.
.2 Provide as required by governing authorities.

1.6 ACCESS TO EXITS

.1 Maintain access to all existing exits at all times.

1.7 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
.3 Design enclosures to withstand wind pressure and snow loading.

1.8 ACCESS TO SITE

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

1.9 PUBLIC TRAFFIC FLOW

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

1.10 FIRE ROUTES

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

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.12 PROTECTION OF BUILDING FINISHES

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

1.13 PROTECTION OF LANDSCAPE ELEMENT

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
.2 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

1 General

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within seven days of written request by Consultant, submit following information for materials and products proposed for supply:

- .1 Name and address of manufacturer.
- .2 Trade name, model and catalog number.
- .3 Performance, descriptive and test data.
- .4 Manufacturer's installation or application instructions.
- .5 Evidence of arrangements to procure.

.3 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.

1.2 REFERENCE STANDARDS

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

.2 If there is question as to whether any product or system is in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.

.3 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.3 CONFORMANCE

.1 When material or equipment is specified by standard or performance specifications, upon request of Consultant, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.4 SUBSTITUTION OF MATERIAL

.1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.

.2 Proposals will be considered by Consultant if:

- .1 Products selected by tenderer from those specified, are not available, or
- .2 Delivery date of products selected from those specified would unduly delay completion of Contract.
- .3 Alternative products to those specified, which are brought to attention of, and considered by Consultant as equivalent to those specified and will result in credit to Contract amount.
- .4 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as a result of substitution.
- .5 Amounts of all credits arising from approval of substitutions will be determined by Consultant and Contract price will be reduced accordingly. No substitutions will be permitted without prior written approval of Consultant.

1.5 QUALITY OF PRODUCTS

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

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

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

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

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

1.6 QUALITY OF WORK

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

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

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

1.7 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.8 TRANSPORTATION

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

.2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor to unload, handle and store such products.

1.9 STORAGE, HANDLING AND PROTECTION

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

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

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

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

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

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

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

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

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

1.10 MANUFACTURER'S INSTRUCTIONS

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

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

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

1.11 CO-ORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

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

1.12 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, color and finish as base metal in which they occur.

.2 Prevent electrolytic action between dissimilar metals.

.3 Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.4 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs not acceptable.

.5 Keep exposed fastenings to minimum, space evenly and lay out neatly.

.6 Fastenings which cause spalling or cracking are not acceptable.

.7 Obtain Consultant's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166-1975, and observe restrictions in Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.13 FASTENINGS - EQUIPMENT

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

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

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

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and resilient washers with stainless steel.

1.14 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Consultant of conflicting installation. Install as directed.

1.15 CONCEALMENT

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.16 REMEDIAL WORK

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

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

1.17 CONSTRUCTION EQUIPMENT AND PLANT

.1 On request, prove to the satisfaction of Consultant that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Field engineering survey services to measure and stake site.
.2 Recording of subsurface conditions found.
.3 Survey services to determine measurement inverts for the Work.
.4 Requirements and limitations for cutting and patching the Work.

1.2 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practice in Prince Edward Island.

1.3 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.
.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
.3 Make no changes or relocations without prior written notice to Consultant.
.4 Report to Consultant when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
.5 Require surveyor to replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
.2 Establish lines and levels, locate and lay out, by instrumentation.
.3 Stake for grading, fill and topsoil placement and landscaping features.
.4 Stake slopes and berms.
.5 Establish pipe invert elevations.
.6 Stake batter boards for foundations.
.7 Establish foundation, column locations and floor elevations.
.8 Establish lines and levels for mechanical and electrical work.

1.5 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Consultant.

1.6 LOCATION OF EQUIPMENT AND FIXTURES

.1 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
.2 Inform Consultant of impending installation and obtain approval for actual location.
.3 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.
.4 Record locations of maintained, re-routed and abandoned service lines.

1.7 SUBSURFACE CONDITIONS

.1 Promptly notify Consultant in writing if discovered surface or subsurface conditions at Place of Work differ materially from those indicated in Contract Documents.

.2 Advise the Consultant of a reasonable assumption of probable conditions when determined. After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes or Change Orders.

END OF SECTION

1 General

1.1 SUBMITTALS

.1 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of any element of Project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.2 Include in request:
- .1 Identification of Project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

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

1.3 PREPARATION

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

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

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

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

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

1.4 EXECUTION

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

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

.3 Uncover Work to install ill-timed Work.

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

.5 Remove samples of installed Work for testing.

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

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

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

.9 Restore work with new products in accordance with requirements of Contract Documents.

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

.11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.

.12 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

.13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Progressive cleaning.
.2 Cleaning prior to acceptance.

1.2 RELATED SECTION

.1 Section 01 77 00 - Closeout Procedures.
.2 All Sections

1.3 CLEANING MATERIALS

.1 Cleaning Agents and Materials: Low VOC content.

1.4 PROGRESSIVE CLEANING

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by other Contractors.
.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.
.3 Clear snow and ice from area of construction, bank or pile snow in designated areas only.
.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
.5 Containers:
  .1 Provide on-site steel framed, hinged lid containers for collection of waste materials and debris.
  .2 Provide and use clearly marked, separate bins for recycling.
.6 Remove waste material and debris from site and deposit in waste container at end of each working day.
.7 Dispose of waste materials and debris off site.
.8 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.
.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
.10 Provide adequate ventilation during use of volatile or noxious substances. Use of enclosure ventilation systems is not permitted for this purpose.
.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.5 CLEANING PRIOR TO ACCEPTANCE

.1 Prior to applying for Substantial Performance of the Work, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
.3 Prior to final review, remove surplus products, tools, construction machinery and equipment.
.4 Remove waste products and debris including that caused by sub contractors.
.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant.
.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors.
.9 Clean lighting reflectors, lenses, and other lighting surfaces.
.10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
.11 Clean and polish surface finishes, as recommended by manufacturer.
.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
.13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
.14 Remove dirt and other disfiguration from exterior surfaces.
.15 Clean and sweep roofs, gutters, areaways, and sunken wells.
.16 Sweep and wash clean paved areas.
.17 Clean equipment and fixtures to a sanitary condition; replace filters of mechanical equipment.
.18 Clean roof surfaces, down-spouts, and drainage components.
.19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
.20 Remove snow and ice from access to facilities.

1.6 FINAL PRODUCT CLEANING

.1 Execute final cleaning prior to final project assessment.
.2 Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum soft surfaces.
.3 Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
.4 Replace filters of operating equipment.
.5 Clean site; sweep paved areas, rake clean landscaped surfaces.
.6 Remove waste and surplus materials, rubbish, and construction facilities from the site.

END OF SECTION

1 General

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection:
- .1 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 Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .2 Request Consultant's Inspection.

.2 Consultant's Inspection:
- .1 Consultant, Owner and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct 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 Boiler Inspection Branch have been submitted.
- .5 Systems have been commissioned.
- .6 Operation of systems have been demonstrated to Owner's personnel.
- .7 Work is complete and ready for Final Inspection.

.4 Final Inspection:
- .1 When items noted above are completed, request final inspection of Work by Owner and Consultant. If Work is deemed incomplete by Consultant complete outstanding items and request re inspection.

.5 Declaration of Substantial Performance:
- .1 When Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article for specifics to application.

.6 Commencement of Lien and Warranty Periods:
- .1 Date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment:
- .1 When Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2. If Work is deemed incomplete by Owner, complete outstanding items and request re inspection. Cost of re inspection will be deducted from final payment.

.8 Payment of Holdback:
- .1 After issuance of Certificate of Substantial Performance of Work, submit an application of payment of holdback amount in accordance with CCDC2.

1.2 CERTIFICATE OF SUBSTANTIAL PERFORMANCE

.1 Upon approval, a Certificate of Substantial Performance will be issued to the Owner by the Consultant with a copy delivered to the Contractor. This Certificate will take the form shown in Section 01 77 00 - Closeout Procedures.

.2 The Certificate of Substantial Performance will establish the date of the Consultant's inspection as the date of Substantial Performance of the Contract, and will commence the required 60-day period before release of the lien holdback amount.

.3 During the 60-day period, Contractor shall continue to complete the work.

.4 The Contractor shall immediately deliver to the Consultant specified submissions upon receipt of the Certificate of Substantial Performance.

1.3 ESTABLISHMENT OF WARRANTIES

.1 Warranties shall commence at date of Substantial Performance of the Work.

1.4 CERTIFICATE FOR PAYMENT OF LIEN HOLDBACK AMOUNT

.1 The Contractor shall submit statement and supporting documents for application of Release of Lien Holdback amount. These documents include those listed in Paragraph 2.2.2 and 2.2.3 and the Statutory Declaration Form CCDC 9A.

.2 Within five working days of receipt of application for Release of Lien Holdback amount and if approved, the Consultant will prepare a Certificate for Payment of the Lien Holdback amount. This Certificate dated on the day following termination of the 60 day period will be issued to the Owner with a copy delivered to the Contractor.

.3 The Owner will before the date of this Certificate ensure that no liens related to the Contract are registered and that no notice of liens has been received at the end of the 60-day period.

.4 Should no liens exist, the Lien Holdback will be due and payable one day after termination of the 60-day period in the amount indicated on the approved application for Certificate of Substantial Performance.

.5 The Owner will review jointly with the Contractor's Insurance related to the Contract before the 60-day period is terminated to ensure that all parties are adequately covered.

1.5 TOTAL PERFORMANCE

.1 The Contractor shall inspect the work to establish its completion in accordance with the Contract Documents and when satisfied of this completion request of the Consultant a final inspection.

.2 The Consultant will compile a final deficiency list at this inspection and issue it to the Contractor and Owner.

.3 The Contractor shall correct final deficiencies before a date agreed upon by the Contractor and Consultant.

.4 When the Contractor has satisfied himself that these corrections have been completed in a satisfactory manner by his inspection, he shall schedule a re-inspection by the Consultant, and the Owner's representatives if required, within five working days of the Contractor's request.

.5 When the Consultant is satisfied that all deficiencies have been rectified and the work is complete, the Contractor shall submit an application for the final progress payment.

.6 When "seasonal deficiencies", as determined by the Owner and/or Consultant exist, a sum of money will be withheld in accordance with the requirements of CCDC2-GC5.8.

1.6 WARRANTY PERIOD

.1 The Owner will advise the Consultant of defects observed during Warranty periods.

.2 The Consultant will notify the Contractor of these defects and request him to remedy the defects in accordance with the Contract Documents.

.3 Thirty (30) days before expiration of Warranties the Owner's representatives, the Consultant and the Contractor will review the work as arranged by the Contractor noting defects of products and workmanship.

.4 The Contractor shall immediately remedy such noted defects.

1.7 CERTIFICATE

.1 CONTRACTOR: _____

PROJECT: _____

DATE OF SUBSTANTIAL PERFORMANCE: _____

.1 Substantial Performance Inspection for above described work was carried out _____ (date) by:

.1 For Owner _____

.2 For Consultant _____

.3 For Contractor _____

.2 The items which are not in accordance with the Plans and Specifications and require correction under the Conditions of the Contract Agreement are listed as an attachment to this Document.

CONTRACTOR'S CERTIFICATION

I hereby Certify that the work has been executed in accordance with the Plans and Specifications with the exception of deficiencies listed herewith. The undersigned hereby agrees that notwithstanding the generality of the foregoing, the acceptance of the works shall not prejudice any rights of the Owner or affect any liabilities of the undersigned Contractor pursuant to the provisions of the Contract.

_____

Contractor Date

OWNER'S ACCEPTANCE

I hereby accept the work on behalf of the Owner providing that the deficiencies listed herewith are completed. This acceptance is not to be construed as relieving the Contractor from the responsibility to correct other defects in the work, whether latent or patent, as may become apparent within the guarantee/warranty period. This acceptance is made without prejudice to the rights of the Owner or to the liabilities of the Contractor which may arise and/or continue after acceptance of the work.

_____

Owner Date

CONSULTANT'S DECLARATION

Based on periodic visits to the job site and general familiarity with the progress of the work, I declare that, to the best of my knowledge, information and belief, construction is proceeding in accordance with the intent of the design and in general compliance with the plans and specifications, with the exception of the deficiencies listed herewith.

_____

Consultant Date

1.8 DEFICIENCIES

.1 The following is a list of deficiencies to be corrected. This acceptance is not to be construed as relieving the Contractor from the responsibility of correcting other defects in the work as may become apparent during the Guarantee/Warranty Period.

.1 _____
.2 _____
.3 _____

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Project Record Documents as follows:
- .1 As-Built drawings;
- .2 As-Built specifications;
- .3 Reviewed shop drawings.

.2 Operations and Maintenance data as follows:
- .1 Operations and Maintenance Manual;
- .2 Maintenance Materials;
- .3 Spare Parts;
- .4 Special Tools.

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 Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .2 Request Consultant's Inspection.

.2 Consultant's Inspection: Consultant 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, balanced and are fully operational.
- .4 Certificates required by authorities having jurisdiction have been submitted.
- .5 Operation of systems have been demonstrated to Owner'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 Consultant, and Contractor. If Work is deemed incomplete by Consultant, complete outstanding items and request re inspection.

.5 Declaration of Substantial Performance: When Consultant considers 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 Consultant considers 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 PROJECT RECORD DOCUMENTS

.1 Consultant will provide two white print sets of contract drawings and two copies of Specifications Manual specifically for "as-built" purposes.

.2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.

.3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Consultant at any time during construction.

.4 As-Built Drawings:

.1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of project and prior to interim inspection, neatly transfer notations to second set (also by use of red ink). Submit both sets to Consultant. All drawings of both sets shall be stamped "As-Built Drawings" and be signed and dated by Contractor.

.2 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.

.3 Record following information:

.1 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;

.2 Field changes of dimension and detail;

.3 Location of all capped or terminated services and utilities.

.4 Chases for mechanical, electrical and other services;

.5 Ceiling and floor elevations;

.6 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;

.7 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;

.8 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;

.9 Any details produced in the course of the contract by the Consultant to supplement or to change existing design drawings must also be marked-up and dimensioned to reflect final as-built conditions and appended to the as-built drawing document;

.10 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-built Specifications: legibly mark in red each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.

.2 Changes made by Addenda and Change Orders.

.3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.

.6 Maintain As-built documents current as the contract progresses. Consultant will conduct reviews and inspections of the documents on a regular basis. Frequency of reviews will be subject to Consultant's discretion. Failure to maintain as-builts current and complete to satisfaction of the Consultant shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

1.4 REVIEWED SHOP DRAWINGS

.1 Compile full set of shop drawings and product data reviewed on project and incorporate into Operations and Maintenance Manual. Supply number of shop drawing sets equal to the required number of final Operations and Maintenance manuals.

.2 Submit shop drawing sets at same time and as part of the contents of the Operation and Maintenance manuals specified in this section.

1.5 OPERATIONS AND MAINTENANCE MANUALS

.1 Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

.2 Manual Language: final manuals to be in English language.
.3 Number of copies required:
  .1 Submit 2 draft copies of the manual for review and inspection by Consultant. Make revisions and additions as directed and resubmit.
  .2 Upon review and acceptance by Consultant, submit 3 final copies. Initial copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
.4 Submission Date: submit complete operation and maintenance manual to Consultant three weeks prior to application for Interim Certificate of Completion of project.
.5 Binding:
  .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
  .2 Where multiple binders are needed, correlate data into related consistent groupings.
  .3 Identify contents of each binder on spine.
  .4 Organize and divide data into sections same as 16 division numerical order of contract specifications and thereafter subdivided into various equipment or building systems.
  .5 Material: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each separate product or system within each section and with typed description of product and major component parts of equipment.
  .6 Type lists and notes. Do not hand write.
  .7 Drawings, diagrams and manufacturers' literature must be legible, determined solely by the Consultant. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.
.6 Manual Contents:
  .1 Cover sheet containing:
    .1 Date submitted.
    .2 Project title, location and project number.
    .3 Names and addresses of Contractor, and all Sub-contractors.
  .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
  .3 List of maintenance materials.
  .4 List of spare parts.
  .5 List of special tools.
  .6 Original or certified copy of Warranties and Guarantees.
  .7 Copies of approvals, and certificates issued by Inspection Authorities.
  .8 Copies of reports and results from tests designated as Contractor's responsibilities.
  .9 Product Information Data on all materials, equipment and systems as specified in individual sections of the specifications to include:
    .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.
    .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
    .3 Parts list.
    .4 Installation details.
    .5 Operating instructions.
    .6 Maintenance instructions for equipment.
    .7 Maintenance instructions for finishes.
.7 Shop drawings:
  .1 Bind one complete set of reviewed shop drawings into each copy of operations and maintenance manual.
  .2 Bind the shop drawings in a manner such that they correspond with the specification section they relate to.

.3 Where large quantity of data is supplied due to size of project, fold and bind professionally into separate correctly sized binder.

.8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:

.1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed color coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include seasonal and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Servicing and lubrication schedule, and list of lubricants required.

.7 Manufacturer's printed operation and maintenance instructions.

.8 Sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's coordination drawings, with installed color coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports.

.15 Additional requirements as specified in individual specification sections.

.9 Materials and Finishes Maintenance Data:

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and color and texture designations.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.6 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

.1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.

.2 Tag all items with associated function or equipment.

.3 Provide items of same manufacture and quality as items in Work.

.4 Deliver to site in well packaged condition. Store in location as directed by Consultant.

.5 Clearly mark as to contents indicating:

.1 Part number.

.2 Identification of equipment or system for which parts are applicable.

.3 Installation instructions or intended use as applicable.

.4 Name, address and telephone number of nearest supplier.

.6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

.7 Turnover to Facility Manager and obtain signature. Include receipt with Maintenance Manual.

1.7 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.
.2 Provide items with tags identifying their associated function and equipment.
.3 Deliver to site; place and store.
.4 Receive and catalog all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.8 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 Consultant'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 Consultant, three final hard copies and one electronic final copy (PDF) of operating and maintenance manuals in 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.
.9 Failure to deliver maintenance materials, spare parts, special tools and as-builts will delay progress payments.

1.9 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.
.9 Provide one (PDF) file of the manual to the Consultant for distribution.

1.10 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;
  .1 date of submission; names,
  .2 addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
  .3 schedule of products and systems, indexed to content of volume.
.2 For each product or system:
  .1 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.
.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control and Section 01 77 00 - Closeout Procedures.
.6 Training: Refer to Section 01 91 13 - General Commissioning Requirements.

1.11 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on 2 sets of white print, opaque drawings, and in copy of Project Manual.
.2 Provide felt tip marking pens, maintaining separate colors for each major system, for recording information.
.3 Record information concurrently with construction progress. Do not conceal Work until required information is 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 catalog 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 sections.

1.12 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
.2 Store in original and undamaged condition with manufacturer's seal and labels intact.
.3 Store components subject to damage from weather in weatherproof enclosures.
.4 Store paints and freezable materials in a heated and ventilated room.
.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.13 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 where specifically requested by individual specification sections, within ten days after completion of the applicable item of work.
.4 Except for items put into use with Owner'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 submittal.

END OF SECTION

1 General

1.1 SUMMARY

.1 Section Includes:
- .1 This Section specifies roles and responsibilities of Commissioning Training.

.2 Related Requirements
- .1 Training and Demonstration requirements from other Sections.
- .2 Section 01 79 00 Demonstration and Training
- .3 Section 01 91 13 General Commissioning Requirements
- .4 Section 01 91 13.13 Commissioning Plan
- .5 Section 01 91 13.16 Commissioning Forms
- .6 Preliminary Commissioning Plan

1.2 SCOPE OF WORK

.1 Provide sufficient time, material, labour and supervision for training associated with equipment and systems outlined in Section 01 79 00 Demonstration and Training, Section 01 91 13.13 Commissioning Plan and in accordance with the Training Plan Outline provided in the Commissioning Plan, as applicable.

1.3 TRAINEES

.1 Trainees: Personnel selected for operating and maintaining the facility, may include Property or Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.

.2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

.3 Trainees may participate in functional performance testing as part of training activities.

1.4 INSTRUCTORS

.1 Mechanical and Electrical Design Consultants will provide:
- .1 Descriptions of systems.
- .2 Instruction on design philosophy, design criteria, and design intent.
- .3 Interaction among systems during integrated operation.

.2 Contractor and certified factory-trained manufacturers' personnel to provide instruction on the following:
- .1 Start-Up, operation, shut-down of equipment, components and systems once Functional Performance Tests have been successfully completed.
- .2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
- .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

.3 Contractor and equipment manufacturer to provide instruction on:
- .1 Start-up, operation, maintenance and shut-down of equipment they have certified as installed, started up and once Functional Performance Tests have been successfully completed.

1.5 TRAINING OBJECTIVES

.1 Training to be detailed and of duration to ensure:
- .1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
- .2 Effective on-going inspection, measurements of system performance.
- .3 Proper preventive maintenance, diagnosis and trouble-shooting.
- .4 Ability to update documentation.

.5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.6 TRAINING MATERIALS

.1 Instructors to be responsible for content and quality.
.2 Training materials to include:
  .1 "As-Built" Contract Documents.
  .2 Operating Manual.
  .3 Maintenance Manual.
  .4 Management Manual.
  .5 TAB and Functional Performance Test Reports.
.3 Owner, Project Manager and Commissioning Agent reserve the right to review and approve the training manuals.
.4 Training materials to be in a format that permits future training procedures to the same degree of detail.
.5 Provide sufficient handouts for all Trainees.
.6 Supplement training materials:
  .1 Transparencies for overhead projectors.
  .2 Multimedia presentations.
  .3 Manufacturer's training videos.
  .4 Equipment models.

1.7 SCHEDULING

.1 Include in the Commissioning Schedule or Construction Schedule time for training.
.2 Deliver training during regular working hours, training sessions to be maximum of 3 hours in length.
.3 Schedule sufficient sessions to cover all topics.
.4 Training to be completed prior to acceptance of facility.

1.8 RESPONSIBILITIES

.1 Be responsible for:
  .1 Implementation of training activities,
  .2 Coordination among instructors,
  .3 Quality of training, training materials,
.2 Owner, Project Manager and Commissioning Agent reserve the right to evaluate training and materials.
.3 Upon completion of training, provide written report, signed by Instructors and witnessed by Consultant, Project Manager, Commissioning Agent or Owner Representative.

1.9 TRAINING SESSIONS

.1 No training will take place without the Contractor submitting the following information to the Project Manager 21 days in advance for review:
  .1 Name and qualifications of Instructors
  .2 Provide training agenda for each session, complete with detailed list of topics to be covered during the training session
  .3 Training manuals, tools, O&M Manuals and training handouts
.2 Training to include demonstrations by Instructors using the installed equipment and systems.
.3 Use of room with computer containing control software, graphics sequences, etc. specific to the facility is considered a pre-requisite for effective demonstration and presentation of the materials. As required based on number of Trainees, provide screen and projector to facilitate training of the group.
.4 Upon completion of training, provide written report, signed by Instructors, witnessed by Owner, Project Manager and/or Commissioning Agent outlining:
  .1 Time, Date and Location

.2 Name of Instructor(s)
.3 Topics of training
.4 List of Trainees

.5 Provide specialized training as specified in relevant Technical Sections of the Project Specifications and Contract Documents.

1.10 TRAINING CONTENT

.1 Training to include:
.1 Review of facility, occupancy profile and functional requirements.
.2 System philosophy, limitations and interaction of systems.
.3 Review of system layout, equipment, components and controls.
.4 Equipment and system start-up, operation, monitoring, servicing, maintenance, emergency and shut-down procedures.
.5 In depth review of system operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control setting and emergency procedures.
.6 Maintenance and servicing.
.7 Trouble-shooting diagnosis.
.8 Interaction among systems during integrated operation.
.9 Review of O & M documentation emphasizing safe and proper operating requirements, preventative maintenance, special tools needed, spare parts inventory suggestions.
.10 Discussion on health and safety issues and concerns.
.11 Information concerning the warranties and their use and the location of all guarantees.
.12 Description of spare parts in stock and their service.
.13 Service contracts and protocols.

1.11 TRAINEE VERIFICATION

.1 At the discretion of the Owner, Trainees will be evaluated to verify that they have received information required to operate and maintain the facility.
.2 Cooperate with CxA to develop test form for each training session. This will require that each contractor provide questions and answers to be used during Trainee verification.
.3 Schedule for the administration of tests to be reviewed with Owner prior to beginning of training.

1.12 VIDEO-BASED TRAINING

.1 Manufacturer's video-based training resources to be used as training tool require Owner, Project Manager and/or Commissioning Agent review and written approval three (3) months prior to commencement of scheduled training.
.2 On-Site training videos:
.1 Contractor to provide video recordings of training sessions for use during future training by Owner.
.2 To be performed after systems are fully commissioned.
.3 Organize into several short modules to permit incorporation of changes.
.3 Production methods to be of professional quality. Provide sample for review by Owner 21 days prior to commencement of training.

2 Products

2.1 NOT USED

.1 Not Used.

3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 General

1.1 SUMMARY

.1 Section Includes:
- .1 General requirements relating to commissioning of project's equipment, and systems, specifying general requirements for static, start-up and functional performance verification and testing of components, equipment, sub-systems, systems, and integrated systems.

.2 Related Requirements:
- .1 Section 01 79 00.13 Demonstration and Training for Building Commissioning
- .2 Section 01 91 13.13 Commissioning Plan
- .3 Section 01 91 13.16 Commissioning Forms
- .4 Preliminary Commissioning Plan
- .5 Commissioning requirements outlined in other specification sections

1.2 REFERENCES

.1 CSA-Z8001-13 – Commissioning of Healthcare Facilities
.2 ASHRAE Guideline 0-2013 - The Commissioning Process
.3 ASHRAE Guideline 1.1-2007 – HVAC&R Technical Requirements for the Commissioning Process
.4 CAN/ULC-S1001 Integrated Systems Testing of Fire Protection and Life Safety Systems
.5 CSA C282 Emergency Electrical Power Supply for Buildings

1.3 ABBREVIATIONS

.1 The following are common abbreviations used in this document.

A/E	Design Team Consultants
BOD	Basis of Design
CC	Controls Contractor
Cx	Commissioning
CxA	Commissioning Agent / Authority
EC	Electrical Contractor
FPT	Functional Performance Test
FPTF	Functional Performance Test Form
GC	General Contractor / Construction Manager
MC	Mechanical Contractor
Mfr	Manufacturer
PC	Plumbing Contractor
OPR	Owner’s Project Requirements
RFI	Request for Information
SUF	Start-Up Form
SVF	Static Verification Form
TAB	Test and Balance Contractor

1.4 SCOPE OF WORK

.1 Once the contractor’s commissioning, testing and troubleshooting is completed as outlined in the Contract Documents, provide material, tools, labour and supervision to verify in detail with the CxA that the equipment and systems have been commissioned in accordance with this and related Sections.
.2 Coordinate, cooperate, and harmonize efforts with the CxA.
.3 Commissioning shall be done in accordance with this and related Sections and the Commissioning Plan.

1.5 GENERAL

.1 Commissioning is a planned program of tests, procedures and checks systematically carried out on equipment, systems and integrated systems of the finished Project to verify that they meet the Owner's Project Requirements. Commissioning is performed after systems and integrated systems are completely installed, functional and the Contractor's responsibilities have been completed and approved.

.2 Objectives:

- .1 Verify installed equipment, materials, systems and integrated systems operate in accordance with the Owner's Project Requirements, the contract documents and design criteria and intent.
- .2 Verify that O&M personnel have been fully trained in all aspects of the installed equipment and systems.
- .3 Proper documentation relating to the equipment and systems are compiled and provided to the Owner.

.3 Contractor participates in the Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

- .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be operated interactively with each other as intended in accordance with Contract Documents and design criteria.
- .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.4 Design Criteria: as per the Owner's Project Requirements or determined by designer. To meet the Project's functional and operational requirements.

1.6 PARTICIPATION IN COMMISSIONING PROCESS

.1 Contractors are to participate in and cooperate fully with the commissioning process, as directed by the CxA.

.2 Contractors are to participate in all commissioning activities related to their scope of work and as directed by the CxA.

.3 Commissioning activities include, but no limited to:

- .1 Participation in start-up coordination meeting.
- .2 Participation in commissioning meetings. Refer to Section 1.13.4 and 1.13.5 for meeting frequency.
- .3 Completion of all required documentation.
- .4 Supplying all reports and documentation requested by the CxA.
- .5 Provide test data, material data sheets and inspection reports requested by the CxA.
- .6 Participation in static, pre-functional, start-up and functional performance test and integrated system test activities, as directed by the CxA.
- .7 EMCS / BAS Contractor to participate in functional performance testing of all control system components and programming as directed by the CxA. All sequences of operation outlined in the project documents, and / or required to make all systems and equipment fully operational as per the design intent, will be verified as part of the functional performance testing.
- .8 Participation in the resolution and re-verification of issues related to their scope of work.
- .9 Participation in training activities related to their scope of work.
- .10 Other activities as determined by the CxA.
- .11 Provide documentation for final commissioning documentation and deliverables, as requested by the CxA.

1.7 COMMISSIONING OVERVIEW

.1 Refer to Section 01 91 13.13 Commissioning Plan for overview of the Cx process and list of equipment to be commissioned.

.2 For Cx responsibilities refer to Section 01 91 13.13 Commissioning Plan.

.3 Cx to be a line item of Contractor's cost breakdown.

.4 Pay costs associated with starting, testing, adjusting of components, equipment and systems and relevant instruments and supplies required to perform duties outlined in this and related Sections.

.5 Cx activities supplement field quality and testing procedures described in relevant technical sections of the Contract Documents. Cx activities do not relieve the Contractor from the contractual requirements outlined in other specification sections of the Contract Documents. Cx activities do not circumvent or relieve the Contractor from warranty requirements, responsibilities or obligations.

.6 Cx is conducted in concert with other activities performed during various stages of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the Project is constructed and proven to operate satisfactorily under various weather, environmental and occupancy conditions to meet the functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.

.7 Ensure all systems have been started, adjusted to design criteria, and are functionally operational, ready for independent testing. The CxA will not begin Functional Performance Testing until satisfied that all requirements have been met. The CxA reserves right to request inspection reports and sign-off from Contractor or Consultant that equipment and systems are ready for Functional Performance Testing.

.8 Employ experienced personnel for equipment start up and commissioning, who are able to interpret results of readings and tests, and report the system status in a clear and concise manner.

.9 Provide all equipment required to perform testing, balancing, and commissioning of systems. Calibrate instruments used in start-up; provide calibration certificates if requested by the CxA. The same calibrated device, tool or instrument used during the contractor’s preparation for functional testing is to be used during the functional performance testing with the CxA.

.10 Utilize equipment check certificates and other commissioning documents required by the CxA.

.11 Verify that equipment is installed in accordance with Contract Documents, and reviewed shop drawings. Sign and date Static Verification forms and Start-Up Forms.

.12 Do not start up equipment unless Static Verification forms have been completed and submitted.

.13 Commissioning will be considered complete once:

- .1 Completed Cx documentation has been received, reviewed for suitability and approved by the CxA and the Owner.
- .2 Equipment, components and systems have been commissioned and all issues have been addressed to the satisfaction of the Commissioning Agent, Owner and Authority Having Jurisdiction.
- .3 O&M training has been completed.

1.8 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the non-functional system, including related systems as deemed required by the CxA to ensure effective performance.

.2 Costs for corrective work, additional tests and inspections to determine acceptability and proper performance of such items to be borne by the Contractor. Above costs to be in the form of progress payment reductions or hold-back assessments.

1.9 PRE-CX REVIEW

.1 Before Construction:
  .1 Review contract documents, confirm in writing to:
    .1 Adequacy of provisions for Cx.
    .2 Aspects of design and installation pertinent to success of Cx.
.2 During Construction:
  .1 Co-ordinate provision, location and installation of provisions for Cx.
.3 Before start of Cx:
  .1 Have completed Cx Plan up-to-date.
  .2 Ensure installation of related components, equipment, sub-systems, and systems are complete.
  .3 Fully understand Cx requirements and procedures.
  .4 Understand completely design criteria and intent and special features.
  .5 Submit complete start-up documentation or material data and installation requirements to CxA and Owner for review.
  .6 Have Cx schedule up-to-date.
  .7 Ensure systems have been cleaned thoroughly.
  .8 Complete TAB procedures on systems; submit TAB reports to CxA and Owner for review.
  .9 Ensure "As-Built" system schematics are available.
.4 Inform CxA and Owner, in writing, of discrepancies and deficiencies on finished works.

1.10 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to CxA, Owner and Design Consultants before start-up and obtain clarification.
.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.11 COMMISSIONING DOCUMENTATION

.1 Refer to Section 01 91 13.13 Commissioning Plan and Section 01 91 13.16 Commissioning Forms for requirements and instructions for use.
.2 CxA to review and approve Cx documentation prepared by Contractor.
.3 Provide completed and approved Cx documentation to CxA.
.4 Contractor to provide cut sheets, shop drawings, installation and start-up checklists and O&M and troubleshooting procedures as requested by the CxA. CxA may request information prior to the O&M manual submission process outlined in other Sections.

1.12 COMMISSIONING SCHEDULE

.1 General sequence of events:
  .1 Equipment is not “temporarily” started until pre-start checklist items and all manufacturers’ pre-start procedures are completed and moisture, dust and other environmental and building integrity issues have been addressed.
  .2 Functional testing is not begun until Static Verification, Pre-Functional, Start-Up and TAB is completed, for a given system (this does not preclude a phased approach).
  .3 The controls system and equipment it controls are not functionally tested until all points have been calibrated and pre-functional testing is completed.
  .4 TAB is not performed until the controls system has been sufficiently functionally tested and approved by the CxA for TAB work
  .5 TAB is not performed until the envelope is completely enclosed and ceiling complete, unless the return air is ducted.
.2 Provide detailed Cx schedule as part of the construction schedule and in accordance with the Contract Documents. Monthly updates shall be provided.
.3 A general overview of activities is provided in the Cx Plan.

.4 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
  .1 Approval of Cx documentation and reports.
  .2 Verification of reported results.
  .3 Repairs, retesting, re-commissioning, re-verification.
  .4 Training.

1.13 COMMISSIONING MEETINGS

.1 Purpose: to identify and resolve issues and monitor progress relating to Cx.
.2 Participate in and cooperate fully in the Cx meetings, chaired by the CxA.
.3 The CxA will convene an initial Cx meeting to:
  .1 Review the Cx Plan and Cx schedule
  .2 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
  .3 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.
  .4 Review activities, requirements and expectations during the Cx process.
.4 Initial Cx meeting for all contractors will be schedule at approximately 60% construction and will occur as needed, increasing in frequency as the project approaches completion.
.5 Continue Cx meetings on regular basis until commissioning deliverables have been addressed or as otherwise indicated by the CxA. Meetings will be chaired by CxA who will record and distribute minutes.
.6 Ensure subcontractors and relevant manufacturer representatives are present at initial and subsequent Cx meetings and as required.

1.14 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Include disassembly and re-assembly after approval, starting, testing and adjusting, and supply of testing equipment.

1.15 WITNESSING OF START-UP, TESTING AND BALANCING

.1 Provide 14 days' notice prior to commencement.
.2 Allow Cx team members to witness start-up, testing, adjusting and balancing procedures.
.3 CxA reserves the right to witness start-up and testing.
.4 Contractor to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.16 ACCESS TO THE SITE

.1 Allow CxA free access to the site for scheduled and un-scheduled visits, inspections and other Cx activities.

1.17 MANUFACTURER'S INVOLVEMENT

.1 Factory testing: Manufacturer to:
  .1 Coordinate time and location of testing.
  .2 Provide testing documentation for approval by Consultant.
  .3 Arrange for Consultant to witness tests.
  .4 Obtain written approval of test results and documentation from Consultant before delivery to site.
.2 Obtain Manufacturer's installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Consultant and CxA.
  .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
  .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.

.3 Manufacturer's site visits and inspections are encouraged, where available, to confirm material installation.

.3 Integrity of warranties:
- .1 Use manufacturer trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
- .2 Verify with manufacturer that testing as specified will not void warranties.

.4 Qualifications of manufacturer's personnel:
- .1 Experienced in design, installation and operation of equipment and systems.
- .2 Ability to interpret test results accurately.
- .3 To report results in clear, concise, logical manner.

1.18 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up and testing and Cx in following distinct phases:
- .1 Included in delivery and installation:
  - .1 Verification of conformity to specification, approved shop drawings and completion of Static Verification Forms.
  - .2 Visual inspection of quality of installation.
- .2 Start-up: follow accepted start-up procedures and complete Start-Up Forms, Reports or Checklists.
- .3 Operational testing: document equipment performance.
- .4 Conduct Functional Performance Testing in presence of CxA, including repetition of tests after correcting issues identified during initial FPT.
- .5 Conduct fine-tuning as required by Consultants and CxA.

.3 Correct issues and obtain approval from Consultant and CxA after distinct phases have been completed and before commencing next phase.

.4 Document required tests on approved Cx forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency, selected by the Owner. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
- .1 Minor equipment/systems: implement corrective measures approved by Consultant and Owner.
- .2 Major equipment/systems:
  - .1 If evaluation report concludes that damage is minor, implement corrective measures approved by Consultant and Owner.
  - .2 If evaluation report concludes that major damage has occurred, Consultant and Owner shall reject equipment.
    - .1 Rejected equipment to be removed from site and replace with new.
    - .2 Subject new equipment/systems to specified start-up procedures.

1.19 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Consultant and CxA for review and approval before commencement of Functional Performance Testing.

.2 Start-up documentation to include:
- .1 Factory and on-site test certificates for specified equipment.
- .2 Pre-start-up inspection reports.
- .3 Signed installation/start-up check lists.
- .4 Start-up reports,
- .5 Step-by-step description of complete start-up procedures to permit Owner to repeat start-up at any time.

1.20 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
.2 With assistance of manufacturer develop written maintenance program and submit to Consultant for approval before implementation.
.3 Operate and maintain systems for length of time required for commissioning to be completed.
.4 After completion of commissioning, operate and maintain systems until issuance of certificate of acceptance.

1.21 TEST RESULTS

.1 If start-up, testing and/or FPT produce unacceptable results, repair, replace or repeat specified starting, testing and/or FPT procedures until acceptable results are achieved.
.2 Provide manpower and materials. Assume all costs for re-commissioning.

1.22 START OF COMMISSIONING

.1 Notify Consultant and CxA at least 21 days prior to start of Cx.
.2 Start Cx after elements of building affecting start-up and FPT verification of systems have been completed.

1.23 INSTRUMENTS / EQUIPMENT

.1 Submit to Consultant and CxA for review and approval:
  .1 Complete list of instruments proposed to be used.
  .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
.2 Provide the following equipment as required:
  .1 2-way radios.
  .2 Ladders.
  .3 Equipment as required to complete work.
  .4 The same calibrated device, tool or instrument used during the contractor's preparation for functional testing is to be used during the functional performance testing with the CxA.

1.24 PRE-REQUISITES FOR FUNCTIONAL PERFORMANCE TESTING

.1 Prerequisites for functional testing are as follows:
  .1 Pre-start-up inspections by the Consultants have been completed, rectification of deficiencies to Consultant's satisfaction and permission to start-up equipment or systems has been received.
  .2 For mechanical equipment and systems, all pre-start-up activities, such as pressure tests, static tests, flushing, cleaning and "bumping" have been completed as specified in the relevant technical sections.
  .3 For electrical distribution systems, all equipment, components, devices and systems have been energized and tested, including grounding, insulation resistance measurements (meggering), voltage measurements and load balancing.
  .4 For lighting systems, all devices have been installed and tested including, sensors calibration and programming, lighting sequences and scheduling.
  .5 For fire protection and life safety integrated systems, all testing for certification purposes has been completed and the integration of all required systems is fully functional and verified.
  .6 All related equipment has been started up and start-up reports and pre-functional checklists are submitted and approved ready for functional testing.

.7 All control system functions for the specific system and all interlocking, interconnected or integrated systems are programmed and operable per contract documents, including final setpoints and schedules with debugging, loop tuning and sensor calibrations completed.
.8 All required control system trend logs, meters and measurement devices are in place and fully functional.
.9 Piping system flushing complete and required report approved.
.10 Water treatment system complete and operational.
.11 Vibration control report approved (if required).
.12 Test and balance (TAB) complete and approved for the air and hydronic systems.
.13 All A/E deficiency list items for the equipment specified are corrected.
.14 Functional test procedures have been reviewed and approved by installing contractor.
.15 Safeties and operating ranges reviewed by the CxA and the Contractor.
.16 Test requirements and sequences of operation provided.
.17 Schedules and setpoints provided.
.18 False loading equipment, system and procedures are ready.
.19 Crankcase heaters have been on long enough for start-up.
.20 Sufficient clearance around equipment for servicing.
.21 Record of all values for pre-test setpoints changed to accommodate testing has been made and a check box provided to verify return to original values (control parameters, limits, delays, lockouts, schedules, etc.)
.22 Other miscellaneous checks of the pre-functional checklist and start-up reports completed successfully.
.23 Points verification report from Control Contractor has been provided.

1.25 COMMISSIONING FUNCTIONAL PERFORMANCE TESTING AND PERFORMANCE VERIFICATION

.1 Carry out Cx:
.1 Under actual or accepted simulated operating conditions, over entire operating range, in all modes.
.2 On independent systems and interacting systems.
.2 Cx procedures to be repeatable and reported results are to be verifiable.
.3 Follow equipment manufacturer's operating instructions.
.4 EMCS trending to be available as supporting documentation for performance verification.
.5 Ensure all systems have been started, adjusted to design criteria, and are functionally operational, ready for independent testing. The CxA will not begin Functional Performance Testing until satisfied that all requirements have been met. The CxA reserves right to request inspection reports and sign-off from Contractor or Consultant that equipment and systems are ready for Functional Performance Testing.
.6 Functional Performance Testing of mechanical systems will generally consist of verifying the installation, operation and calibration of system devices and components, including adherence to the sequence of operations outlined by the Design Engineer. Conditions and loads for Functional Performance Testing are to be actual or accepted simulated operating conditions, over entire operating range, in all modes. Functional performance test forms will be made available prior to the commencement of testing.
.7 Functional Performance Testing of electrical systems will generally consist of verifying the installation, operation and calibration of system devices and components, including adherence to the sequence of operations outlined by the Design Engineer. Conditions and loads for Functional Performance Testing are to be actual or accepted simulated operating conditions, over entire operating range, in all modes. Load balancing, voltage and amperage of equipment will be verified. Functional performance test forms will be made available prior to the commencement of testing.

.8 Where fire protection and life safety systems and systems with fire protection and life safety functions are integrated with each other, they shall be tested as a whole in accordance with CAN/ULC-S1001 Integrated Systems Testing of Fire Protection and Life Safety Systems.

.9 Back-up generators deemed to meet the requirements of CSA C282 Emergency Electrical Power Supply for Buildings will be tested in accordance with the requirements of the standard.

1.26 WITNESSING COMMISSIONING

.1 CxA and Consultant to witness activities and verify results.

1.27 AUTHORITIES HAVING JURISDICTION

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.3 Provide copies to CxA and Consultant within 5 days of test and with Cx report.

1.28 COMMISSIONING CONSTRAINTS

.1 Should access to secure or sensitive areas of the building be difficult after occupancy or at any given time during the commissioning process, it is necessary to complete the functional performance testing prior to the restrictions being put in place.

1.29 EXTRAPOLATION OF RESULTS

.1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by CxA and Consultant in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.30 EXTENT OF VERIFICATION

.1 Provide manpower and instrumentation to verify reported results based on the sampling strategy outlined in the Project Specifications and the Commissioning Plan.

.2 Number and location to be at discretion of CxA.

.3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

.4 Review and repeat commissioning of systems if inconsistencies found in more than 10% of reported results.

.5 Perform additional commissioning until results are acceptable to CxA, Consultant and Owner.

1.31 REPEAT VERIFICATIONS

.1 Assume costs incurred by CxA and Consultant for third and subsequent verifications where:

.1 Verification of reported results fail to receive Consultant's or CxA’s approval.

.2 Repetition of second verification again fails to receive approval.

.3 CxA deems Contractor's request for second verification was premature.

1.32 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.33 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Consultant and CxA.

.2 Report problems, faults or defects affecting Cx to CxA and Consultant in writing. Stop Cx until problems are rectified. Proceed with written approval from Consultant.

1.34 O&M MANUALS

.1 Provide copy of O&M Manual for review by CxA, as requested.

1.35 WARRANTY PERIOD

.1 During the warranty period, required seasonal testing and other deferred testing is completed according to the Specifications. The CxA coordinates this activity. Contractor to cooperate fully with the CxA. Tests are executed and issues are corrected by the appropriate Sub-Contractors, witnessed by facilities staff and the CxA. Any final adjustments to the O&M manuals and as-builts due to the testing are to be made by the Sub-Contractor.

.2 At the discretion of the CxA, the CxA and the Contractor will return to the project approximately 10 months into the 12-month warranty period. During this visit(s) the CxA will review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning.

.3 Contractor to cooperate fully with CxA for Cx activities during the Warranty Period.

1.36 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx leave systems in normal operating mode.

.2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by the CxA and the Owner.

1.37 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.38 FINAL COMMISSIONING DOCUMENTATION

.1 CxA responsible for compiling of Commissioning Report and Systems Manual.

.2 Contractor to cooperate fully in providing all requested documentation required by CxA to complete the above mentioned documents. This includes, but is not limited to:

- .1 As-Built Drawings
- .2 Operations & Maintenance Manuals
- .3 As-Built Sequence of Operations
- .4 Trend Logs
- .5 Test Reports, Certification Reports

.3 System Manual requirements are outlined in the Preliminary Commissioning Plan.

.4 All documentation, including As-Built Drawings and O&M Manuals, to be provided in an electronic format which can be used for inclusion in the above mentioned documents.

1.39 TRAINING

.1 In accordance with Section 01 79 00.13 Demonstration and Training for Building Commissioning.

1.40 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.41 OCCUPANCY

.1 Cooperate fully with CxA during stages of acceptance and occupancy of facility.

1.42 INSTALLED INSTRUMENTATION

.1 Use instruments installed under Contract for TAB and FPT if:
  .1 Accuracy complies with these specifications.
  .2 Calibration certificates have been deposited with the CxA and the Consultant.
.2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.43 PERFORMANCE VERIFICATION TOLERANCES

.1 Application tolerances:
  .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
.2 Instrument accuracy tolerances:
  .1 To be of higher order of magnitude than equipment or system being tested.
.3 Measurement tolerances during verification:
  .1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

1.44 OWNER'S PERFORMANCE TESTING

.1 Performance testing of equipment or system by Owner, CxA or Consultant will not relieve Contractor from compliance with specified start-up and testing procedures.

2 Products

2.1 NOT USED

.1 Not Used.

3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

This page intentionally left blank

1 General

1.1 SUMMARY

.1 Section Includes:
- .1 Description of overall structure of the Commissioning Plan and roles and responsibilities of the Commissioning Team.

.2 Related Requirements
- .1 Section 01 79 00.13 Demonstration and Training for Building Commissioning
- .2 Section 01 91 13 General Commissioning Requirements
- .3 Section 01 91 13.16 Commissioning Forms
- .4 Preliminary Commissioning Plan

1.2 ABBREVIATIONS

.1 The following are common abbreviations used in this document.

A/E	Design Team Consultants
BOD	Basis of Design
CC	Controls Contractor
Cx	Commissioning
CxA	Commissioning Agent / Authority
EC	Electrical Contractor
EMCS	Energy Monitoring and Control Systems
FPT	Functional Performance Test
FPTF	Functional Performance Test Form
GC	General Contractor / Construction Manager
MC	Mechanical Contractor
Mfr	Manufacturer
PC	Plumbing Contractor
OPR	Owner’s Project Requirements
RFI	Request for Information
SUF	Start-Up Form
SVF	Static Verification Form
TAB	Test and Balance Contractor

1.3 GENERAL

.1 Provide a fully functional facility
- .1 Systems, equipment and components meet Owner's project requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
- .2 Owner and O&M personnel have been fully trained in aspects of the installed systems.
- .3 Equipment operation and performance has been optimized to improve life cycle costs.
- .4 Complete documentation relating to installed equipment and systems has been provided to the Owner.

.2 The Cx Plan aids the building design, construction and operations team in verifying that the project will meet the Owner’s Project Requirements. It sets out the process and methodology for the successful commissioning of the project during the design and construction phases. The Cx Plan also acts as a communication tool to facilitate each team member’s understanding of their roles and responsibilities in the commissioning process.

.3 The Cx Plan is a living document in that information is added and modified as the project progresses.

.4 The Cx Plan does not relieve the project team from contractual requirements outlined in the other specification sections of this project. The project specifications may include special testing requirements for equipment. These tests are mutually exclusive of the verification and functional procedures outlined in the Cx Plan.

.5 The Project Specifications will take precedence in the event of a contradiction or conflict between the Project Specification and the Cx Plan.

1.4 PURPOSE OF THE COMMISSIONING PLAN

.1 The purpose of the Cx Plan is to provide direction for the commissioning process during construction by:

- .1 Outlining the organization, scheduling, allocation of resources, documentation, pertaining to the implementation of Cx.
- .2 Communicating the responsibilities of the team members involved in Cx scheduling, activities, documentation requirements, and verification procedures.
- .3 Setting out the deliverables relating to the process and administration of Cx.
- .4 Describes the process for the verification of how equipment and systems meet the Owner's Project Requirements and the design intent.
- .5 Producing a complete functional system prior to issuance of Certificate of Occupancy.
- .6 Acting as a management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
  - .1 Overview of Cx.
  - .2 General description of elements that make up Cx Plan.
  - .3 Process and methodology for successful Cx.

1.5 DEVELOPMENT OF FINAL CX PLAN

.1 The CxA is responsible for developing the preliminary and final Cx Plan.

.2 Cx Plan provided as part of the project specifications is preliminary only and is subject to change as project progresses.

.3 Cx Plan to be finalized by the CxA to take into account:

- .1 Approved shop drawings and product data.
- .2 Approved changes to contract.
- .3 Contractor's project schedule.
- .4 Cx schedule.
- .5 Contractor's, sub-contractor's, suppliers' requirements.
- .6 Project construction team's and Cx team's requirements.

.4 The CxA will provide a final commissioning plan prior to the start of the commissioning activities.

1.6 REFINEMENT OF CX PLAN

.1 During the construction phase, the CxA will revise, refine and update the Cx Plan to include:

- .1 Changes resulting from Client program modifications.
- .2 Approved design and construction changes.

1.7 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM

.1 The CxA will coordinate the commissioning process. The GC and all sub-contractors are expected to cooperate fully with the CxA.

.2 All members of the Cx Team will work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.

.3 A general description of the commissioning roles is as follows:

- .1 CxA:
  - .1 Reports to the Owner.
  - .2 Develops and updates the Commissioning Plan.
  - .3 Coordinates the Commissioning Process.

.4 Reviews commissioning documentation and other test reports for compliance with the Contract Documents. Commissioning documentation includes, but is not limited to SVF, SUF and FPTF forms.
.5 Prepares, oversees and documents Functional Performance Tests.
.6 Verifies that the systems are performing in accordance with Contract Documents.
.7 Reviews Training Plan and helps coordinate training.
.8 Prepares a final Commissioning Report and other deliverables, with the assistance of the Commissioning Team.

.2 GC:
.1 Responsible for subcontractor participation in the commissioning process.
.2 Facilitates and supports the Commissioning Process.
.3 Coordinates the response to RFIs throughout the commissioning process.
.4 Ensures that all subcontractors fulfill their commissioning responsibilities.
.5 Integrates Commissioning into the Construction Process and Schedule.
.6 Coordinates and provides Training.
.7 Includes the CxA on the distribution lists for project documents such as shop drawings and start-up reports.

.3 Subcontractors (MC, EC, PC, CC, TAB, and others):
.1 Completes all required start-up and testing activities, as outlined in the project specifications, prior to commencement of the FPT by the CxA.
.2 Demonstrates proper system performance and performs the actual testing as designated by the Commissioning Team.
.3 Coordinates with manufacturers and suppliers to provide documentation requested by the Commissioning Team.
.4 Completes commissioning documentation as outlined in the Commissioning Plan.
.5 Participates in all commissioning activities related to equipment and systems associated with their scope of work and as directed by the CxA.
.6 Conducts training and coordinates with Manufacturers.
.7 Controls Contractor and Electrical Contractor will support the implementation of meters, sub-meters, trendlogs and other devices used as part of the Monitoring-Based Commissioning Process.

.4 A/E:
.1 Develops Basis of Design document, project specifications and drawings.
.2 Provides clarification on the design intent to the Cx Team, as required.
.3 Responds to RFIs relating to the commissioning process.
.4 Reviews or inspects installed equipment and systems for compliance with the project specifications prior to commencement of the FPT by the CxA.
.5 Participates in the training process, as required.

.5 Owner and Owner's Representative:
.1 Develops the Owner's Project Requirements.
.2 Gives final approval of the Commissioning work.
.3 Coordinates the involvement of Owner or User representatives in the commissioning and training process.

1.8 OTHER CX PARTICIPANTS

.1 The General Contractor and Sub-contractors are expected to employ the following Cx participants to verify performance of equipment and systems, as required:
.1 Installation contractor/subcontractor:
.1 Equipment and systems except as noted.
.2 Equipment / Material manufacturer: equipment / materials specified to be installed and started / inspected by manufacturer.
.1 To include performance verification.

.2 To include installation verification.

.3 Specialist subcontractor: equipment and systems supplied and installed by specialist subcontractor.

.4 Specialist Cx agency:

.1 Possessing specialist qualifications and installations providing environments essential to client's program but are outside scope or expertise of Cx specialists on this project.

.5 Owner: equipment for which the Owner is the specialist.

.2 Ensure that Cx participant:

.1 Complete work within scheduled time frame.

.2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O&M personnel, including:

.1 Modify ventilation rates to meet changes in off-gassing.

.2 Changes to heating or cooling loads beyond scope of EMCS.

.3 Changes to EMCS control strategies beyond level of training provided to O&M personnel.

.4 Redistribution of electrical services.

.5 Modifications of fire alarm systems.

.6 Modifications to other systems.

.3 Provide names of participants to the CxA prior to starting date of Cx for review and approval.

1.9 COMMISSIONING PROCESS

.1 General overview of Commissioning Process is included in Project Specifications and Commissioning Plan.

.2 CxA to lead the Commissioning Team during the Commissioning Process.

.3 Contractor and other Commissioning Team members shall cooperate fully with the CxA.

1.10 EQUIPMENT AND SYSTEMS TO BE COMMISSIONED

.1 Commissioning and training for the following systems and equipment will be verified as part of the commissioning process. Multiple, identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. The CxA will provide the sampling strategy as required, with a preliminary sample rate indicated in the Preliminary Commissioning Plan. Note that the final list of commissioned equipment and systems will be provided in the final commissioning plan. The list below is a sample only.

.1 Mechanical Systems:

.1 Wet and Dry Pipe Sprinkler System

.2 Fire Extinguishers

.3 DHW Piping and Pumps

.4 Plumbing Fixtures

.5 Washroom Fixtures

.6 Trap Primers

.7 Hydronic Loops & Pumps

.8 Radiant Floor Heating

.9 Exhaust Fans

.10 Air Handling Unit and Cooling Coil

.11 Relocated Condensing Units

.12 Constant Volume Boxes

.13 HVAC Zones

.14 TAB Work

.15 Energy Management Control System

.16 Fire and Fire/Smoke Dampers

.2 Electrical Systems:

.1 Panelboards

.2 Interior and Exterior Lighting and Control Systems
.3 Exit Lighting
.4 Emergency Lighting
.5 Fire Alarm System, including integration of other building systems
.6 Access Control System
.7 CCTV System
.8 Public Address System

1.11 DELIVERABLES RELATING TO THE CX PROCESS

.1 Contractors to provide:
  .1 Completed Static Verification Forms
  .2 Completed installation and pre-start-up checklists, forms and reports
  .3 TAB reports
  .4 Factory test reports
  .5 Reports for testing, inspections and quality control activities specified in the Contract Documents or request by the Design Engineer.
  .6 Completed Functional Performance Testing forms
  .7 Training Plans
  .8 O&M Manuals
  .9 As-Built documentation
  .10 As-Built sequence of operations
  .11 Prescribed activities during warranty period
.2 Contractors are to sign the documentation confirming that they conducted the testing required.
.3 Documentation is to be submitted to the CxA for review.

2 Products

2.1 NOT USED

.1 Not Used.

3 Execution

3.1 PRELIMINARY AND FINAL COMMISSIONING PLAN

.1 Reference the Preliminary Commissioning Plan located at the end of this section as an attachment.
.2 Final Commissioning Plan and forms will be provided by the Commissioning Agent once all shop drawings are submitted and reviewed.
.3 FPT forms prepared by the Commissioning Agent will be provided prior to start of testing process and will form part of the final commissioning plan. Test forms will be based on sequence of operations, requirements outlined in project drawings and specifications, and operating requirements outlined by the design engineers.

END OF SECTION

This page intentionally left blank

1 General

1.1 SUMMARY

.1 Section Includes:
- .1 Commissioning forms to be completed for equipment, systems and integrated systems.

.2 Related Requirements
- .1 Section 01 91 13 General Commissioning Requirements
- .2 Section 01 91 13.13 Commissioning Plan

1.2 COMMISSIONING FORMS

.1 Use commissioning forms to verify installation and record performance when starting equipment and systems.

.2 Strategy for Use:
- .1 Commissioning Agent provides Contractor project-specific commissioning forms with specification data included.
- .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
- .3 Use forms to confirm operation as per design criteria and intent.
- .4 Identify variances between design and operation and reasons for variances.
- .5 Verify operation in specified normal and emergency modes and under specified load conditions.
- .6 Record analytical and substantiating data.
- .7 Verify reported results.
- .8 Form to bear signatures of recording technician and reviewed and signed off by Commissioning Agent.
- .9 Submit immediately after tests are performed.
- .10 Report results in true measured unit values consistent with the information in the design documents.
- .11 Provide Commissioning Agent with originals of completed forms.
- .12 Maintain copy on site during start-up, testing and commissioning period.
- .13 Forms to be both hardcopy and electronic format with typed written results in accordance with other Project Specification Sections

1.3 STATIC VERIFICATION / PRODUCT INFORMATION REPORT FORMS

.1 Static Verification Forms are used to confirm and compile data on equipment or system components including nameplate information, performance requirements and other pertinent technical data.

.2 Forms will be prepared by the Commissioning Agent once shop drawings have been submitted to and reviewed by the Design Team. Forms provided in Preliminary Commissioning Plan are samples only and subject to change.

.3 Prior to Start-up and Functional Performance Testing of equipment or systems, Installer to complete the Static Verification Forms related to their systems and equipment and submit to Commissioning Agent for review and acceptance.

.4 Installer to sign forms after completion certifying that the information provided on the forms is correct and matches the equipment and systems installed. Forms will be required during the commissioning process and will be included in the Commissioning Report at completion of project.

1.4 START-UP FORMS / INSTALLATION CHECKLISTS

.1 Start-up forms and installation checklists are used to confirm that manufacturer's instructions and good installation practices are adhered to during the installation and start-up process.

.2 Forms will be prepared by the Commissioning Agent once shop drawings have been submitted to and reviewed by the Design Team. Forms provided in Preliminary Commissioning Plan are samples only and subject to change.

.3 Start-up / installation forms, checklists and reports include the following:

.1 Equipment / material manufacturer's installation instructions and recommended checks.

.2 Special procedures as specified in relevant technical sections.

.3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.4 TAB reports, points verification reports.

.5 Contractor or manufacturer test forms and reports.

.6 Other documents as outlined in the Commissioning Plan.

.4 Equipment manufacturer's start-up forms and installation checklists are acceptable for use. Submit to Commissioning Agent for review and approval prior to use. If manufacturer start-up forms or checklists are not available, Contractor to advise Commissioning Agent early in the project. Commissioning Agent reserves right to develop equipment specific checklists should none be available from the manufacturer.

.5 As deemed necessary by Commissioning Agent, supplemental forms, checklists and reports will be required for specific project conditions.

.6 Prior to Functional Performance Testing of equipment or systems, use checklists to verify equipment installation. Document checklist verifying checks have been made, indicate deficiencies and corrective action taken.

.7 Submit documentation to Commissioning Agent for review and acceptance prior to the start of Functional Performance Testing.

.8 Installer and Manufacturer Representative to sign checklists and/or forms upon completion, certifying stated checks and inspections have been performed. Forms and checklists will be required during Commissioning process and will be included in the Commissioning Report at completion of project.

1.5 FUNCTIONAL PERFORMANCE TEST FORMS

.1 FPT forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct and efficient operation, and that equipment and systems function independently and interactively with other systems as intended in the Owner’s project requirements and the design documents.

.2 FPT forms include those developed by Contractor to record measured data and readings taken during functional testing procedures and those developed by the Commissioning Agent.

.3 FPT forms prepared by the Commissioning Agent will be provided prior to start of testing process and will form part of the final commissioning plan. Test forms will be based on sequence of operations, requirements outlined in project drawings and specifications, and operating requirements outlined by the design engineers.

.4 Prior to Functional Performance Testing of integrated system, complete FPT forms of related systems and submit to Commissioning Agent for review and acceptance.

.5 Participants and Witnesses to the Functional Performance Testing to sign forms acknowledging their presence at the testing.

.6 Forms provide in electronic format will not require signatures. Commissioning Agent reserves the right to prepare separate attendance form for signature by all Participants and Witnesses.

1.6 SAMPLES OF COMMISSIONING FORMS

.1 Commissioning Agent will develop and provide to Contractor required project-specific Commissioning forms in electronic format complete with specification data.

.2 Revise items on Commissioning Forms to suit project requirements.

.3 A Preliminary Commissioning Plan and Commissioning Forms is provided as part of the project specification for review by the contractor. Preliminary Commissioning Plan and Commissioning Forms provided with the project specifications are not final and subject to change prior to commencement of commissioning.

1.7 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS

.1 When additional forms are required, the Commissioning Agent will develop appropriate verification forms.

1.8 LANGUAGE

.1 To suit the language profile of the awarded contract.

2 Products

2.1 NOT USED

.1 Not Used.

3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

This page intentionally left blank

1 General

1.1 RELATED WORK

.1 Section 01 35 29 - Health, Safety and Emergency Response Procedures
.2 Section 01 56 00 - Temporary Barriers and Enclosures

1.2 DESCRIPTION OF WORK

.1 The work of this Section comprises the furnishing of all labour, materials and equipment necessary for all demolition work required to complete the Work of this Contract in accordance with the requirements of this Section and as shown on the Drawings.

1.3 PROTECTION

.1 Size, depth and location of existing utilities and structures as indicated are for guidance only; completeness and accuracy are not guaranteed.
.2 Protect existing items designated to remain. In event of damage, immediately replace such items or make repairs to approval of Consultant and at no additional cost to the Owner.
.3 Protect existing surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.
.4 Prevent movement, settlement or damage of adjacent utilities and structures. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.
.5 If safety of structure being repaired or adjacent structures appear to be endangered, cease operations and notify Consultant and Owner. Take precautions to support structures.
.6 Maintain and protect from damage, all structures, utilities encountered during the execution of Work. Obtain direction of Consultant before moving or otherwise disturbing utilities or structures.
.7 Record in accordance with requirements of Section 01 72 00 - Project Record Documents, locations of maintained, re-routed and abandoned underground lines.
.8 Make good and pay for damage to any lines resulting from work.

1.4 SAFETY CODE

.1 Carry out demolition work in accordance with ALL applicable codes and regulations and as outlined in Section 01 54 50 Safety Requirements.

2 Products

2.1 NOT APPLICABLE

.1 Not applicable.

3 Execution

3.1 PREPARATION

.1 Inspect building and site and verify items designated for removal and items to be preserved.
.2 Locate and protect all utility services.
.3 Any damage to existing utilities and services shall be immediately repaired to the satisfaction of the Owner.

3.2 REMOVAL OF SALVAGED ITEMS

.1 Remove items designated for salvage and stockpile on site as designated by Owner.
.2 Items not designated for salvage and re-use shall be removed and dispose of off-site by the Contractor.

3.3 DISPOSAL OF MATERIAL

.1 Dispose of all removed materials off-site.
.2 Pay all fees that may be charged to dispose of materials at licensed disposal sites.
.3 Remove all material contaminated with oil, gasoline, calcium chloride or other toxic or dangerous materials and dispose of in manner to minimize danger at site and to a location off site approved by Provincial Authority governing such disposal.

3.4 RESTORATION

.1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
.2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 14 00 - Earth Stripping and Stockpiling.

1.2 PROTECTION

.1 Protect existing items designated to remain. In event of damage, immediately replace such items or make repairs to approval of Consultant and at no additional cost to Owner.

1.3 DESCRIPTION OF WORK

.1 Perform all demolition and removal as specified in this Section and indicated on the Drawings.

1.4 DEMOLITION

.1 Demolish the following items:
- .1 Remove existing retaining wall.

1.5 SALVAGE

.1 Salvage the following items:
- .1 All exterior metal cladding, trims and flashings are to be removed and stored for re-use. Screws and girts can be disposed of.
- .2 All exterior insulation behind the cladding being removed is to be stored for general re-use on site.

END OF SECTION

This page intentionally left blank

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 20 00 - Concrete Reinforcing.
.2 Section 03 30 00 - Cast-in-Place Concrete.
.3 Section 03 35 00 - Concrete Finishing.
.4 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)
  .1 CAN/CSA-A23.1-2014, Concrete Materials and Methods of Concrete Construction.
  .2 CAN/CSA-O86-19, Engineering Design in Wood (Limit States Design).
  .3 CSA O121-17, Douglas Fir Plywood.
  .4 CSA O151-17, Canadian Softwood Plywood.
  .5 CSA O153-13 (R2017), Poplar Plywood.
  .6 CAN3-O188.0, Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.
  .7 CSA O437 Series-93 (R2013), Standards for OSB and Waferboard.
  .8 CSA S269.1-2016, Falsework for Construction Purposes.
  .9 CAN/CSA-S269.3-M92 (R2013), Concrete Formwork.
.2 Council of Forest Industries of British Columbia (COFI)
  .1 COFI Exterior Plywood for Concrete Formwork.

1.3 SHOP DRAWINGS

.1 Submit shop drawings for formwork and falsework in accordance with Division 01 - General Requirements.
.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings.
.3 Indicate sequence of erection and removal of formwork/falsework as directed by Consultant.
.4 Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Province of Prince Edward Island, Canada.

1.4 QUALITY CONTROL

.1 Pre-Pour Meeting: Attend a quality control meeting including all relevant sub-trades to review the quality of the formwork, reinforcement installation, exposed concrete finishes, under floor services, pour sequence and related issues.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Place materials defined as hazardous or toxic waste in designated containers.
.5 Ensure emptied containers are sealed and stored safely for disposal.
.6 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

2 Products

2.1 MATERIALS

.1 Formwork materials:
  .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.
.2 Form ties:
  .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
.3 Form release agent: non-toxic.
.4 Form release agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.
.5 Falsework materials: to CSA-S269.1.
.6 Sealant: to Section 07 92 00 - Joint Sealing.

3 Execution

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels and centers before proceeding with formwork/falsework and ensure dimensions agree with drawings.
.2 Obtain Consultant's approval for framing openings not indicated on drawings.
.3 Hand trim sides and bottoms of excavation and remove loose earth from earth forms before placing concrete.
.4 Fabricate and erect falsework in accordance with CSA S269.1.
.5 Do not place shores and mud sills on frozen ground.
.6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.
.7 Align form joints and make watertight. Keep form joints to minimum.
.8 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
.9 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
.10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
.11 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
.12 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
.13 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

3.2 REMOVAL

.1 Leave formwork in place for following minimum periods of time after placing concrete.
  .1 72 hours for footings and abutments.
.2 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00 - Concrete Forming and Accessories.
.2 Section 03 30 00 - Cast-in-Place Concrete.
.3 Section 32 16 00 - Curbs, Gutters, Sidewalks and Driveways.

1.2 REFERENCES

.1 American Concrete Institute (ACI)
  .1 ACI 315R-2018, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
.2 American National Standards Institute/American Concrete Institute (ANSI/ACI)
  .1 ANSI/ACI 315-99, Details and Detailing of Concrete Reinforcement.
.3 American Society for Testing and Materials (ASTM)
  .1 ASTM A775 / A775M-91c, Specification for Epoxy-Coated Reinforcing Steel Bars.
.4 Canadian Standards Association (CSA)
  .1 CAN/CSA-A23.1-14, Concrete Materials and Methods of Concrete Construction.
  .2 CAN3-A23.3-14, Design of Concrete Structures for Buildings.
  .3 CSA G30.3-M1983 (R1998), Cold Drawn Steel Wire for Concrete Reinforcement.
  .4 CSA G30.5-M1983 (R1998), Welded Steel Wire Fabric for Concrete Reinforcement.
  .5 CSA G30.14-M1983 (R1998), Deformed Steel Wire for Concrete Reinforcement.
  .6 CSA G30.15-M1983 (R1998), Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
  .7 CAN/CSA-G30.18-09 (R2014), Billet-Steel Bars for Concrete Reinforcement.
  .8 CAN/CSA-G40.21-13, Structural Quality Steels.
  .9 CAN/CSA-G164-2018, Hot Dip Galvanizing of Irregularly Shaped Articles.
  .10 CSA W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.
.2 Upon request inform Consultant of proposed source of material to be supplied.

1.4 SHOP DRAWINGS

.1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 - Submittal Procedures.
.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Consultant, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada . ANSI/ACI 315 and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
.3 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide Type A tension lap splices where indicated.
.4 Each drawing submitted shall bear the signature and stamp of qualified professional engineer registered to practice in Prince Edward Island.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Consultant.
.2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
.3 Cold-drawn annealed steel wire ties: to CSA G30.3.
.4 Welded steel wire fabric: to CSA G30.5. Provide in flat sheets only.
.1 All 152 x 152 MW x 18.7 x 18.7 minimum or as indicated on Drawings.
.5 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.
.6 Mechanical splices: subject to approval of Consultant.
.7 Steel Fiber: DRAMIX 3D 55 / 60 to Manufacturers recommendations.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada. ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures unless indicated otherwise.
.2 Obtain Consultant's approval for locations of reinforcement splices other than those shown on placing drawings.
.3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

3 Execution

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Consultant.
.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
.3 Replace bars which develop cracks or splits.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
.2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
.3 Prior to placing concrete, obtain Consultant's approval of reinforcing material and placement.
.4 Ensure cover to reinforcement is maintained during concrete pour.
.5 Protect epoxy coated portions of bars with covering during transportation and handling.
.6 Provide concrete half-bricks to support welded wire mesh in proper position in floor slabs during placing of concrete.

3.3 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

This page intentionally left blank

1 General

1.1 DESCRIPTION OF WORK

.1 The work of this Section comprises the furnishings of all equipment, labor and materials necessary for the provision of all concrete for the work of this project, which includes but is not necessarily limited to, the following:

- .1 All concrete work required for the building which includes, but is NOT necessarily limited to:
  - .1 Foundation walls, retaining walls, footings, slab-on-grade, exterior ramps and pads, and concrete topping for steel deck.
  - .2 All concrete work including housekeeping pads and reinforcement, both inside and outside of building, required for the work of Mechanical and Electrical Division. This work will be the financial responsibility of, and carried out by the General Contractor under the direction of the Mechanical and Electrical Division Subcontractors, respectively.

1.2 RELATED REQUIREMENTS

.1 Section 03 10 00 - Concrete Forming and Accessories.
.2 Section 03 20 00 - Concrete Reinforcing.
.3 Section 03 35 00 - Concrete Finishing.
.4 Section 05 50 00 - Metal Fabrications.
.5 Section 31 23 00 - Excavation and Fill

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM C109/C109M-16, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50-mm Cube Specimens).
- .2 ASTM C260-10a (2016), Specification for Air-Entraining Admixtures for Concrete.
- .3 ASTM C309-11, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .4 ASTM C332-17, Specification for Lightweight Aggregates for Insulating Concrete.
- .5 ASTM C494-17, Specification for Chemical Admixtures for Concrete.
- .6 ASTM C827-16, Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
- .7 ASTM C939-16a, Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
- .8 ASTM D1751-04 (2013), Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
- .9 ASTM D1752-04a (2013), Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet for Use in Building Construction.

.3 Canadian Standards Association (CSA)
- .1 CAN/CSA-A3000-18, Cementitious Materials Compendium.
- .2 CAN/CSA-A23.1-14, Concrete Materials and Methods of Concrete Construction.
- .3 CAN/CSA-A23.2-14, Methods of Test for Concrete.
- .4 CAN/CSA-A5 Portland Cement.

1.4 CERTIFICATES

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

.2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
.3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

1.5 TESTING AND INSPECTION

.1 Testing and inspection of concrete and concrete materials will be carried out by testing laboratory engaged and paid by the Owner in accordance with Section 01 29 83 - Payment Procedures: Testing Laboratory Services. Frequency of tests will be determined by the testing laboratory.
.2 Remove defective concrete and embedded debris and repair as directed by Consultant.

1.6 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
.2 Pre-Pour Meeting:
  .1 Convene a pre-pour meeting 2 weeks prior to beginning concrete works.
  .2 Ensure concrete forming, finishing and concrete supplier personnel, attend.
  .3 Verify project requirements.
  .4 Review all aspects of the work including construction sequence, access to work by other Trade Contractors, Quality of falsework for trueness to dimensions, quality of finish expected at exposed concrete and all other aspects of the work.
.3 Submit to Consultant, minimum 4 weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
.4 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for review by Consultant on following items:
  .1 Falsework erection.
  .2 Hot weather concrete.
  .3 Cold weather concrete.
  .4 Curing.
  .5 Finishes.
  .6 Formwork removal.
  .7 Joints.

1.7 ENVIRONMENTAL CONDITIONS

.1 Provide all protection during concrete placing and curing in hot and in cold weather, and to CAN/CSA-A23.1, Clause 21.
.2 Prior to placing, ensure that all needed material and equipment is on hand, and obtain the Consultant's approval for particular methods to be used.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Use excess concrete for: additional paving, post footing anchorage, swale rip-rap reinforcing, mud slab, flowable fill, retaining wall footing ballast, storm structure covers, underground utility pipe kickers, storm pipe flared end section, toe wash protection, shoulder and toe outfall restraints for temporary erosion pipes.
.5 Use trigger operated spray nozzles for water hoses.
.6 Designate a cleaning area for tools to limit water use and runoff.
.7 Carefully coordinate the specified concrete work with weather conditions.
.8 Ensure emptied containers are sealed and stored safely for disposal.

.9 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.

.10 Choose least harmful, appropriate cleaning method which will perform adequately.

2 Products

2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A5.

.2 Blended hydraulic cement: to CSA A362-98.

.3 Supplementary cementing materials: to CAN/CSA-A23.5.

.4 Cementitious hydraulic slag: to CAN/CSA-A363.

.5 Water: to CAN/CSA-A23.1.

.6 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.

.7 Air entraining admixture: to CSA CAN3 - A 266.1.

.8 Chemical admixtures: to CSA CAN3 - A 266.2. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.

.9 Shrinkage compensating grout: premixed compound consisting of metallic aggregate, Portland cement, water reducing and plasticizing agents.

- .1 Compressive strength: 50 MPa at 28 days.
- .2 Consistency:
  - .1 Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30s.
  - .2 Flowable: to ASTM C827. Flow table, 5 drops in 3s, (ASTM C109, applicable portion) 125 to 145%.
  - .3 Plastic: to ASTM C827. Flow table, 5 drops in 3s, (ASTM C109, applicable portions) 100 to 125%.
  - .4 Dry pack to manufacturer's requirements.
- .3 Net shrinkage at 28 days: maximum nil %.

.10 Curing compound: to CAN/CSA-A23.1 white and to ASTM C309, Type 1-chlorinated rubber. Coordinate with finish floor materials for compatibility.

.11 Premoulded joint fillers:

- .1 Bituminous impregnated fiber board: to ASTM D1751.

.12 Polyethylene film: 10 mil thickness to CAN/CGSB-51.34.

.13 Joint Sealer: chemical curing, multi-component, Class B, Type I for horizontal joints, Type II for vertical joints to CAN/CGSB 19.24.

.14 Under slab Vapor Barrier: polyolefin-based resin chemical barrier to meet ASTM E-1745 Class A, B and C.

- .1 Acceptable Material:
  - .1 Perminator, Sealtight distributed by W.R. Meadows.

2.2 MIXES

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1 to give following properties:

- .1 Concrete foundation walls and footings, except where specified otherwise:
  - .1 Cement: use Type 10 Portland cement.
  - .2 Minimum compressive strength at 28 days: 25 MPa.
  - .3 Class of exposure: F-2.
  - .4 Nominal size of coarse aggregate: 20mm.
  - .5 Slump at point and time of discharge: 80mm +/- 20.
  - .6 Air content: 4 to 7%.
- .2 Concrete floor slabs generally:
  - .1 Cement: use Type 10 Portland cement.

.2 Minimum compressive strength at 28 days: 25 MPa.
.3 Class of exposure: N.
.4 Nominal size of coarse aggregate: 20mm.
.5 Slump at point and time of discharge: 80mm +/- 20.

.3 Exterior Concrete Slabs, Ramps and Pads:
.1 Cement: use Type 10 Portland cement.
.2 Minimum compressive strength at 28 days: 35 MPa.
.3 Class of exposure: C-2.
.4 Nominal size of course aggregate: 20 mm.
.5 Slump at point and time of discharge: 80 mm +/- 20.
.6 Air content: 4-7% as per Table 4.

.2 If requested by Consultant, provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CAN/CSA-A23.1.

.3 Use of calcium chloride not permitted.

2.3 ADMIXTURES

.1 Admixtures will be permitted only to correct deficiency in mixture or to make correct placement requirements as recommended by Testing Laboratory and approved by Consultant.

.2 Use of accelerating admixtures, if approved by Consultant, will not relax cold weather placement requirements of CAN/CSA-A23.1. Use of calcium chloride not permitted.

3 Execution

3.1 PREPARATION

.1 Obtain Consultant's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.2 Pumping of concrete will be permitted. Place concrete in accordance with CAN/CSA-A23.1 to meet all requirements of mix design at point of placement.

.3 Ensure reinforcement and inserts are not disturbed during concrete placement.

.4 Prior to placing of concrete obtain Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.6 In locations where new concrete is doweled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout or as noted on drawings to anchor and hold dowels in positions as indicated.

.7 Do not place load upon new concrete until authorized by Consultant.

3.2 CONSTRUCTION

.1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.

.2 Sleeves and inserts.
.1 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Consultant before placing of concrete.
.2 Check locations and sizes of sleeves and openings shown on drawings.
.3 Sleeve, do not core required openings.

.3 Anchor bolts.
.1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

.4 Dowels:
.1 Drill holes into existing concrete structures, clean holes, place rebar and fill solid with non shrink grout where and as indicated.

.5 Placing Grout: Place shrinkage compensating grout under base plates for structural steel and other equipment, using procedures in accordance with manufacturer's recommendations, which result in 100%, contact over grouted area.
- .1 Refer to structural drawings for thickness and edge profile of grout under base plate for structural steel.

.6 Finishing.
- .1 Finish concrete to CAN/CSA-A23.1 with final finishing as follows:
  - .1 Foundation walls: ensure that all form ties etc. are cut back to minimum 15mm below surface and depressions packed with cement mortar. Remove fins and other projections on exterior face to provide smooth surface for installation of membrane waterproofing, damp proofing, insulation or polyethylene slip sheet, as applicable at exterior and insulation on interior.
  - .2 Refer to Section 03 35 00 for interior & exterior slab finish.

.7 Joint fillers.
- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- .2 Locate and form isolation joints as indicated. Install joint filler.
- .3 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.8 Under Slab Vapor Barrier.
- .1 Install Under slab Vapor Barrier directly under concrete slabs-on-grade inside building.
- .2 Lap membrane minimum 150 mm at joints and seal.
- .3 Seal punctures in membrane before placing concrete. Use patching material at least 150 mm larger than puncture and seal.

.9 Polyethylene Slip Sheet/Bond Breaker.
- .1 Install 10mil polyethylene slip-sheet at exterior face of all foundation walls from top of footing to future finished grade. Provide temporary support until backfilling is completed.
- .2 Use 10mil polyethylene sheet as bond breaker between foundation walls and slabs-on-grade and slabs on steel floor decking. Provide temporary support until slabs are placed. Trim flush with top of slab.

.10 Under Slab Rigid Insulation:
- .1 Install rigid insulation as indicated.

3.3 SITE TOLERANCE

.1 Concrete tolerance in accordance with CAN/CSA-A23.1 straight edge method.

END OF SECTION

This page intentionally left blank

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00 - Cast-in-Place Concrete.

1.2 DESCRIPTION OF WORK

.1 The work of this section comprises the furnishing of all labor, material and equipment necessary for the following, in accordance with the requirements of this Section and as shown on the Drawings.
- .1 Finishing of all interior floor slabs and in-fill areas.
- .2 Finishing of exterior slabs at entrances, exits and ramps.
- .3 Supply and application of all curing, sealing, hardening compounds.
- .4 Saw-cutting of all saw-cut control joints.
- .5 Filling of saw-cut control joints at interior concrete floor slabs.
- .6 Sandblasting concrete finishes.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-25.20-95 , Surface Sealer for Floors.

.2 Canadian Standards Association (CSA)
- .1 CSA-A23.1-09 , Concrete Materials and Methods of Concrete Construction.

1.4 PERFORMANCE REQUIREMENTS

.1 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.

.2 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

1.5 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content.

.3 Include application instructions for concrete floor treatments.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Work area:
- .1 Make the work area water tight protected against rain and detrimental weather conditions.

.2 Temperature:
- .1 Maintain ambient temperature of not less than 10°C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 80% during same period.

.3 Moisture:
- .1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.

.4 Safety:
- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.5 Ventilation:
- .1 Contractor will arrange for ventilation system to be operated during installation of concrete floor treatment materials.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
.3 Provide continuous ventilation during and after coating application.

1.7 QUALITY CONTROL

.1 Pre-Pour Meeting
.1 Attend a pre-pour quality control meeting including all relevant sub-trades to review the quality of exposed concrete finishes, hardener/sealer application, saw cuts, prepared sub-base, under floor services, pour sequence and related issues.
.2 When requested and prior to pouring concrete, provide a 750mm high x 450mm x 450mm sample complete with chamfered corners for the purpose of establishing finish quality of exposed concrete columns, walls and ceilings.
.3 The quality of the finished concrete is to be equal or better than the accepted sample.
.4 Where the quality of finished concrete falls short of accepted sample for exposed concrete, the Contractor must pay all associated costs to achieve quality of exposed concrete as provided by approved sample.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Place materials defined as hazardous or toxic waste in designated containers.
.5 Ensure emptied containers are sealed and stored safely for disposal.
.6 Use chemical hardeners that are non-toxic.
.7 Dispose of surplus chemical and finishing materials in accordance with federal, provincial and municipal regulations.
.8 Dispose of waste from stripping of floors in a manner that will not have unfavorable effects on the environment.

2 Products

2.1 SEALING COMPOUNDS

.1 Surface sealer: to CAN/CGSB-25.20, Type 1 - solvent-based, clear .
.2 Surface sealers may not be manufactured or formulated with aromatic solvents hexavelant chromium and their compounds.

2.2 CURING AND SEALING COMPOUNDS

.1 Curing and sealing compound for floor slabs: liquid type, water-based acrylic to ASTM C-309.
.1 Acceptable Material:
.1 Meadows "Vocomp 20".
.2 CPD Acrylic Cure and Seal (Water Based).
.3 Sternson Florseal WB.
.4 Master Builders "Master-Kure-100W".
.5 Pecora DynaTrol II SG.
.2 Flexible Saw-Cut Control Joint Filler:
.1 Two component, non-priming, self-leveling, chemical curing polyurethane sealant.
.2 Acceptable Material:
.1 Tremco "THC-900".
.2 Sonneborn "SL-2".
.3 Pecora NR 200.
.3 Use compatible additives, admixtures, curing compounds and hardeners.
.4 Do not sprinkle dry cement or dry cement and sand mixture over concrete surfaces.

2.3 MIXES

.1 Mixing, ratios and application in accordance with manufacturer's instructions.

3 Execution

3.1 EXAMINATION

.1 Verify that slab surfaces are ready to receive work and elevations are as indicated on shop drawings. Refer also to Section 03 10 00 - Concrete Forming and Accessories.

3.2 PREPARATION OF EXISTING SLAB

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated .
.2 Saw cut control joints to CSA-A23.1, 24 hours maximum after placing of concrete. Saw cuts not cut straight will be rejected and concrete replaced.
.3 Use strong solvent to remove chlorinated rubber or existing surface coatings.
.4 Use protective clothing during stripping of chlorinated rubber or existing surface coatings.

3.3 APPLICATION

.1 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with Joint Filler.
.2 Apply floor treatment in accordance with Sealer manufacturer's written instructions.
.3 Clean over spray. Clean sealant from adjacent surfaces.
.4 Co-ordinate curing and sealing compounds with floor finishes.

3.4 CONCRETE FINISHES

.1 Finish concrete in accordance with CAN3-A23.1.
  .1 Interior floor slabs: Hard, smooth dense, troweled to flat tolerance classification (5mm in 3m).
  .2 Finishes:
    .1 Exposed concrete is to be smooth, even, joints are to be rubbed to remove joint edges and free from excess air pockets. All as evaluated against the submitted sample.
    .2 Exterior concrete ramps: broom finish perpendicular to the direction of travel
.2 Do not sprinkle dry cement or dry cement and sand mixture over concrete surfaces.
.3 Saw cut crack control joints to CAN3-A23.1, to match existing locations and to layouts indicated on drawings.

3.5 APPLICATION OF CURING AND SEALING COMPOUNDS

.1 Apply in strict accordance with manufacturer's instructions and at rate recommended by manufacturer to meet moisture-retention requirements of ASTM C309.
.2 Apply to concrete floor slab using appropriate type as specified under PART2 of this section. Use ONLY curing and sealing compound by same manufacturer.

3.6 PROTECTION

.1 Protect finished installation in accordance with manufacturer's instructions.

3.7 FILLING OF SAW-CUT CONTROL JOINTS

.1 Clean and prepare saw-cut control joints at interior floor slabs to joint filler manufacturer's requirements.
.2 Install self-leveling sealant at the bottom of all saw-cut control joints in the concrete floor slabs.

.3 Install cementitious joint filler over flexible sealant in all joints. Strike filler flush with surface of concrete slab and leave ready for installation of floor finish.

3.8 APPLICATION OF EXTERIOR SEALING COMPOUNDS

.1 After concrete has cured for thirty (30) days apply sealing compound to all exterior concrete walks, in accordance with manufacturer's recommendations.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 23 - Unit Masonry Restoration.
.2 Section 04 05 13 - Masonry Mortaring.
.3 Section 04 05 19 - Masonry Anchorage and Reinforcing.
.4 Section 04 05 23 - Masonry Accessories.
.5 Section 04 22 00 - Concrete Unit Masonry.
.6 Section 05 50 00 - Metal Fabrications.
.7 Section 07 21 13 - Board Insulation.
.8 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).
  .1 CAN/CSA A165 Series-04, Standards on Concrete Masonry Units.
  .2 CAN/CSA A179-04, Mortar and Grout for Unit Masonry.
  .3 CAN/CSA A371-04, Masonry Construction for Buildings.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
.2 Product Data.
  .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
.3 Samples.
  .1 Submit:
    .1 Two of each type of masonry unit specified.
    .2 Two of each type of masonry accessory specified.
    .3 One of each type of masonry reinforcement, tie and connector proposed for use.
    .4 A minimum of six for testing purposes if requested.
  .2 Submit samples tested to laboratories employing technicians certified/trained in procedures for testing masonry units.
.4 Manufacturer's Instructions.
  .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports.
  .1 Certified test reports showing compliance with specified performance characteristics and physical properties.
  .2 Submit laboratory test reports in accordance Section 01 29 83 - Payment Procedures: Testing Laboratory Services.
  .3 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
  .2 Certificates:
    .1 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 and exposed interior masonry walls construction 1200 x 1800 mm showing masonry colors and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar and workmanship.
    .2 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.3 Construct mock-up where directed.

.4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with work.

.5 When accepted by Consultant, mock-up will demonstrate minimum standard for this work. If accepted, mock-up may remain as part of finished work.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to job site in dry condition.

.3 Storage and Protection.

.1 Keep materials dry until use except where wetting of bricks is specified.

.2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 SITE CONDITIONS

.1 Site Environmental Requirements.

.2 Cold weather requirements:

.1 Supplement Clause 5.15.2 of CSA-A371 with following requirements.

.1 Maintain temperature of mortar between 5 degrees C and 20 degrees C until batch is used or becomes stable.

.2 Maintain ambient temperature between 5 degrees C and 20 degrees C and protect site from wind chill.

.3 Hot weather requirements.

.1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.

2 Products

2.1 MATERIALS

.1 Masonry materials are specified in Related Sections.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalog 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.

3.3 INSTALLATION

.1 Do masonry work in accordance with CSA-A371 except where specified otherwise.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.4 CONSTRUCTION

.1 Exposed masonry.
- .1 Remove chipped, cracked, and otherwise damaged units, in exposed masonry and replace with undamaged units in accordance with CSA A-165, Clause 82.

.2 Jointing.
- .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.
- .2 Allow joints to set just enough to remove excess water, then rake joints uniformly to 6 mm depth and compress with square tool to provide smooth, compressed, raked joints of uniform depth where raked joints are indicated.
- .3 Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.
- .4 Exposed joints: Concave.

.3 Cutting.
- .1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.
- .2 Make cuts straight, clean, and free from uneven edges.

.4 Building-In.
- .1 Build in items required to be built into masonry.
- .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

.5 Wetting of bricks.
- .1 Except in cold weather, wet bricks having an initial rate of absorption exceeding 1 g/minute/1000 mm2: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.
- .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

.6 Support of loads.
- .1 Use 20 MPa concrete to Section 03 30 00 - Cast-in-Place Concrete, where concrete fill is used in lieu of solid units.
- .2 Use grout to CSA A179 where grout is used in lieu of solid units.
- .3 Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.

.7 Provision for movement.
- .1 Leave 3 mm space below shelf angles.
- .2 Leave 40 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
- .3 Built masonry to tie in with stabilizers, with provision for vertical movement.

.8 Loose steel lintels.
- .1 Install loose steel lintels. Centre over opening width.

.9 Control joints.
- .1 Construct continuous control joints as indicated.

.10 Expansion joints.
- .1 Build-in continuous expansion joints as indicated.

.11 Interface with other work.
- .1 Cut openings in existing work as indicated.
- .2 Openings in walls: approved by Consultant.
- .3 Make good existing work. Use materials to match existing.

3.5 LATERAL SUPPORT

.1 Install all interior masonry lateral support angles supplied under the work of this contract.

3.6 SITE TOLERANCES

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

3.7 FIELD QUALITY CONTROL

.1 Damaged masonry and/or masonry not meeting the quality established by the accepted mock up WILL be removed at Contractor's expense.

3.8 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

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

3.9 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

1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 05 00 - Common Work Results for Masonry.
.2 Section 04 22 00 - Concrete Unit Masonry.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).
  .1 CAN/CSA A179-04, Mortar and Grout for Unit Masonry.

1.3 SUBMITTALS

.1 Product Data.
  .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Division 01 - General Requirements.
  .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Division 01 - General Requirements. Indicate VOC's mortar, grout, parging, color additives and admixtures.
.2 Samples.
  .1 Submit samples in accordance with Division 01 - General Requirements.
  .2 Submit two samples of mortar.
.3 Manufacturer's Instructions.
  .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
  .1 Submit laboratory test reports in accordance Division 01 - General Requirements.
  .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Use same brands of materials and source of aggregate for entire project.
.2 Mortar and grout: CSA A179.
.3 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
.4 Color: ground colored natural aggregates or metallic oxide pigments.
.5 Mortar for exterior masonry above grade:
  .1 Load bearing: type S based on property specifications.
  .2 Non-Load bearing: type N based on property specifications.
  .3 Parapet walls, chimneys, unprotected walls: type N based on property specifications.
  .4 All other applications: type N
.6 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: type M based on property specifications.
.7 Mortar for interior masonry.

.1 Load bearing: type N based on property specifications.
.2 Non-Load bearing: type N based on property specifications.

.8 Following applies regardless of mortar types and uses specified above:
.1 Mortar for calcium silicate brick and concrete brick: type O based on Proportion specifications.
.2 Mortar for stonework: type N based on proportion specifications.
.3 Mortar for grouted reinforced masonry: type S based on property specifications.

.9 White mortar: use white Portland cement, and lime to produce mortar type specified.

.10 Colored mortar: use coloring admixture not exceeding 10% of cement content by mass, or integrally colored masonry cement, to produce colored mortar to match approved sample.

.11 Non-Staining mortar: use non-staining masonry cement for cementitious portion of specified mortar type.

.12 Grout: to CSA A179, Table 3, minimum 25MPa.

2.2 MIXES

.1 Color and mix grout to semi-fluid consistency.

.2 Colored mortars: incorporate color into mixes in accordance with manufacturer's instructions.
.1 Use clean mixer for colored mortar.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 CONSTRUCTION

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

.2 Grout the following masonry components:
.1 All cores of block for full height of vertical reinforcement.
.2 All cores of block for full height of dowels.
.3 All lintel blocks and continuous bond beams.
.4 All cores in which both horizontal and vertical anchor bolts and similar devices are embedded.
.5 Top two courses of block at locations where concrete block forms back up for exterior walls.
.6 Reinforce and fully grout every core of block walls, as well as door frames, as detailed.
.7 Top two courses where block walls terminate below structure and carry up as steel stud partition.
.8 All other locations where vertical reinforcing or grout is indicated on drawings.

3.3 CLEANING

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

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 05 00 - Common Work Results for Masonry.
.2 Section 04 05 13 - Masonry Mortaring.
.3 Section 04 22 00 - Concrete Unit Masonry.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).
  .1 CAN/CSA A23.1-2014/A23.2-2014, Concrete Materials and Methods of Concrete Construction/ Methods of Test for Concrete.
  .2 CAN/CSA A370-14 (R2018), Connectors for Masonry.
  .3 CAN/CSA A371-14 (R2019), Masonry Construction for Buildings.
  .4 CSA G30.14-M1983(R1998), Deformed Steel Wire For Concrete Reinforcement.
  .5 CSA G30.18-09 (R2019), Carbon Steel Bars for Concrete Reinforcement.
  .6 CSA S304.1-04 (R2010), Design of Masonry Structures.
  .7 CSA W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete
  .8 CAN/CSA A179-14 (R2019), Mortar and Grout For Unit Masonry.

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 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for epoxy coatings and galvanized protective coatings and touch-up products.
.2 Shop Drawings :
  .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  .2 Shop drawings consist of bar bending details, lists and placing drawings.
  .3 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
.3 Manufacturer's Instructions:
  .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Pre-Installation Meetings: attend pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Use 2-rod continuous ladder type reinforcement with adjustable hook type box ties with side rods minimum 4.76mm and box tie rods minimum 4.76mm at all masonry cavity walls.
.2 Reinforcement sized to suit wall thickness and width of cavity.
.3 Finish, hot-dipped galvanized to ATM A153, Class B2, 457 g/m2.

.4 Connectors and wire reinforcement to CSA-A370 and as follows:
- .1 Use truss type reinforcement sized to suit wall thickness at all single wythe masonry walls. Finish, hot-dipped galvanized to ASTM A153 Class B2, 457 g/m2.
- .2 Load bearing walls: use reinforcement with two 4.76mm side rods and 4.76mm cross rods.
- .3 Non-load bearing walls: use reinforcement with two 3.66mm side rods and 3.66mm cross rods.
- .4 Acceptable Material:
  - .1 Blok-Lok adjustable Econo-Cavity Lok II, BL 30.
  - .2 Dur-O-Wall, adjustable DA 310 Truss.
  - .3 Wire Bond, 2 wire Series 200.
  - .4 Wire Bond, 2 wire Series 300.

.5 Use adjustable, triangular galvanized steel ties with clip type anchors with 4.76mm x length required galvanized steel ties, for securing all new masonry where ends of new masonry walls abut concrete walls.
- .1 Acceptable Material:
  - .1 Blok-Lok, Type "C".
  - .2 Dur-O-Wall DA801.
  - .3 Wire Bond Type 1, 1000 and 1100 R tie.

.6 Use flexible rectangular ties with flat/hump plate anchors between structural steel and masonry, with 4.76 mm galvanized tie, overall length 300 mm, width of tie sized to suite wall.
- .1 Acceptable Material:
  - .1 Blok-Lok, Adjustable Flex O Lock - Type "C" w/BLT 9.
  - .2 Dur-O-Wall D/A 210 w/triangle ties 700.

.7 Anchorage to existing concrete or concrete block:
- .1 Acceptable Material:
  - .1 Blok-Lok BL-5407

.8 Bar type reinforcement:
- .1 To CSA-A371 and CAN/CSA G30.18, Grade 400, deformed bars.

.9 Bolts and anchors:
- .1 To CSA-A370.

.10 Corrosion protection:
- .1 To CSA-S304 and as specified for horizontal reinforcing in interior walls.

2.2 FABRICATION

.1 Fabricate reinforcing in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.
.2 Fabricate connectors in accordance with CSA-A370.
.3 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
.4 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
.5 Ship reinforcement and connectors, clearly identified in accordance with drawings.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Consultant with certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis, minimum 5 weeks prior to commencing reinforcement work.
.2 Upon request inform Consultant of proposed source of material to be supplied.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

.1 Supply and install masonry connectors and reinforcement in accordance with CSA-A370, CSA-A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
.2 Prior to placing concrete, obtain Consultant's approval of placement of reinforcement and connectors.
.3 Supply and install additional reinforcement to masonry as indicated.

3.3 BONDING AND TYING

.1 Bond walls of two or more wythes using metal connectors in accordance with CSA-S304, CSA-A371 and as indicated.
.2 Tie masonry veneer to backing in accordance with NBC, CSA-S304.1, CSA-A371 and as indicated.
.3 Bond masonry cavity walls using metal ties spaced at 400mm o.c. vertically and in accordance with CSA-A370.
.4 Tie ends of all new concrete unit masonry walls with adjustable triangular ties spaced at 400mm o.c. vertically, anchored securely to existing wall.
.5 Tie masonry to steel columns using connectors.
    .1 Attach ties to continuous hump-type anchor straps welded to structural steel at 400 mm spacing.
    .2 Embed ties solidly in mortar to develop maximum resistance to design forces.
.6 Interconnect concrete block at column enclosures and elsewhere as indicated using flat plate anchors.

3.4 HORIZONTAL REINFORCING

.1 Install truss type reinforcing as follows:
    .1 Interior walls:
        .1 Load-bearing walls: at vertical intervals of 400mm.
        .2 Non-load bearing walls: at vertical intervals of 400mm.
    .2 In addition:
        .1 Install reinforcing in the first and second courses immediately above and below all wall openings and at the top course immediately below roof and floor levels.
        .2 Reinforcement in the second bed joint above or below openings shall extend 600mm beyond the jambs.
        .3 All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints.
        .4 Lap side rods minimum 150 mm at splices.
        .5 Use prefabricated corner and tee sections to form continuous reinforcement around corners and for anchoring abutting walls and partitions.
        .6 Material in corner and tee sections shall correspond to the type and design of reinforcement used.

3.5 VERTICAL REINFORCING

.1 For load bearing masonry walls, install vertical No. 20 rebar reinforcement in cavities of hollow concrete masonry at 600 mm spacing.

.2 Fill cores solid with grout to requirement of Section 04 05 13 - Masonry Mortar and Grout.

3.6 REINFORCED LINTELS AND BOND BEAMS

.1 Reinforce masonry lintels and bond beams as indicated.
.2 Make joints in lintels/bond beams to match adjacent walls.
  .1 Place and grout reinforcement in accordance with CSA-S304.1, CSA-A371, and CSA-A179. Use concrete of 20 MPa strength.
    .1 Provide 200mm deep masonry bond beams at all floor and roof levels filled solid with grout reinforced with two 25M rebar.
  .2 Provide 200mm deep masonry bond beam at all floors and roof levels filled solid with grout reinforced with two 20M rebar.
  .3 Provide one 20M vertical rebar each side of all openings in masonry walls. Extend rebar minimum 800mm beyond opening.

3.7 GROUTING

.1 Grout masonry in accordance with CSA-S304.1, CSA-A371 and CSA-A179 and as indicated.

3.8 ANCHORS

.1 Supply and install metal anchors as indicated.

3.9 LATERAL SUPPORT AND ANCHORAGE

.1 Supply and install lateral support and anchorage in accordance with CSA-S304.1 and as indicated.

3.10 MOVEMENT JOINTS

.1 Reinforcement will not be continuous across movement joints unless otherwise indicated.

3.11 FIELD BENDING

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.
.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
.3 Replace bars and connectors which develop cracks or splits.

3.12 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.13 CLEANING

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

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 05 00 - Common Work Results For Masonry.
.2 Section 04 22 00 - Concrete Unit Masonry.
.3 Section 07 27 00 - Air Barriers.

1.2 SYSTEM DESCRIPTION

.1 System Description: Use the trapezoidal shaped Mortar Net with Insect Barrier technology adhered to the face of the Mortar Net.

1.3 SUBMITTALS

.1 General:
  .1 Submit listed submittals in accordance with Conditions of the Contract and Division 01 - General Requirements.
.2 Product Data:
  .1 Submit product data, including manufacturer's product sheet, for specified products.
.3 Samples:
  .1 Submit selection and verification samples.
.4 Quality Assurance Submittals: Submit the following:
  .1 Certifications: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria.
  .2 Manufacturer's Instructions: Manufacturer's Installation Instructions.

1.4 QUALITY ASSURANCE

.1 Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

1.5 DELIVERY, STORAGE AND HANDLING

.1 General: Comply with Division 1 Product Requirements Sections.
.2 Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid constructions delays.
.3 Packing, Shipping, Handling and Unloading:
.4 Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
.5 Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.6 SEQUENCING

.1 General: Install trapezoidal shaped Mortar Net with Insect Barrier product after flashing has been installed, the first 1 or 2 courses of brick have been laid, and weep holes have been created. Install product before third or higher courses of brick have been laid.

1.7 WARRANTY

.1 Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
.2 Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Control joint filler:
  .1 Brick masonry: purpose-made closed cell neoprene to ASTM D1056, Class RE41.
  .2 Acceptable Material:
    .1 Dur-O-Wall "Rapid Expansion Joint" - DA 2015
.2 Weep hole vents:
  .1 Acceptable Material: Rid-O-Mice, Stainless steel weep cover
.3 Masonry flashing:
  .1 Minimum 40 mil thick specially compounded, plasticized polyvinyl chloride permanently bonded to 10 x 10 woven glass fiber mesh.
  .2 Acceptable Material::
    .1 Lexsuco FR-40.
  .3 At walls with air/vapor barrier membrane use through-wall flashing supplied by air vapor barrier manufacturer specifically for this purpose.
.4 Nailing Inserts:
  .1 0.6mm thick purpose made galvanized steel inserts for setting in mortar joints.
.5 Cavity Wall Drainage System:
  .1 The Mortar Net accessory.
    .1 Trapezoidal shaped Mortar Net/Insect Barrier, 254 mm high x thickness of the cavity.
  .2 Materials: Manufacturer's standard trapezoidal shaped Mortar Net material with Insect Barrier for specified product.
    .1 All dimensions are nominal. Measurements are inclusive of the continuous bottom strip and the trapezoidal shape.
    .2 Continuous bottom strip on all sizes of material is 76.2 mm high, regardless of material thickness or overall material height.
    .3 Product is a 90% open weave mesh in a trapezoidal configuration connected by a continuous bottom strip.
    .4 The insect barrier fabric is made of nylon and polyester woven material and is attached to the face of the trapezoidal Mortar Net material.
  .3 Source Quality: Obtain the trapezoidal shaped Mortar Net materials with Insect Barrier from a single manufacturer.
  .4 Acceptable Materials:
    .1 Mortar Net USA, Ltd.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

.1 Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
  .1 Match product size to cavity size.

.2 Cavity should be no more than 6.4 mm wider than 25.4 mm thick material and 51 mm thick material, and 10.2 mm thick material should touch both the outer wythe and the inner wall.

.3 Inspect for and repair holes in flashing immediately prior to installing Mortar Net with Insect Barrier.

3.3 PREPARATION

.1 Preparation:

.1 Clean flashing and weep holes so they are free of mortar droppings and debris immediately prior to installing Mortar Net with Insect Barrier.

.2 Washing flashing with water or chemicals prior to installation is not necessary.

.3 Place spacer against the outside of the interior wall so the Mortar Net with Insect Barrier is against the inside of the exterior wythe or apply additional rows of Mortar Net with Insect Barrier to fill width of cavity.

.4 If no spacer is used, flashing should extend not less than 152 mm above the top of the Mortar Net with Insect Barrier to avoid the possibility of mortar bridging between the exterior wythe and interior wall.

.5 Adhesives, fasteners, specials skills or tools are not required.

3.4 INSTALLATION

.1 Mortar Net with Insect Barrier Installation:

.1 Install one continuous row of trapezoidal shaped Mortar Net with Insect Barrier at base of wall and over all wall openings directly on flashing.

.2 To prevent mortar bridging between the outer wythe and inner wall, install flashing extending from the bottom of the Mortar Net with Insect Barrier to at least 152 mm above the top of the Mortar Net with Insect Barrier.

.3 Multiple thicknesses of The Mortar Net with Insect Barrier may be installed to match cavity widths and if excessive droppings are expected.

.4 Inspection, preparation and installation procedure for multiple thicknesses is the same as for single thickness.

.5 When installing multiple thicknesses, align the trapezoidal shaped sections with each other.

.6 To match cavity width to product thickness without using multiple thicknesses of the Mortar Net with Insect Barrier, place rigid insulation of appropriate thickness against outside face of inner wall.

.7 Lay the first 1 or 2 courses of brick at flashing level, then install Mortar Net with Insect Barrier continuously by placing it against the inside of the openings. Install Mortar Net with Insect Barrier with fabric facing to the exterior of the wall.

.8 No fasteners or adhesives are required, and mortar need not have set.

.9 The Mortar Net with Insect Barrier shall not come in contact with wall ties standard wall tile installations, but if it does, it may be cut or torn to accommodate wall ties, conduit, plumbing or other materials that bridge or intrude into cavity between inner and outer walls.

.10 Compress the Mortar Net with Insect Barrier horizontally so it can be forced into cavities slightly smaller than its nominal thickness without affecting Mortar Net with Insect Barrier or wall performance.

.11 When forcing the Mortar Net with Insect Barrier into a cavity, be sure mortar has set sufficiently to resist outward pressure from product.

3.5 PROTECTION

.1 Protection: Protect installed product from damage during construction.

END OF SECTION

This page intentionally left blank

1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 05 00 - Common Work Results for Masonry.
.2 Section 04 05 13 - Masonry Mortaring.
.3 Section 04 05 19 - Masonry Anchorage and Reinforcing.
.4 Section 04 05 23 - Masonry Accessories.
.5 Section 07 21 13 - Board Insulation.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
  .1 CAN/CSA A165 SERIES-04, CSA Standards on Concrete Masonry Units.

1.3 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
.2 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
.3 Units having a required fire resistance rating shall be identified by the manufacturer by marking each pallet or cube, or by other means.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Standard hollow concrete masonry units to CSA-A165.
  .1 Classification: H/15/A/M
  .2 Size: modular
  .3 Special shapes: provide as follows:
    .1 Bull-nosed units for all exposed corners.
    .2 Square sash-block units at all control joint locations.
    .3 Purpose-made shapes for lintels and bond beams.
    .4 Solid units at wall caps where wall terminates below ceiling.
    .5 Additional shapes as indicated.
  .4 Acceptable Materials:
    .1 E.J. Casey Concrete Limited
    .2 L.E. Shaw Limited
    .3 South Shore Ready Mix Limited
    .4 V.J. Rice Concrete Limited
.2 Standard semi-solid concrete masonry units to CAN-A165.1-M85.
  .1 Classification: S/20/A/M
  .2 Size: Modular.
.3 Allan Block Retaining Wall Units: Wall units to have minimum strength of 20.67 MPa after 28 days in accordance with ASTM C90.
  .1 Type: AB Three
  .2 Coverage: 1 sq. ft. per block

.3 Setback: 3 degrees from vertical
.4 Dimensions: 200mm H x 500mm D x 450mm L
.5 Weight 34kg
.6 Supply matching capstone
.7 Colour to match Architectural Block colour A.

3 Execution

3.1 INSTALLATION

.1 Concrete block units.
  .1 Bond: running.
  .2 Coursing height: 200 mm for one block and one joint.
  .3 Jointing:
    .1 Concave where exposed or where paint or other similar finish coating is specified
    .2 Tile or similar applied finish.
    .3 Flush at exterior face to receive air/vapor barrier membrane.
    .4 Maintain cavity at masonry walls free from mortar droppings.
.2 Concrete block lintels.
  .1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
  .2 End bearing: not less than 200 mm as indicated on drawings.

3.2 QUALITY CONTROL

.1 Notwithstanding visual inspection requirements of CSA Standards, masonry units shall be free of surface indentations, surface cracks due to manufacture, or chipping.
.2 THE REQUIREMENTS OF CLAUSE .1 ABOVE WILL BE STRICTLY ENFORCED AND CONTRACTOR WILL BE REQUIRED TO EITHER REPLACE UNACCEPTABLE UNITS, OR AT THE CONSULTANT'S DISCRETION, DEMOLISH PART OF ALL OF A WALL DEEMED BY THE CONSULTANT, AS NOT MEETING THOSE REQUIREMENTS.

3.3 HEATING PIPING IN CONCRETE UNIT MASONRY WALLS

.1 Where heating piping supply and return lines travel vertically in concrete block walls cores of block to be aligned and/or webs cut, and masonry work coordinated with work of Mechanical Sections to permit installation of heating lines.

3.4 CONCRETE MASONRY LINTELS

.1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
.2 End bearing: not less than 200mm.

3.5 GROUTING-IN OF DOOR FRAMES

.1 Fill fire-rated door frames solid with mortar.

3.6 RETAINING WALL

.1 Install retaining wall to the requirements of the manufacturer's printed instructions and as indicated on the drawings.
.2 Crushed stone or gravel base: consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
  .1 Gradations: within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 rather than ASTM E 11.

SIEVE DESIGNATION	% PASSING
19mm	100
12.5mm	70-100
3.3mm	40-3.4
2.00mm	23-50
0.425mm	7-25
0.075mm	3-8

.3 Manufactured sand for bedding: hard, durable, crushed stone particles, conforming to the gradation of concrete sand as specified in CAN/CSA A23.1, Section 5.3.2 Sand shall be free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.1 Gradations: within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 rather than ASTM E 11.

SIEVE DESIGNATION	% PASSING
10mm	100
5mm	95-100
2.5mm	80-100
1.25mm	50-90
0.630mm	25-60
0.315mm	10-35
0.160mm	2-10

3.7 CLEANING

.1 Standard block: Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

.2 Glazed block: Clean masonry as work progresses using soft, clean cloths, within few minutes after laying. Upon completion, when mortar has set so that it will not be damaged by cleaning, clean with soft sponge or clean cloths, brush, and clean water. Polish with soft, clean cloths.

END OF SECTION

This page intentionally left blank

1 General

1.1 RELATED REQUIREMENTS

.1 Section 09 91 00 - Painting.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM A36/A36M-08, Specification for Carbon Structural Steel.
- .2 ASTM A325M-00, Specification for High-Strength Bolts for Structural Steel Joints Metric.
- .3 ASTM A490M-09a, Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric).

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB 85.10-99, Protective Coatings for Metals.

.3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
- .1 CISC/CPMA 1-73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.
- .2 CISC/CPMA 2-75, Quick-Drying, Primer for use on Structural Steel.

.4 Canadian Standards Association (CSA International)
- .1 CSA G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA S16-19, Design of Steel Structures.
- .4 CSA S136-16, North American Specification for the Design of Cold Formed Steel Structural Members, Includes Update No. 1 (2009), Update No. 2 (2010).
- .5 CSA-S136.1-07, Commentary on CSA Standard S136.
- .6 CSA W47.1-19, Certification of Companies for Fusion Welding of Steel.
- .7 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
- .8 CSA W55.3-08 (R2018), Certification of Companies for Resistance Welding of Steel and Aluminum.
- .9 CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding).

.5 Master Painters Institute
- .1 MPI-INT 5.1-98, Structural Steel and Metal Fabrications.
- .2 MPI-EXT 5.1-98, Structural Steel and Metal Fabrications.

1.3 QUALITY CONTROL

.1 At least 4 weeks prior to fabrication of structural steel, submit eight (8) copies of mill test reports showing chemical and physical properties and other details of steel to be incorporated into work. Such mill test reports shall be certified by qualified metallurgists confirming that tests conform to requirements of CAN/CSA G40.20 and CAN/CSA G40.21.

.2 Minimum four (4) weeks before bolts, nuts and washers are required on site, the Contractor must provide the Consultant with the following:
- .1 Name of manufacturer of bolts, nuts and washers.
- .2 Certificate of Compliance issued by manufacturer stating that nuts, bolts and washers meet the standard(s) required by this specification.

.3 All structural steel and bolts, nuts and washers used on this project to be manufactured and supplied by Canadian Mills.

1.4 DESIGN REQUIREMENTS

.1 Design details and connections in accordance with requirements of CAN/CSA-S16 to resist forces, moments, shears and allow for movements indicated.

.2 Shear connections:

.1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.
.2 If shears are not indicated, select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam.

.3 For connections, submit sketches and design calculations stamped and signed by qualified professional engineer registered or licensed in the Province of Prince Edward Island in Canada.

1.5 SHOP DRAWINGS

.1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section 01 33 00 - Submittal Procedures.
.2 Erection drawings: indicate details and information necessary for assembly and erection purposes including:
.1 Description of methods.
.2 Sequence of erection.
.3 Type of equipment used in erection.
.4 Temporary bracings.
.3 Ensure Fabricator drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the province of Prince Edward Island, Canada.
.4 The Consultant may provide an electronic set of documents for the Contractor's preparation of shop drawings but for a fee.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Divert unused metal materials from landfill to metal recycling facility.
.5 Divert unused paint material from landfill to official hazardous material collections site.

2 Products

2.1 MATERIALS

.1 Structural steel: to CAN/CSA-G40.20/G40.21 Grade 350W.
.2 HSS Sections: Class C, Grade 350W.
.3 Structural steel cast-in-place anchor bolts: to CAN/CSA-G40.20/G40.21.
.4 Cold-rolled sections: to CSA S136-94 and ASTM A607, Grade 50.
.5 Bolts, nuts and washers: to ASTM A307.
.6 Welding materials: to CSA W48 Series and certified by Canadian Welding Bureau.
.7 Shop paint primer: to CISC/CPMA1.
.8 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 300 g/m2 or as indicated.
.9 Anchor bolts: fabricated from material conforming to CSA -G40.21, Grade 300W, with yield strength 300 MPa; nuts and washers to be of equal or greater strength than bolts.

2.2 SHOP PAINTING

.1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16.
.2 Do not prime structural steel surfaces receiving fire proofing spray - refer to Architectural Drawings for elements that require spay-applied fireproofing materials

.3 Clean members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPC-SP-6.
.4 Apply one coat of primer in shop to steel surfaces, except:
  .1 Surfaces to be encased in concrete.
  .2 Surfaces and edges to be field welded.
  .3 Contact surfaces of friction-type connections.
  .4 Below grade surfaces in contact with soil.
.5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
.6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S16.
.2 Welding: in accordance with CSA W59.
.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.
.4 Steel fabrication companies to be Canadian Institute of Steel Construction (CISC) certified.

3.2 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Consultant for direction before commencing fabrication.

3.3 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.
.2 Continuously seal members by continuous welds. Grind smooth.
.3 Provide punched holes for 11 to 27mm in diameter for attachment of other work.
.4 Reinforce openings to maintain required design strength.
.5 Fabricate all closure angles at edge of deck and at all openings as indicated on drawings.
.6 Fabricate all masonry lateral support angles to lengths and in quantities required.

3.4 MARKING

.1 Mark materials in accordance with CAN/CSA G40.20/G40.21. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
.2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.5 ERECTION

.1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.
.2 Install all miscellaneous steel sections, plates, etc., indicated on the structural drawings.
.3 Field cutting or altering structural members: to approval of Consultant.
.4 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
.5 Continuously seal members by continuous welds where indicated. Grind smooth.

3.6 FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship if required will be carried out by testing laboratory designated by the Owner and paid for by the Owner except as follows:
.2 At the Contractor's discretion, either one of the following two (2) options may be used to confirm that the bolted connections have been properly torqued.
  .1 The use of tension control bolts (TCB) in accordance with CAN/CSA S-16.1.

.2 Engage and pay for the services of a testing laboratory, acceptable to the Consultant, to carry out random torque tests on bolted connections, at locations and in numbers determined by the testing laboratory to be sufficient provide a written report confirming that from their tests, it is their opinion that all bolted connections have been torqued in accordance with the specified requirements.

.3 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Consultant.

.4 Submit test reports to Consultant within three (3) weeks of completion of inspection.

3.7 FIELD PAINTING

.1 Touch up damaged surfaces and surfaces without shop coat with primer to SSPC-SP-6 except as specified otherwise. Apply in accordance with CAN/CGSB 85.10.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 12 23 - Structural Steel for Buildings.
.2 Section 09 91 00 - Painting.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
  .1 ASTM A653/A653M-09a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  .2 ASTM A792/A792M-09a, Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
.3 Canadian Standards Association (CSA International)
  .1 CSA C22.2 No.79-1978(R2008), Cellular Metal and Cellular Concrete Floor Raceways and Fittings.
  .2 CSA S16-19, Design of Steel Structures.
  .3 CSA S136-16, North American Specification for the Design of Cold Formed Steel Structural Members, Includes Update No. 1 (2009), Update No. 2 (2010).
  .4 CSA W47.1-19, Certification of Companies for Fusion Welding of Steel.
  .5 CSA W55.3-08 (R2018), Certification of Companies for Resistance Welding of Steel and Aluminum.
  .6 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding).
.4 Canadian Sheet Steel Building Institute (CSSBI)
  .1 CSSBI 10M-08, Standard for Steel Roof Deck.
  .2 CSSBI 12M-08, Standard for Composite Steel Deck.

1.3 DESIGN REQUIREMENTS

.1 Design steel deck using working stress design, in accordance with CSSB1 10M and CSSB1 12M as applicable.
.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, composite deck action, and uplift as indicated.
.3 Deflection under specified live load not to exceed 1/240 of span, except that when plaster ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.
.4 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CAN/CSA-S16.1, Appendix 'G'.
.5 All steel decking used on this project to be fabricated in Canada, from steel manufactured in Canada by Canadian Mills.

1.4 SHOP DRAWINGS

.1 Submit shop drawings erection and shoring drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Prince Edward Island, Canada.
.3 Submit design calculations if requested by Consultant.
.4 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.
.5 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete fill decks.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Divert unused metal from landfill to metal recycling facility.
.5 Dispose of unused paint material at official hazardous material collections site.
.6 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
.7 Dispose of unused caulking material at official hazardous material collections site.

2 Products

2.1 MATERIALS

.1 Closures: as approved in accordance with manufacturer's recommendations.
.2 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm. Metallic coating same as deck material.
.3 Deck coating shall be Z275 (G90) according to the standard ASTM A 653M. Where spray applied fire proofing materials are indicated and required, deck finish shall be compatible with the fire proofing material to achieve appropriate bonding.
.4 Hilti steel deck fasteners purpose designed for the application or 20mm diameter puddle welds complete with washers.
.5 #10 Tek screws or side lap button punching.

2.2 TYPES OF DECKING

.1 Floor deck: single fluted element, composite deck, with minimum nominal base thickness of 0.76 mm (22 ga.) with interlocking side laps.
  .1 Acceptable Material:
    .1 Canam P-3615 Composite Deck.
    .2 Or approved equal.
.2 Roof deck: single fluted element, composite deck, with minimum nominal base thickness of 0.76 mm (22 ga.) with interlocking side laps.
  .1 Acceptable Material: Canam P-3615

3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S136 and CSSB1 10M and CSSB1 12M as applicable.
.2 Welding: in accordance with CSA W59 and with CSA W59S1, except where specified otherwise.
.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.
.4 Steel fabrication companies to be Canadian Institute of Steel Construction (CISC) certified.

3.2 ERECTION

.1 Erect steel deck as indicated and in accordance with CSA S136 and CSSB1-10M and CCSB1-12M as applicable and manufacturer's instructions and in accordance with approved erection drawings.
.2 Fastening uplift resistance to CSA S136.F04, 2.09kN.

.3 Weld decking to steel joists and steel beams strictly in accordance with requirements indicated on drawings.
.4 Where underside of steel decking will be exposed in the final assembly. Exercise care during handling and installation to ensure that exposed face will be free from dents, scratches, excessive weld burns and other unsightly blemishes. Use chalk line to locate joists. Hammer marks or dents alongside of top chords not acceptable.
.5 Butt ends: to 1.5 to 3 mm gap. Install steel cover plates over gaps wider than 3 mm.
.6 Lap ends: to 50 mm minimum.
.7 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.
.8 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.
.9 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.
.10 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.
.11 Place and support reinforcing steel as indicated.
.12 Deck to span minimum of 3 joist spans generally.

3.3 CLOSURES

.1 Install closures in accordance with approved details. Refer to 2.1.2.

3.4 OPENINGS AND AREAS OF CONCENTRATED LOADS

.1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.
.2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer, except as otherwise indicated.
.3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.5 CONNECTIONS

.1 Install connections in accordance with CSSBI Steel Roof Deck, 10M-86 and Composite Steel Deck. 12M-84 as applicable and in accordance with design requirements for diaphragm action.

END OF SECTION

This page intentionally left blank

1 General

1.1 SUMMARY

.1 Work included: Provide metal fabrications including but not limited to following:
- .1 Miscellaneous sections and framing.
- .2 Bollards.
- .3 Miscellaneous mechanical equipment brackets.

1.2 RELATED REQUIREMENTS

.1 Following description of work is included for reference only and shall not be presumed to be complete:
- .1 Section 03 30 00 - Cast-in-Place Concrete.
- .2 Section 05 12 23 - Structural Steel For Buildings.
- .3 Section 09 91 00 - Painting.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM A53/A53M-07, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A269-10, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A307-07b, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 ASTM A123/A123M-09, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .5 ASTM A153/A153M-09, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .6 ASTM A325M-07a, Specification for High-Strength Bolts for Structural Steel joints [Metric].
- .7 ASTM A653M-09a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .8 ASTM B117-09, Practice for Operating Salt Spray (Fog) Apparatus.
- .9 ASTM E119-09c, Test Methods for Fire Tests of Building Construction and Materials.
- .10 ASTM E736-00 (2006), Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- .11 ASTM F436M-10, Specification for Hardened Steel Washers.
- .12 ASTM F844-07a, Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB 1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
- .2 CAN/CGSB 1.181-99, Ready Mixed Organic Zinc-Rich Coating
- .3 CAN/CGSB 85.10-99, Protective Coatings for Metals

.3 Canadian Standards Association (CSA International)
- .1 CAN/CSA G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA S16-19, Design of Steel Structures.
- .4 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
- .5 CSA W59-03 (R2008),Welded Steel Construction (Metal Arc Welding).
- .6 CSA S136-16 - North American Specification for the Design of Cold Formed Steel Structural Members (Using Appendix B provisions applicable to Canada).
- .7 CSA W47.1-19 - Certification of Companies for Fusion Welding of Steel.

.8 CSA W47.2-M1987 (R2008) - Certification of Companies for Fusion Welding of Aluminum.
.9 CSA W48.1-M1991 (R1998) - Carbon Steel Covered Electrodes for Shielded Metal Arc Welding.
.10 CSA W48-06 - Filler Metals and Allied Materials for Metal Arc Welding.
.11 CSA W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding).
.12 CSA W117.2-06 - Safety in Welding, Cutting, and Allied Processes.
.13 SSPC - Steel Structures Painting Council, "Steel Structures Painting Manual, Vol. 2".

1.4 SYSTEM DESCRIPTION

.1 Design Requirements:
.1 Drawings and details are diagrammatic and are intended to show design concept, configuration, components and arrangements; they are not intended to identify nor solve completely problems of thermal and structural movements, assembly framing, fixings and anchorages.
.2 Design work to withstand within acceptable deflection limitations, variations from plumb in vertical and horizontal lines, its own weight, forces applied by movements of building structure and attached adjacent components and maximum design loads due to pressure and suction of wind, snow, ice, rain and hail.
.3 Design load bearing structures to NBC requirements and provide miscellaneous steel supports and anchors to suit design. Conform to CAN/CSA-S16.1 and CAN/CSA-S136.

1.5 SUBMITTALS

.1 Product Data:
.1 Submit manufacturer's literature, data sheets for each type of material provided under this Section for Project. Data sheets shall provide all required information. Submit 3 copies of detailed instructions for maintaining, preserving and keeping materials in clean and safe conditions and give adequate warning of maintenance practices of materials detrimental to specified materials. Submit manufacturer's installation instructions.
.2 Material Safety Data Sheets:
.1 Submit MSDS for inclusion in Operation and Maintenance Manual without limitations for adhesives, sealants, patching and leveling compound, solid polymer and as designed by Consultant.
.3 Shop Drawings
.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 In addition to minimum requirements indicated following:
.1 Large scale details of members, materials and connections.
.2 Joint details.
.3 Methods of setting, sealing, securing, anchorage.
.4 Field connections.
.5 Submit Shop Drawings for following work bearing the stamp of a Professional Engineer registered in the Province of Prince Edward Island.
.4 Samples:
.1 Extruded and formed metals: minimum 300 mm long.
.2 Metal sheet: minimum 300 mm square and of specified thickness.

1.6 QUALITY ASSURANCE

.1 Test Reports: Submit 3 copies of certified test reports showing compliance with specified performance characteristics and physical properties.
.2 Certificates: Submit 3 copies of product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Welding: Provide welding in accordance with CSA W59-m performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau as specified herein.

.4 Structural Design and Inspection:

.1 Employ a professional structural engineer carrying a minimum $2,000,000.00 professional liability insurance and is registered in the province of Prince Edward Island to:

.1 Design components of the work of this Section requiring structural performance.

.2 Be responsible for full assemblies and connections

.3 Be responsible for determining sizes, joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.

.4 Be responsible for production and review of Shop Drawings.

.5 Inspect work of this Section during fabrication and erection.

.6 Stamp and sign each shop drawing.

.7 Provide site administration and inspection of this part of the Work.

.2 Certification:

.1 Submit certification from registered professional structural Engineering registered in province of Prince Edward Island, who shall affix his/her seal and signature to certificate, stating structure is capable of supporting its own weight and specified live loads.

.2 Welders employed on this project may be asked by Consultant at any time for their welding certificate.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off-the-ground, undercover storage locations. Do not load areas beyond the designed limits.

.2 Handle and store metal materials at job site in such a manner to prevent damage to other materials, (to existing buildings) or property.

.3 Handle components with care, and Provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of steel members.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Steel sections and plates: New Material Conforming to CAN/CSA-G40.20/G40.21, Grade 350W.

.2 Hollow Structural Sections: New material conforming to CSA G40.20 and CSA G40.21, Grade 350W, Class H.

.3 Steel Pipe: ASTM A53, Type E or S, Grade A or B, Standard weight, Schedule 40.

.4 Stainless Steel:

.1 Provide highest architectural quality in various forms, straight and true. Ensure there are no scratches, scars, creases, buckles, ripples or chatter marks. Provide finished surfaces suitable for polishing where required. Ensure finished surfaces exposed to view are free of pitting, seam marks, roller marks, oil-canning, stains, discolorations or other imperfections.

.2 Stainless Steel Sheet, Strip, Plate, and Flat Bar: ASTM A167 or ASTM A666, Type 304 and Type 316 alloy with exposed surfaces having No. 4 polished finish. Sizes as required to meet design requirements.
.3 Stainless Steel Tubing: ASTM A554, Grade MT 304.
.4 Stainless Steel Pipe: ASTM A312M, Grade TP 304.

.5 Structural aluminum: to CSA HA series - M, Type 6061-T6, clear anodized.

.6 Welding Materials: Conforming to CSA W48.1-M and CSA W59-M.

.7 High Strength Bolts: Supply bolts, nuts and washers conforming with ASTM A325M. Supply each type and size of bolt and nut of same manufacture and of same lot.
.1 Bolts: Heavy, hexagon head high strength structural bolts, of standard size, of lengths required for thickness of members joined and for type of connection.
.2 Nuts: Heavy hexagon semi-finished nuts.
.3 Washers: For general use bolt, nut and stud application to provide increased bearing surfaces, spacing and to prevent galling. Flat and smooth hardened washers, quenched and tempered to suit applications and conforms to ASTM F844. Provide AISI Type 304 stainless steel washers at exterior locations.
.4 Hardened Steel Washers: To suit applications and conforms to ASTM F436M.
.5 Stainless Steel Bolts: To suit applications and conforms to ASTM F738M.
.6 Stainless Steel Nuts: To suit applications and conforms to ASTM F836M.
.7 Lock Washers: Helical spring type steel "lock" washers to suit applications and conforms to federal specification FF-W-84. Provide AISI Type 304 stainless steel lock washers at exterior locations.
.8 Security Fasteners: Button head Torx® Plus R screw tamper resistant # 10, 25 mm long 2 per glass stop minimum stainless steel machine screws.

.8 Common or Ordinary Bolts and Anchor Bolts: Unfinished bolts conforming with ASTM A307, Grade A, with hexagon heads and nuts where exposed in the finish work. Supply common bolts of lengths required to suit thickness of material being joined, but not projecting more than 6 mm) beyond nut, without the sue of washers. Supply anchor bolts of lengths noted, but projecting not less than 13 mm beyond nut unless otherwise noted.

.9 Galvanized Primer Paint: Zinc rich conforming to CAN/CGSB-1.181 for new galvanized metal.

.10 Steel Pipe Bollards: Conforming to ASTM A53M, Schedule 80 steel pipe of sizes shown.

.11 Galvanized: Hot dipped galvanized with minimum zinc coating of 600 g/m2 to CAN/CSA-G164-M.

.12 Galvanized Sheet Steel: Supply 0.91 mm (20 ga) core thickness commercial quality to ASTM A653M, CS Type A, with Z275 zinc coating designation to ASTM A653M.

.13 Grout:
.1 Cementitious, non shrinking, non expanding grout: 'Sika Grout 212' by Sika Canada Inc., or 'Non Shrink Structural Grout - Dry Pack Grout' by Euclid Chemical Company or 'Sealtight CG 86 Construction Grout' by W.R. Meadows.
.2 Epoxy, non-shrinking, non expanding grout: 'Sika Anchor Fix'.
.3 Master Flow 100.
.4 Master Emaco ADH 1420.

.14 Tamper-Resistant Fasteners: Unless indicated otherwise, exposed fasteners must be stainless steel, operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific type of fastener. Provide drive-system type, head style, material, and protective coating as required for assembly, installation, and strength.
.1 Drive-System Type: Pinned Torx-Plus.
.2 Acceptable Manufacturers:
.1 Holo-Krome; www.holo-krome.com
.2 Tamper-Pruf Screws; www.tamper-pruf-screws.com
.3 Acument Global Technologies; www.acument.com

2.2 FABRICATION

.1 Fabricate each item of work of this Section in accordance with following general requirements:
- .1 Members square and straight.
- .2 Members plumb and true.
- .3 Joints accurately and tightly fitted.
- .4 Intersecting members in true, finish planes.
- .5 Fasteners concealed.

.2 Fabricate, fit and assemble work in shop where possible. Where shop fabrication is not possible, make trial assembly in shop.

.3 Provide hangers, rods, bars, bolts, anchors, brackets, rivets, bearing plate and bracing, fitting, drilling, stopping, soldering, as required for a complete assembly.

.4 Isolate dissimilar metals to prevent galvanic corrosion.

.5 Weld connections unless otherwise indicated.

.6 Shop Welding:
- .1 Execute welding to avoid damage or distortion to work. Should there be, in the opinion of Consultant or Inspection Company, doubts as to adequacy of welds, they shall be tested for efficiency and any work not meeting Standards be removed and replaced with new work satisfactory to Consultant. Carry out welding in accordance with following standards:
  - .1 Fabricator shall be fully certified by Canadian Welding Bureau for fusion welding of steel structures to CSA W47.1 and for fusion welding of aluminum to CSA W47.2.
  - .2 CSA W48-M - for Electrodes (if rods are used, only coated rods are allowed).
  - .3 CSA W59-M - for design of connections and workmanship.
  - .4 CSA W117.2 - for safety.

.7 Thoroughly clean welded joints and steel exposed for a sufficient space to properly perform welding operation. Neatly finish welds. Ensure welds exposed to view and finish painted are continuous and ground smooth.

.8 Provide exposed metal fastenings and accessories of same material, texture, color and finish as base metal to which they are applied or fastened.

2.3 FINISHES

.1 Cleaning and Shop Painting:
- .1 Clean steel to SSPC SP6 and remove loose mill scale, weld flux and splatter.
- .2 Shop prime steel with 1 coat of primer paint to dry film thickness of 0.025 mm (1 mil). Paint on dry surfaces free from rust, scale, grease. Do not paint when temperature is lower than 7 deg C. Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods, equipment, temperature, and humidity conditions.
- .3 Do not prime steel members and structural steel members to receive sprayed fire resistive materials.
- .4 Shop prime galvanized steel in accordance with CAN/CGSB-85.10.
- .5 Clean but do not paint surfaces being welded in the field and surfaces in contact after assembly.

.2 Hot Dip Galvanizing:
- .1 After fabrication, hot dip galvanize specific miscellaneous steel items noted on Drawings and/or called for herein. Plug relief vents air tight. After galvanizing, remove plugs, ream holes to proper size and re-tap threads. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with "Galvafroid" by W.R. Meadows in accordance with manufacturer's printed directions.

.2 Galvanized members exposed to elements when in final location; members embedded in concrete; members specified in this Section or noted on Drawings.

.3 Hot-dip galvanize members, in accordance with CAN/CSA-G164-M and the requirements of following ASTM standards, with minimum coating weights or thickness as specified:

.1 Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips: ASTM A123M; average weight of zinc coating per sq/ft of actual surface, for 4.8 mm and less thickness members 2 ounces, for 6 mm and heavier members 2.3 ounces.

.2 Iron and Steel Hardware: ASTM A153M; minimum weight of zinc coating, in ounces per sq ft of surface shall be in accordance with Table 1 of ASTM A153M, for the various classes of materials used on the Project.

.3 Steel Sheet: ASTM A653M; weight of zinc coating, per sq ft on both sides of sheet. Coating designation Z275 (G90), minimized spangle and chemically treated.

.3 Color: to be selected by Consultant.

.4 Zinc-rich primer: Ready, mixed, zinc-rich primer conforming to CAN/CGSB-1.181 Acceptable Products and manufacturers shall be Sealtight Galvafroid Zinc-Rich Coating by W.R. Meadows of Canada Limited, or Zinc Clad No. 7 Organic Zinc Rich Primer by Sherwin Williams Company of Canada Ltd., or other Product and manufacturer acceptable to Consultant.

.5 Isolation Coating: Bituminous paint, alkali-resistant bituminous paint or epoxy resin solution to provide dielectric separation which will dry to be tack-free and withstand high temperatures. Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers. Carboline Bitumastic 50 by Carboline Canada, or Copper Creek Top Service 760 Black by Sherwin Williams Company, 410-02 by Bakor Inc. or other Product and manufacturer acceptable to Consultant.

2.4 MILLWORK MISC. METAL PLATES, ANGLES AND BENTS

.1 Provide all miscellaneous plates, angles and bents required for support of millwork as indicated and detailed on the drawings.

2.5 MILLWORK SUPPORTS

.1 50mm x 75mm HSS supports for build-in to front edge of millwork for spans in excess of 1200mm.

.2 Prime paint.

.3 Turn over to millwork Trade for build-in.

2.6 PIPE BOLLARDS

.1 Fabricate from HSS Round, Grade 350 W to size 203mm nominal, complete with anchor lugs.

.2 Supply to Section 03 30 00 - Cast-In-Place Concrete for installation in concrete bases.

.3 Provide post guards of 1/8" high density polyethylene (HDPE) with guaranteed fade resistance for six (6) years, complete with cap.

.4 Single color from manufacturer's full range of colors, selected by Consultant.

.5 Acceptable Material:

.1 Post Guard by Sure Guard.

.2 Global Industries.

.3 Uline.

.4 Idealshield.

2.7 RADON PIT FRAME & COVER

.1 75 x 75 x 6mm galvanized angle cover support.

.2 6mm checker plate cover.

.3 6mm galvanized square edge bar, 4 sides.

3 Execution

3.1 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.
.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
.3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
.4 Exposed fastening devices to match finish and be compatible with material through which they pass.
.5 Provide components for building by other sections in accordance with shop drawings and schedule.
.6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
.7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 INSTALLATION

.1 Verify dimensions at the Place of the Work to ensure work of this Section fits to that of other parts of the Work.
.2 Erect the work of this Section plumb, square, true and level.
.3 Securely anchor work of this Section and rivet, weld or bolt to structural framing of the building. Where secured to concrete, Provide bolts for setting in concrete. Provide expansion bolt supports to masonry.
.4 Provide necessary fitting, setting and cutting required in connection with the fitting of work of this Section to other parts of the Work.
.5 Field Painting: Paint bolt heads, washers, nuts, field welds and previously unpainted items. Touch up with matching paint, shop primer damaged during transit and installation.

3.3 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
.3 On completion of installation, carefully clean metal work.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: Provide architectural woodwork including but not limited to following:

- .1 decorative laminate casework and associated hardware.
- .2 decorative laminate countertops.
- .3 fiberglass laminate panels.
- .4 White board enclosures
- .5 Miscellaneous trim and mouldings.
- .6 interior ornamental work.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

- .1 Architectural Cabinetry:
  - .1 In the context of architectural cabinetry, the following definitions apply in accordance with North American Architectural Woodwork Standards (NAAWS), Section 10 and amended as follows:
    - .1 Exposed Surfaces: Defined as all surfaces exposed to view in open casework or behind transparent doors. These include:
      - .1 Surfaces visible when doors and drawers are closed, including knee spaces
      - .2 Underside of cabinet bottoms over 1067 mm (62”) above finished floor level, including cabinet bottoms behind light valances and bottom edge of light valances.
      - .3 Cabinet tops under 2032 mm (80”) above finished floor, or if 2032 mm (80”) and over and visible from an upper building level or floor.
      - .4 Front edges of stretchers, ends, divisions, tops and bottoms.
      - .5 Sloping tops of cabinets that are visible.
      - .6 Shelves (including edgebanding),
      - .7 Divisions and partitions,
      - .8 Interior face of ends (sides), backs, and bottoms (including pull-outs). Also included are the interior surfaces of cabinet top members 914 mm (36”) or more above the finished floor.
      - .9 Interior face of door and applied drawer fronts.
    - .2 Semi-Exposed Surfaces: Defined as those interior surfaces only exposed to view when doors or drawers are opened. These include:
      - .1 Tops and bottoms shelves, including front edgebanding (front edge is considered exposed)
      - .2 Divisions and partitions (front edge is considered exposed)

.3 Interior face of ends (sides), backs, and bottoms (including pull-outs). Also included are the interior surfaces of cabinet top members 914 mm (36") or more above the finished floor
.4 Drawer sides, sub-fronts, backs, and bottoms.
.5 The underside of cabinet bottoms between 610 mm (24") and 1067 mm (42") above the finished floor.
.6 Security and dust panels or drawer stretchers.
.7 The faces of cabinet ends of adjoining units that butt together.

.3 Concealed Surfaces: Defined as those exterior or interior surfaces that are covered or not normally exposed to view. These include:

.1 Toe space unless otherwise specified.
.2 Sleepers, stretchers, and solid sub-tops
.3 The underside of cabinet bottoms less than 610 mm (24") above the finished floor
.4 The flat tops of cabinets 2032 mm (80") or more above the finished floor, except if visible from an upper floor or building level.
.5 The three non-visible edges of adjustable shelves.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 Coordination:

.1 Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork and related items can be supported and installed as indicated.

.2 Perform pre-wiring and partial mounting of electrical and audio/visual equipment and concealed wiring required. Finalize location of outlets and similar items with Consultant prior to installation.

.3 Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.

.4 Coordinate fabrication schedule with construction progress to avoid delaying the Work.

.5 Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for Project in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Shop Drawings:

.1 Submit Shop Drawings indicating material characteristics, details of construction, connections and relationship with adjacent construction.

.2 Indicate locations and sizes of cutouts and holes for plumbing and electrical fixtures, lavatories and similar items required in architectural woodwork; coordinate with appropriate trades.

.3 Clearly indicate material being supplied and show connections, attachments, reinforcing, anchorage and location of exposed fastenings in accordance with NAAWS Section 1.

.4 Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication to ensure proper fitting of work. Do not proceed with fabrication until Shop Drawings have been reviewed.

.4 Samples: Submit samples in accordance with Division 01 samples in following sizes:

.1 minimum 300 mm (12") square and of specified thickness, plastic laminate or wood veneer as applicable, mounted on 19 mm (3/4") core and finished as specified. Submit samples for Consultant's approval prior to fabrication.

.1 For each colour of plastic laminate or wood veneer species selected (as applicable), submit manufacturer's standard 300 mm x 460 mm (12” x 18”) chips.

.2 minimum 300 mm (12") square x 13 mm (1/2”) thick countertop materials.

.3 each type of hardware.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years’ experience in the manufacture of such materials.

.2 Installers: Provide Work of this Section executed by competent installers with minimum 5 years’ experience in the application of Products, systems and assemblies specified and be a member of AWI/AWMAC in good standing for the previous 2 years.

.3 Welders: Welding shall be performed by welders having minimum certification requirements of CSA W47.1 to suit type of welding performed. Ensure welders are familiar with welding procedures for welding steel and aluminum.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.3 Mock-ups: Provide Mock-ups in locations designated by Consultant and as required to demonstrate quality of workmanship. Maintain Mock-ups during construction in an undisturbed condition as a standard for judging the completed work. Approved Mock-ups may become part of completed work if undisturbed at time of Substantial Performance of the Work. Provide Mock-ups for following items:

.1 Basic Cabinetry consisting of one base cabinet, one wall hung cabinet, and one countertop. Base cabinet to have minimum one drawer.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver and Acceptance Requirements:

.1 Do not deliver finished Products during rainy or damp weather.

.2 Do not deliver Work of this Section until building and storage areas are sufficiently dry to ensure Products will not be damaged by changes in relative humidity and moisture content. Deliver, store and handle Products of this Section in accordance with NAAWS Section 2.

.3 Do not deliver and Install damaged Products. Replace in accordance with requirements of this Section.

.4 Storage and Handling Requirements: Cover and protect finished surfaces with heavy Kraft paper and other acceptable means. Put in cartons for protection. Do not remove protective covers until immediately prior to final cleaning.

1.7 SITE CONDITIONS

.1 Ambient Conditions: Ensure conditions conform to requirements of NAAWS Section 2 and moisture contents of wood for interior locations at time of installation are at established Optimum Moisture Content and Optimum Indoor Relative Humidity outlined in NAAWS Section 2.

1.8 WARRANTY

.1 Warrant work of this Section for period of 3 years from Substantial Performance of the Work against defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to: delamination of plastic laminate, opening of seams, warpage and extensive colour fading.

2 - PRODUCTS

2.1 DESCRIPTION

.1 Regulatory Requirements:

.1 Provide work of this Section in accordance with North American Architectural Woodwork Standards (NAAWS), except as specified otherwise herein. Any reference to grades and terminology in this Section to be as defined in “NAAWS” and by reference are made a part of this Section. Requirements of this Section govern and modify NAAWS.

.2 Fire-Test-Response Characteristics:

.1 Flame-spread index shall be in accordance with National Building Code of Canada requirements when tested according to CAN/ULC-S102

.2 Where fire-retardant materials are indicated, Provide materials with specified fire-test-response characteristics as determined by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency on surfaces of materials that will be concealed from view after installation

.2 Design and Performance Requirements:

.1 Architectural Drawings and details are diagrammatic and are only intended to show design concept, aesthetics, interfacing requirements, configuration, components and

arrangements. They are not intended to identify or solve completely problems of thermal and structural movements, assembly framing, engineering design, fixings and anchorages.

.2 Seismic Performance: Design materials specified in this Section to withstand the effects of earthquake motions determined according to British Columbia Building Code and CAN/CSA S832 requirements. Professional engineer referenced in this Section shall be responsible for designing systems and submitting signed and sealed analysis data and Shop Drawings illustrating seismic-resistant systems. Refer to Structural documents for seismic sensitivity values.

.3 Ensure millwork casework (e.g. countertops, wall cabinets, cabinet drawers and similar items) are capable of supporting structural loads without deflection in accordance with Casework Integrity Tests in Appendix A of AWMAC- NAAWS Standard Manual of current edition at time of bidding.

.4 All composite wood products and laminating adhesives used in millwork shall not contain added urea-formaldehyde resins;

.5 Seal all wood surfaces and edges to meet infection control requirements;

.6 All cabinets shall be flush overlay construction;

.7 Design millwork so that no sharp edges are exposed, provide minimum 25 mm radiused corner to countertops;

.8 Incorporate all required mechanical, electrical and communication services into millwork so that wires and pipes are hidden from view, provide access panels to all services to allow for future adjustment;

.9 Provide built-in valance lighting underneath all upper cupboards over counter tops;

.10 All architectural woodwork hardware shall be stainless steel of durable quality to meet standards of AINSI/BHMA grade 1 Cabinet Hardware.

.1 In patient accessible areas, hardware to be tamper-resistant types and installed with tamper-resistant fasteners.

.11 All door, drawer and other exposed millwork edges shall have applied appropriately sized solid wood edging. Plastic laminate-to-plastic laminate edges are not permitted.

.12 Provide Baltic Birch veneer core plywood for all cores unless indicated otherwise.

.13 Minimum nominal thickness and material for cabinet components and shelf deflection, type of materials, thicknesses, span width and total load distribution: In accordance with AWMAC-NAAWS Standard Manual Section 10, current edition.

.14 Minimum nominal thickness and material for cabinet components and shelf deflection, type of materials, thicknesses, span width and total load distribution: In accordance with NAAWS Section 10.

2.2 MATERIALS

.1 Panel Products: Conform to AWMAC NAAWS Section 4.

.1 Baltic Birch Plywood: Unless otherwise specified, Provide Baltic birch plywood conforming to GOST 3916.1-96, minimum 19 mm 3/4" thick, at all locations, with the exception of doors and other vertical surfaces subject to delamination per AWMAC requirements.

.2 At doors and other vertical surfaces subject to delamination per AWMAC's requirements, provide Medium Density Fibreboard Core (MDF) manufactured from 100% recycled materials, without the use of added formaldehyde resins and with following characteristics:

.1 Minimum density: 770 kg/m3 (48 lb. /cu ft.)
.2 Surface characteristics: In accordance with ANSI/NPA A208.2
.3 Grade: Minimum 155.
.4 Acceptable Products:

.1 Medium Density Fibreboard Core (MDF):

.1 Decorative panels, “Medite II®“ by Sierra Pine Ltd; www.sierrapine.com or
.2 approved equivalent Products manufactured by Flakeboard Company Limited.; www.flakeboard.com,
.3 Uniboard Canada Inc.; www.uniboard.com; or
.4 Tafisa Canada and Company, Ltd.; www.tafisa.ca.

.3 Melamine Panels: Medium-density fiberboard (MDF) core finished with NEMA LD 3, Grade HGL/VGL, thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

.1 Basis-of-Design: “WF-229 Merit Maple” by Flakeboard Company Limited; www.flabkeboard.com or approved equivalent by one of the following:

.1 Uniboard Canada Inc.; www.uniboard.com;
.2 Tafisa Canada and Company, Ltd.; www.tafisa.ca;
.3 Panolam Industries International, Inc.; www.panolam.com

.2 Facings:

.1 Facing Adhesive: Adhesives shall be non-toxic, non-solvent glue to comply with AWMAC North American Architectural Woodwork Standards, as recommended by manufacturer, and containing no added urea-formaldehyde. Provide water-resistant adhesive for areas subject to moisture

.2 Plastic Laminates (PLAM):Provide following types and thicknesses of high pressure, paper based, decorative laminates (HPDL)conforming to ANSI/NEMA LD3 and ANSI/NEMA LD3.1 and NAAWS Section 4:

Type	Description	Nominal Thickness
HGS	Horizontal – General Purpose	1.2 mm (0.048)
VGS	Vertical – General Purpose	0.7 mm (0.028")
HGP	Horizontal – Post-forming	1.0 mm (0.039")
VGP	Vertical – Post-forming	0.7 mm (0.028")
BKH	Horizontal – Backer Sheet	1.2 mm (0.048”)
BKV	Vertical – Backer Sheet	0.7 mm (0.028”)

.1 Colours and Finishes:

.1 P.LAM-02: Basis-of-Design: “1850 – Luna White” by Wilsonart or approved equivalent by one of the following:

.1 Formica Inc.; www.formica.com
.2 Nevamar Company, LLC; www.nevamar.com
.3 Pionite by Panolam Surface Systems; www.panolam.com

.3 Fiberglass Reinforcement: fiberglass laminate boards “Brass™” by Norva Plasticsor approved equivalent by Armortex O.F. conforming to UL-752 ballistics (Level 1) requirements.

.1 Colours and Finishes: To be selected by Consultant at a later date from plastic laminate manufacturer’s full colour and pattern range.

.3 Millwork Glazing (SGL): Provide security glazing designed to withstand impact loads and forces without damage to the glazing conforming to the requirements of the New York Office of Mental Health Patient Safety Standards.

.1 Construction: Clear laminated glass with multiple plies of heat-strengthened glass as follows.

.1 4.0 mm heat-strengthened glass
.2 Interlayer type: 2.29 mm (0.090 inch) ionoplast interlayer (SentryGlas)
.3 4.0 mm heat-strengthened glass
.4 Nominal Unit Thickness: 10 mm (3/8 inch)

.4 Architectural Woodwork Hardware and Accessories: Provide hardware meeting or exceeding applicable ANSI/BHMA A156 Series (Grade 1) standards.

.1 Slides:

.1 Light Duty Drawer Slides – 610 mm (24”) wide or less, Capacity: 34.02 kg (75 lbs.):

.1 Side Mounted Telescoping Ball Bearing drawer slide, 3/4 extension (length as required to suit drawer size); Following products are acceptable: :

.1 Model No. Accuride – 2132 by Hafele; www.hafele.com
.2 Model No. KA 3432 – by Hettich; www.hettich.com
.3 Approved equivalent by Knape & Vogt; www.knapeandvogt.com

.2 Light Duty Drawer Slides – 610 mm (24”) wide or less, Capacity: 30 kg (66 lbs.):

.1 Under Mounted Telescoping Ball Bearing drawer slide, full extension (length as required to suit drawer size); Following products are acceptable: :

.1 "Model No. Tandem slide #560H Series" by Richelieu Hardware; www.richelieu.com
.2 Model No. Quadro V6 by Hettich; www.hettich.com
.3 Approved equivalent by Knape & Vogt; www.knapeandvogt.com or by Hafele; www.hafele.com

.3 Medium Duty Drawer Slides – 610 mm (24”) wide or less, Capacity: 40.82 kg (90 lbs.):

.1 Side Mounted Telescoping Ball Bearing drawer slide with full extension and 25 mm (1”) over travel (length as required to suit drawer size); Following products are acceptable: :

.1 Model No. Accuride – 3834 by Hafele; www.hafele.com
.2 Model No. 8455 by Knape & Vogt; www.knapeandvogt.com
.3 Model No. KA 5632/1” OT by Hettich; www.hettich.com

.4 Medium Duty Drawer Slides – more than 610 mm (24") wide, Capacity 45.36 kg (100 lbs.)

.1 Side Mounted Telescoping Ball Bearing drawer slide with full extension (length as required to suit drawer size); Following products are acceptable: :

.1 Model No. Accuride – 3832 by Hafele; www.hafele.com
.2 Model No. 1375 by Knape & Vogt; www.knapeandvogt.com
.3 Model No. KA 5632 by Hettich; www.hettich.com

.5 Heavy Duty Drawer Slides – more than 610 mm (24") wide, Capacity: 68.04 kg (150 lbs.)

.1 Side Mounted Telescoping Ball Bearing drawer slide with full extension and 25 mm (1") over travel (length as required to suit drawer size); Following products are acceptable:

.1 Model No. Accuride – 3640 by Hafele; www.hafele.com
.2 Model No. 8505 by Knape & Vogt; www.knapeandvogt.com
.3 Model No. KA 555 by Hettich; www.hettich.com

.2 Cabinet Door Hinges and Stays: Ensure cabinet hinge pin is not removable (tack weld or cap). Provide hinges complete with one-piece non-removable pin with tapered tips (Hospital Tips)

.1 Wood Door Hinges:

.1 Frameless Concealed Hinges (European Type): Self-closing concealed hinges with integrated soft close. Manufacturer's recommended number of hinges to suit door size and thickness.

.1 Opening angle: Minimum 160o, except Provide 110o at locations adjacent to walls to prevent wall damage.
.2 Acceptable Products: "Salice Concealed Hinges 200 and 300 Series" by Hafele; www.hafele.com or "Blum Concealed - Clip-Top Hinge" by Richelieu Hardware; www.richelieu.com or "Intermat 9943" or "Intermat 9956" by Hettich; www.hettich.com

.2 Piano Hinges (patient accessible areas) : Stainless steel; Provide hinges in manufacturer's recommended size and length to suit door size and thickness.

.1 "Model No. 351.10 series" by Hafele; www.hafele.com or approved equivalent. Finish: AISI No. 4, Satin Finish.

.2 Glass Door Hinges: *Provide* hinges as required to suit design. Calculate load capacity of hardware based on dimensions provided on Drawings. Following products are acceptable: :

.1 94º Screw-On Glass Door Hinge #75M43090" by Richelieu; complete with cam mounting plate "#173H710180" and cover cap "#844140140"
.2 95 º Screw-On Glass Door Hinge "Intermat 9904" by Hettich; www.hettich.com
.3 Doors up to 25 kg (55 lbs)

.1 Flush Mount Glass Door Hinge Model # D032033" by Richelieu or approved equivalent by Hafele; www.hafele.com.

.4 Doors up to 20 kg (45 lbs)

.1 Flush Mount Glass Swing Hinge Model # D032026" by Richelieu or approved equivalent by Hafele; www.hafele.com.

.3 Door and Drawer Locks: Provide locks for all of doors and drawers unless indicated otherwise. Provide locks per Owner's keying requirements unless otherwise indicated.

.1 Wood Framed Doors and Drawers:

.1 Cylinder Locks: Provide adjustable locking system with lock throw, orientation and size to suit cabinet size. Following products are acceptable: :

.1 "Cylinder Module System; Model No. 232 Series" by Hafele; www.hafele.com complete with cam locks or deadbolt locks and cores as required to suit applications indicated.

.2 "Disc Tumbler Furniture Locks - Removacore" by CompX National complete with cam locks or deadbolt locks and cores as required to suit applications indicated

.2 Hinged Glass Doors:

.1 "Square Cabinet Glass Door Lock - LK42" by CR Laurence or approved equivalent. Finish: to be selected at a later date.

.4 Handles (Ligature-Resistant):

.1 D-Pulls: Surface mounted pull handle complete with tamper-resistant security screws designed to prevent ligature attachment or wedging "KG62 Anti-Ligature Classicgrip Cabinet Pull Handle" by Kingsway Group USA or approved equivalent.

.5 Recessed Shelf Pilasters, Standards and Clips: Provide required accessories to mount wood or glass shelves. Following products are acceptable: :

.1 "KV255" pilaster and "KV256" adjustable clip supports by Knape & Vogt; www.knapeandvogt.com

.2 "120-10 Series" pilasters and "1903-2G" clip supports by Richelieu Hardware; www.richelieu.com Ltd

.6 Closet Coat Rods: "KV660" by Knape and Vogt Manufacturing Company, 27 mm (1-1/16") od stainless steel rod complete with "KV734 – Full Circle" polished chrome flanges. Size rods to suit closet widths.

.5 Fastenings:

.1 Include necessary fastenings, anchors and accessories required for fabrication and erection of work of this Section.

.2 Fastenings include non-exhaustively: anchor bolts, machine bolts, toggle bolts, male/female bolts, lag screws, expansion shields, sleeves, brackets, washers and nuts.

.3 Only Provide exposed fasteners, where approved and shown on reviewed Shop Drawings, of same texture, colour and finish as base material on which they occur unless otherwise shown or noted.

.4 Supply bolts complete with washers and nuts required for complete installation. Provide lock washers where vibration may loosen bolted fastenings.

.5 Ensure thread dimensions are such that nuts and bolts fit without rethreading or chasing threads.

2.3 COMPONENTS

.1 Provide premium grade quality for all architectural woodwork construction and finishing unless otherwise indicated.

.2 Plastic Laminate Casework and Frames Construction: Conforming to NAAWS Section 10 unless otherwise indicated.

.1 Casework Construction Type: Frameless construction with edge banded front edges

.2 Interface Style: Flush Overlay unless otherwise indicated.

.3 Exposed Surfaces Core, Semi-Exposed and Concealed Surfaces Core: Baltic Birch veneer core plywood unless indicated otherwise.

.1 Medium Density Fiberboard Core (MDF) is acceptable at doors and other surfaces subject to delamination per AWMAC requirements.

.4 Facings: per NAAWS Section 10,

.1 Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

.1 Horizontal Surfaces Other Than Tops: HGS
.2 Vertical Surfaces: VGS.
.3 Post formed Surfaces: Grade HGP.
.4 Edges: ABS edge banding matching laminate in colour, pattern, and finish.

.1 case bodies: minimum 0.5 mm (0.0197”) thick,
.2 doors, drawer fronts, and false fronts: minimum 3 mm (1/8”) thick.
.3 Acceptable Manufacturers: Richelieu Hardware or Wilsonart or approved equivalent.

.5 Plastic Laminate Finish: As specified in this Section.

.2 Semi-Exposed Surfaces:

.1 Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS or Melamine as specified in this Section

.1 Finish: As specified in this Section.

.2 Drawer Sides and Backs: High-pressure decorative laminate, Grade VGS. or Melamine as specified in this Section
.3 Drawer Bottoms: To match drawer sides.

.3 Concealed Surfaces Finish: BKV at vertical locations and BKH at horizontal locations; unless otherwise indicated or Melamine as specified in this Section

.3 Countertops and Backsplashes: Conforming to NAAWS Section 11 unless otherwise indicated.

.1 Cores: unless otherwise indicated, provide exterior grade veneer core plywood with non-telegraphing grain and Type II adhesive as specified herein.

.2 Plastic Laminate Countertops:

.1 Front Edge type: Self-edged
.2 Splash: As noted on Drawings.
.3 Laminate Material: Grade HGS

.1 Plastic Laminate Finish: To be selected from manufacturer’s full range at a later date.

.4 Backer Sheet: backer sheet, Grade BKV, on underside of countertop substrate.

.3 Solid Surface Countertops: Refer to Section 06 61 16.

.4 Stainless Steel Countertops: [Refer to Section 11 53 05]

.4 Glass and Glazing: Refer to Section 08 80 00.

2.4 FINISHES

.1 Factory Finishing: Defer only final touch up, cleaning, and polishing until after installation. Asfaras practical, ensure casework is factory finished unless otherwise indicated or unavoidable.

.2 Apply finishes in accordance with NAAWS Section 5.

.3 Field Touch-Up: Field touch-up is responsibility of installing trade. Architectural woodwork manufacturer is responsible for factory finishing. Field touch-up includes filling and touch-up of exposed job-made nail and screw holes, refinishing of raw surface resulting from job fitting, repair of job-inflicted scratches and mars and final cleaning up of finished surfaces.

2.5 FABRICATION

.1 Fabricated components not meeting AWMAC Architectural Woodwork Standards, as specified herein, shall be replaced, reworked and refinished to approval of AWMAC at no additional cost to Owner.

.2 Fabricate joints accurately fitted, coped where possible, and well glued up. Fabricate joints mitered to perfect fit and alignments carefully matched.

.3 Fabricate finished woodwork in 1 piece where possible. Fabricate running members in the longest lengths obtainable.

.4 Fabricate to conceal fastenings.

.5 Fabricate exposed gables to match the required exposed finishes.

.6 Set nails and countersink screws apply matching wood filler to indentations, sand smooth and leave ready to receive finish.

.7 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

.8 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.9 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

.10 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.11 Ensure adjacent parts of continuous facing work match in colour and pattern.

.12 Apply facings to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface.

3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.

.2 Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 PREPARATION

.1 Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

3.3 INSTALLATION

.1 Install Work of this Section in accordance with corresponding product section of the AWMAC NAAWS.

.2 Grade: Install woodwork to comply with requirements for grade specified herein for fabrication of type of woodwork involved.

.3 Assemble woodwork and complete fabrication at site to comply with requirements for fabrication specified herein.

.4 Install woodwork level, plumb, true, and straight to a tolerance of 3 mm in 2400 mm (1/8" in 8'-0").Shim as required with concealed shims.

.5 Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts. Mitre exposed corners and butt joints.

.6 Anchor woodwork to anchors or blocking built-in or directly attached to substrates to thoroughly fix and anchor Work of this Section into position. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated. Supply and install heavy duty fixture attachments for wall mounted cabinets.

.7 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.

.8 Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

.1 Install cabinets with no more than 3 mm in 2400 mm (1/8" in 8'-0") sag, bow, or other variation from a straight line

.2 Maintain sequence matching of cabinets for cabinet facings.

.3 Fasten wall cabinets through back, near top and bottom, at ends and not more than 400 mm (16") o.c. with toggle bolts through metal backing or metal framing behind wall finish.

.9 Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

.1 Install countertops with no more than 3 mm in 2400 mm (1/8" in 8'-0") sag, bow, or other variation from a straight line.

.2 Provide plastic laminate countertops plumb and true, neatly scribed to adjoining surfaces.

.3 Where backsplashes are not integral, secure backsplashes to tops with concealed metal brackets at 400 mm (16") o.c. and to walls with adhesive.

.4 At junction of countertop backsplashes and adjacent wall finish, apply bead of tamper-resistant sealant in accordance with requirements of Section 07 92 00.

.10 Installation of Architectural Woodwork Hardware:

.1 Install architectural woodwork hardware in accordance with AWMAC requirements and manufacturer's templates. Fit hardware accurately and securely in accordance with manufacturer's written instructions.

.2 Adjust architectural woodwork hardware to provide smooth operation and ensure clearances are maintained. Provide lubricants required and use in manner to ensure smooth function of hardware consistent with manufacturer's recommendations.

.11 Mechanical and Electrical Fittings:

.1 Provide openings required to accommodate mechanical and electrical fittings as part of the Work of this Section and Provide a core sealant to protect counter cores which are exposed.

.2 Locate and Install lenses where indicated. Carefully align lenses, shown in continuous lines so that appear as straight lines. Mount lenses perfectly level or plumb. Lenses shall fit tightly without showing space or light leak between frame and lenses.

.3 Mechanical and electrical fittings and services will be provided as part of the Work of 21, 22 23, 26, 27 and 28.

.12 Finishing:

.1 Prime unexposed surfaces including backs of fitments against walls and underside of fitments.

.2 Before priming, treat knots and sap streaks, with a coat of shellac and then prime with a wood primer.

.3 Shop finish natural finished wood surfaces.

.4 Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.4 ADJUSTING AND CLEANING

.1 Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork.

.2 Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

.3 Clean, lubricate, and adjust moving and operating parts to function smoothly and correctly.

.4 Fill and retouch nicks, chips and scratches. Replace unrepairable damaged items.

.5 Adjust joinery for uniform appearance.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* solid polymer fabrications including but not limited to following:

.1 window sills.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 *Shop Drawings*: Submit *Shop Drawings* in accordance with Division 01, indicating material characteristics, details of construction, connections and relationship with adjacent construction.

.1 Indicate plans, sections, dimensions, component sizes, edge details, thermosetting requirements, fabrication details, attachment provisions, sizes of furring, blocking including concealed blocking, and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacles and other items installed in solid polymer fabrications.

.2 Coordination *Drawings*: Submit coordination *Drawings* indicating plumbing and miscellaneous steel work indicating locations of wall (rated or non-rated), blocking requirements, recessed wall items and similar items.

.3 Field Measurements: Take field measurements prior to preparation of *Shop Drawings* and fabrication to ensure proper fitting of work. Do not fabricate work unless *Shop Drawings* have been reviewed.

.4 Samples: Submit minimum 150 mm x 150 mm (6" x 6") samples in accordance with Division 01. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of color and pattern variation.

1.5 MAINTENANCE MATERIALS SUBMITTALS

.1 Submit manufacturer's care and maintenance data, including repair and cleaning instructions. *Provide* commercial care and maintenance kit and video. Review maintenance procedures and warranty details with *Owner* upon completion. Include information in *Project* closeout documents.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Mock-ups:

.1 Prior to final approval of *Shop Drawings*, erect 1 full size Mock-up of each component at *Project* site demonstrating quality of materials and execution for *Consultant* review. Rework or remake rejected Mock-ups until approval is granted. Remove rejected units from *Project* site.

.2 Approved Mock-up will be used as standard for acceptance of subsequent work and may remain as part of finished work if undisturbed at time of Substantial Performance.

.3 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: Deliver no components to *Project* site until areas are ready for installation. Store components indoors prior to installation.

.2 Storage and Handling Requirements: Handle materials to prevent damage to finished surfaces. *Provide* protective coverings to prevent physical damage or staining following installation for duration of Project.

1.8 WARRANTY

.1 Warrant work of this Section for period of 10 years from Substantial Performance of the Work against defects and deficiencies in accordance with General Conditions of the *Contract.* Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of *Consultant* and at no expense to *Owner*.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Corian; www.corian.con

.2 Wilsonart Canada; www.wilsonart.com

.3 LG Hausys; www.lghausys.com

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Ensure materials used comply with requirements of ASTM E84, NFPA 255, UL 723 and CAN/ULC S102-M as follows:

.1 Flame Spread: <25
.2 Smoke Developed: <25

.2 Ensure materials used comply with use in food preparation zones and conform to requirements of NSF/ANSI 51 for following food zones: all food types.

.2 Solid Polymer Surfaces Design and Performance Requirements:

.1 *Provide* cast, nonporous, filled polymer fabrications, not coated, laminated or of composite construction with through body colours meeting referenced standards and having minimum physical and performance properties as specified herein.

.2 Ensure surfaces do not prevent use of electronic devices that function with optical or tactile sensors.

.3 Ensure superficial damage to a depth of 0.25 mm (0.010") is repairable by sanding and polishing.

.4 Mechanical and Structural Properties:

.1 Tensile Strength: 6000 psi min. per ASTM D638
.2 Tensile Modulus: 1.5 x 10-6 psi min. per ASTM D638
.3 Flexural Strength: 10000 psi min. per ASTM D790
.4 Flexural Modulus: 1.2 x 10-6 psi min. per ASTM D790
.5 Elongation: 0.4% min. per ASTM D638
.6 Hardness: >85-Rockwell "M" scale min. per ASTM D785; 56-Barcol Impresser min per ASTM D2583
.7 Thermal Expansion: 3.02 x 10-5 in/in/deg C. max. per ASTM D696 1.80 x 10-5 in/in/deg F. max.
.8 Color Stability: No change,100 hours min. per ANSI/NEMA LD3
.9 Gloss (60 Gardner): 5–75 (matte—highly polished) per ANSI Z124
.10 Light Resistance: (Xenon Arc) No effect, NEMA LD 3-2000 Method 3.3
.11 Wear and Cleanability: Passes per ANSI Z124.3 & ANSI Z124.6
.12 Abrasion Resistance: No loss of pattern max. per ANSI/NEMA LD3. Weight loss (1000cycles) =0.9g per ANSI Z124.3
.13 Boiling water Surface Resistance: No Change per NEMA LD3, Method 3.5
.14 High Temperature Resistance: No Change per NEMA LD3, Method 3.6

.15 Impact Resistance: Izod Impact (Notched Specimen): 0.28 ft.-lbs/in. Of notch per ASTM D256, Method A
.16 Gardner: 9.0 ft-lbs min per ASTM D5420
.17 Ball Impact Resistance Sheets:

.1 1/4" sheet: 36" min, 1/2 lb ball, no failure per NEMA LD3, Method 3.8
.2 1/2" sheet: 144" min, 1/2 lb ball, no failure per NEMA LD3, Method 3.8
.3 3/4" sheet: 200" min, 1/2 lb ball, no failure per NEMA LD3, Method 3.8

.18 Stain Resistance: Passes per ANSI Z124.3
.19 Weatherability: E^*_{94}<5 in 1,000 hrs 1000 hours per ASTM D1499
.20 Fungi and Bacteria Resistance: Does not support microbial growth per STM G21 & GREENGUARD, Microbial Resistance Program
.21 Specific Gravity: 1.7 min
.22 Water Absorption Weight (% max.) Long Term (per ASTM D570): 0.4% (3/4"), 0.6% (1/2"), 0.8% (1/4")
.23 Gloss Level: Matte or Semi-gloss.

2.3 MATERIALS

.1 Solid Polymer Fabrications: Homogeneous sheets composed of minimum 30% acrylic resin (Polymethyl Methacrylate) and +/- 70% blend of natural minerals meeting ANSI Z124.3 &.6, Type 4 and Fed. Spec. WW-P-541E/GEN. Solid polymer fabrications containing blends with polyester-based materials are not acceptable. Ensure material has minimum physical and performance properties as specified herein. *Provide* solid polymer fabrications complete with following materials as recommended by *Product* manufacturer:

.1 Joint Adhesive: Manufacturer's standard 2-part adhesive kit to create inconspicuous, non-porous joints, with a chemical bond.

.2 Panel Adhesive for Tub and Shower Systems: Manufacturer's recommended standard neoprene-based panel adhesive meeting ANSI A136.1. UL® listed, Greenguard Certified.

.3 Adhesive for Bonding to Other *Products*: One component silicone as recommended by *Product* manufacturer conforming to ASTM C920.

.4 Sealant: Manufacturer's standard mildew-resistant, FDA/UL® and NSF/ANSI 51 compliant, recognized silicone sealant in color matching components or clear formulations.

.5 Sink/Bowl Mounting Hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls, where applicable.

.6 Conductive Tape: Manufacturer’s standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.

.7 Insulating Felt Tape: Manufacturer’s standard for use with conductive tape in insulating solid polymer material from adjacent heat source.

.2 Solid Polymer Fabrication Cores and Supports: *Provide* structurally adequate, continuous perimeter support frames manufactured from exterior grade softwood plywood to , CSA O121-M to ensure flatness and levelness of solid polymer fabrications. Ensure materials are capable of providing support to inside corners and across spans. Following substrates are acceptable

2.4 COMPONENTS

.1 Window Sills (SPS): Surfaces of material adhesively joined with inconspicuous seams and edge details as indicated on *Drawings*.

.1 Vertical Thickness: Minimum 12 mm (1/2”) thick.

.2 Horizontal Thickness: Minimum 12 mm (1/2”) thick.

.3 Edge Details: Waterfall.

.4 Colour: To be selected by Consultant at a later date from manufacturer’s full colour range of Price Group 1.

.5 Finish: Satin or Matte as selected by consultant at a later date.

2.5 FABRICATION

.1 Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved *Shop Drawings* and solid polymer manufacturer requirements. Form joints between components using manufacturer’s standard joint adhesive without conspicuous joints. Reinforce with strip of solid polymer material 50 mm (2") wide. *Provide* factory cutouts for plumbing fittings and bath accessories as indicated on *Drawings*.

.2 Thermoform corners and edges to shapes and sizes indicated on *Drawings*, prior to seaming and joining. Front faces shall have micro bevel edges. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.

.3 Ensure no blistering, whitening and cracking of components during forming.

.4 Form backsplashes from solid surfacing material with radius cove where counter and backsplashes meet as indicated on *Drawings*.

.5 Form joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 100 mm (4") wide reinforcing strip of solid polymer material under each joint.

.6 *Provide* holes and cutouts for plumbing and bath accessories as indicated on *Drawings*.

.7 Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate Work.

.8 Finish: *Provide* surfaces with uniform finish:

.1 Matte: gloss rating of 5 - 20.

.2 Semi-gloss: gloss rating of 25 - 50.

.3 Polished: gloss rating of 55 - 80.

.9 Allowable Tolerances:

.1 Variation in Component Size: ± 3 mm (1/8").

.2 Location of Openings: ± 3 mm (1/8") from indicated location.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

.3 Examine cabinets upon which countertops are to be installed. Verify cabinets are level to within 3 mm in 3 m (1/8" in 10' - 0").

.4 Notify *Consultant* in writing of any conditions which would be detrimental to installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 *Install* components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed *Shop Drawings* and *Product* installation details.

.2 Form field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished Work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints with solid polymer strips extending a minimum of 25 mm (1") on either side of seam with strip being same thickness as top. Cut and finish component edges with clean, sharp returns.

.3 Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer’s written recommendations using adhesive in color to match Work. Carefully dress joints smooth, remove surface scratches and clean entire surface.

.4 *Install* countertops with no more than 3 mm (1/8") sag, bow or other variation from a straight line.

.5 Mount sinks/bowls to countertops using manufacturer's recommended adhesive, mounting hardware or color-matched silicone sealant as applicable. Secure seam mounted bowls and sinks to countertops using colour matched joint adhesive.

.6 Seal joints between wall and components with tamper-resistant joint sealant as specified herein and in Section 07 92 00, as applicable.

.7 *Provide* backsplashes and end-splashes as indicated on *Drawings*. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed *Shop Drawings*. Where indicated, *Provide* CNC-cut rebates for coved backsplashes and side-splashes at walls and adjacent millwork. Do not attach backsplashes and side splashes to countertops with sealants unless specifically noted herein.

.8 Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed *Shop Drawings*. Adhere to countertops using manufacturer’s standard color-matched joint adhesive.

.9 Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean and free of defects at Substantial Performance of *The Work*.

.10 Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean and free of defects at Substantial Performance of *The Work*.

.11 Coordinate connections of plumbing fixtures with Division 22 and ensure fittings and accessories are provided by Division 22.

3.3 ADJUSTING AND CLEANING

.1 Replace damaged Work which cannot be repaired to *Consultant*'s satisfaction. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's instructions.

.2 Clean surfaces in accordance with manufacturer's care and maintenance instructions.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* general installations including but not limited to following:

.1 installation of pressed steel frames.

.2 installation of hollow metal doors.

.3 installation of flush wood core doors.

.4 continuous grouting of fire rated frames in concrete and concrete masonry walls.

.5 spot grouting of door frames in gypsum board partitions.

.6 installation of finish hardware.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Operational and Functional Component (OFC): Components within building which are directly associated with the function and operation of the facility. OFCs consist of architectural components, building services components, and building contents. Items specified herein may be designated as OFCs and may need to be designed in accordance with performance requirements specified herein and in Section 13 48 50.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 In particular address the following items:

.1 electrical roughing in and other preparatory work performed by other trades.
.2 sequence of operation of each type of electrified door hardware.
.3 construction schedule and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
.4 concealed wiring required by the design; exposed wiring shall not be acceptable.
.5 extension of struts to meet design requirements.
.6 required testing, inspecting and certifying procedures.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01.

.2 Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Inspection Reports: After installation of fire-rated assemblies, submit inspection reports from an approved independent inspection and testing agency specified in this Section, certifying fire-rated assemblies comply with requirements of authorities having jurisdiction and applicable standards specified.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

2 - PRODUCTS

2.1 DESCRIPTION

.1 Regulatory Requirements:

.1 Ensure fire rated doors and frames are listed and labeled for ratings specified and noted by organization accredited by the Standard Council of Canada in conformance with CAN4-S104 and CAN4-S105, NFPA 80 and NFPA 252.

.2 Ensure doors and frames are labeled at manufacturing plant by means of metal tags or embossing. Site applied and stamped fire-labelling is not acceptable.

.2 Design and Performance Requirements:

.1 Seismic Performance:

.1 Design and Install work of this Section to withstand seismic motions determined in accordance with requirements of National Building Code of Canada and CAN/CSA S832
.2 Ensure adequate anchorages are provided to avoid failure due to buckling.
.3 Ensure exit doors and frames are provided with isolation to avoid jamming due to drifting.

.4 For changes to existing buildings, review existing connections, structural integrity to ensure safe resistance of seismic and other load effects.

.1 Refer to Appendix A of NRCC “Guidelines for Seismic Evaluation of Existing Buildings” for additional information.

2.2 MATERIALS

.1 Doors, Frames and Hardware: Refer to following Sections for *Product*s to be installed as part of the work of this Section:

.1 Section 08 11 13, Steel Doors and Frames.

.2 Section 08 14 16, Flush Wood Doors.

.2 Spot Grout (Metal Stud Partitions): High density setting-type taping, low shrinkage type compound.

.1 Acceptable Products:

.1 “Durabond 90 Compound” by CGC Inc.,
.2 “High Density 90 - ProRoc” by CertainTeed Canada Inc
.3 Comparable *Products* from manufacturers listed herein will be considered provided they meet the requirements of this Specification, offering functionally, aesthetically equivalent products in Consultant’s opinion and subject to Consultant’s review.

.3 Continuous Grout (Masonry Partitions): Non-shrink, non-metallic, cementitious grout, containing no chlorides, conforming to ASTM C1107 for Grade C type grouts;

.1 Acceptable *Products*:

.1 “Sika Grout 212" by Sika Canada Inc.,
.2 “CG-86 Construction Grout” by W.R. Meadows of Canada Ltd.,
.3 Comparable *Products* from manufacturers listed herein will be considered provided they meet the requirements of this Specification, offering functionally, aesthetically equivalent products in Consultant’s opinion and subject to Consultant’s review.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Examine roughing-in, electrical power systems for embedded and built-in anchors to verify actual locations before frame installation.

.3 Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

.4 Proceed with installation only after unsatisfactory conditions have been corrected.

.5 Notify Consultant in writing of any conditions which would be detrimental to the installation work of this Section. Commencement of work constitutes Contractor’s acceptance of previously completed work.

3.2 PREPARATION

.1 Hollow Metal Doors and Frames:

.1 Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

.2 Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

.1 Squareness: +/- 1.6 mm (1/16”), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
.2 Alignment: +/- 1.6 mm (1/16”) measured at jambs on a horizontal line parallel to plane of wall.
.3 Twist: +/- 1.6 mm (1/16”), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
.4 Plumbness: +/- 1.6 mm (1/16”), measured at jambs on a perpendicular line from head to floor.

.3 Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 GENERAL INSTALLATION REQUIREMENTS

.1 Install work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

.2 Fire-rated Doors and Frames:

.1 Install fire-rated labeled doors and frames in accordance with manufacturer's printed instructions and NFPA 80.

.2 Verify labeled doors and frames are placed in their designated openings. Review, inspect and certify where required by authorities having jurisdiction.

3.4 INSTALLATION OF HOLLOW METAL FRAMES

.1 Install hollow metal frames of size and profile indicated. Comply with HMMA 840 and manufacturer's instructions.

.2 Brace frames rigidly in position while being built in. *Provide* vertical supports and horizontal spreaders to prevent deflection and warping.

.3 Allow for deflection to prevent structural loads from being transmitted to frame.

.4 *Provide* batt insulation to completely fill pressed steel frames of exterior doors and adjacent cavities.

.5 Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

.1 At fire-protection-rated openings, install frames according to NFPA 80.

.2 Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

.3 Install frames with removable glazing stops located on secure side of opening.

.4 Install door silencers in frames before grouting.

.5 Remove temporary braces necessary for installation only after frames have been properly set and secured.

.6 Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

.7 Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

.6 Secure anchorages and connections to adjacent construction:

.1 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.

.2 Provide two anchors for rebate opening heights up to and including 1500 mm (5') and one additional anchor for each additional 760 mm (30") of height or fraction thereof, unless otherwise indicated in Contract Documents.

.3 Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

.7 Metal-Stud Partitions

.1 New construction:

.1 Solidly pack mineral-fiber insulation behind frames.
.2 Anchorages:

.1 Provide frame Products installed in steel stud and drywall partitions with 20 ga. steel snap-in or "Z" stud type anchors.
.2 Supply frame anchors to gypsum board installers with directions for installing steel door frames in gypsum board partitions.
.3 Locate anchor preparations and guides immediately above or below intermediate hinge reinforcing and directly opposite on strike jamb. Provide each preparation with 16 ga. anchor bolt guides.
.4 Provide anchor bolts and expansion shell anchors for above preparations by the Subcontractor responsible for installation.

.3 Spot Grout: Coordinate installation of frames with Section 09 21 16 to allow for spot grouting of frames.

.1 *Provide* spot grout to increase rigidity of frame and improve resistance to frame rotation caused by weight of door.
.2 Comply with manufacturer’s recommendations for surface preparation, cleaning, forming, mixing, placement and curing of grout.
.3 Proportion spot grout as follows: 1 part hardwall plaster to not more than 2-1/2 parts Perlite by weight, with enough water added for `hand pack' consistency and use.
.4 *Provide* spot grout at strike and hinge side jambs of frames set in gypsum board partitions. Do not use pumped slurry method to perform spot grouting.
.5 *Provide* spot grout at strike jambs after studs are installed but before gypsum boards are erected.
.6 After grouting is applied, immediately insert gypsum panels into jamb and attach to framing. Do not terminate gypsum board against trim.

.2 In-Place Gypsum Board Partitions: Secure frames in place with post installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

.8 Masonry and Concrete Walls:

.1 Masonry (New construction):

.1 Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

.2 Provide frame Products for installation in new masonry walls with steel adjustable wall anchors of T-strap, stirrup or wire. Wire Gauge: 16 gauge minimum or 0.156" diameter wire. Provide corrugated or perforated straps not less than 50mm (2") x 254mm (10") in size.

.2 Concrete Walls (New construction): Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.

.3 In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

.1 For frames in previously placed concrete, masonry or structural steel; Provide anchors located not more than 150 mm (6") from top and bottom of each jamb and intermediate anchors at 660 mm (26") oc maximum.

.2 Punch and dimple jambs of frames in previously placed concrete, masonry or structural steel to accept machine bolt anchors, 6.4mm (0.25") diameter, located not more than 150mm (6") from the top and bottom of each jamb.]

.9 Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

.1 Provide channel extensions from top of frame assembly to underside of structure above on sidelights or windows exceeding 3m (9'-10") in width when installed in stud partitions. Fabricate extensions from 2.66 mm (12 ga) steel formed channels, mounting angles and adjusting brackets, with mounting angles welded to inside of frame head. Deliver loose formed adjusting brackets and fasteners. Connect channels mechanically to mounting angles and adjusting brackets with supplied fasteners, on Site, by the Subcontractor responsible for installation.

3.5 INSTALLATION OF HOLLOW METAL DOORS

.1 Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

.1 Non-Fire-Rated Standard Steel Doors:

.1 Jambs and Head: 3 mm (1/8”).

.2 Between Edges of Pairs of Doors: 3 mm (1/8).

.3 Door Bottom:

.1 maximum 19 mm (3/4") to unfinished floor

.2 maximum 16 mm (5/8") to finished floor unless indicated to be undercut.

.2 Fire-Rated Doors: Install doors with clearances according to NFPA 80. *Provide* maximum 6 mm (1/4") at door bottom and not more than 3 mm (1/8") at sides and top.

.3 Glazing: Comply with installation requirements in Section 08 80 00 and with hollow metal manufacturer's written instructions.

.1 Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 230 mm (9”) o.c. and not more than 50 mm (2”) o.c. from each corner.

3.6 INSTALLTION OF FLUSH WOOD CORE DOORS

.1 Install doors to comply with manufacturer's written instructions and as indicated.

.2 Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

.3 Cut, drill and prepare doors to template to receive hardware.

.4 Drill pilot holes before installing hinges. Check and verify with screw manufacturers’ recommendations for size of pilot holes required.

.5 Clearances: Install in accordance with following clearances unless otherwise indicated:

.1 Between doors and frames at head and jambs: 3 mm (1/8") maximum.

.2 Between meeting edges of pairs of doors: 3 mm (1/8") maximum.

.3 At door bottom:

.1 Non rated doors: 19 mm (3/4") maximum to unfinished floor, 16 mm (5/8") maximum to finished floor unless indicated to be undercut;
.2 Fire-Rated Doors: Install doors with clearances according to NFPA 80. Provide maximum 6 mm (1/4") and not more than 3 mm (1/8") at the sides and top.

.4 Bevel:

.1 Bevel non-fire-rated doors 3 mm in 50 mm (1/8” in 2”) at lock and hinge edges.
.2 Bevel fire-rated doors 3 mm in 50 mm (1/8” in 2”) at lock edge; trim stiles and rails only to extent permitted by labeling agency.

.5 Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.7 FINISH HARDWARE

.1 *Install* hardware to doors and frames in accordance with manufacturer's packaged installation, template, and adjusting instructions.

.2 Preparation:

.1 Steel Doors and Frames: Comply with DHI A115 Series.

.2 Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.

.3 Wood Doors: Comply with DHI A115-W Series.

.3 Adjust hardware to *Provide* smooth operation of doors and ensure clearances are maintained. *Provide* lubricants to allow smooth function of hardware consistent with manufacturer's recommendations.

.4 Tighten fastening components snugly. Do not burr or otherwise mar the edges of surfaces of hardware components. Repair defects resulting from work of this Section in accordance with *Consultant*'s review.

.5 Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

.1 Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

.2 Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

.6 Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

.7 Boxed Power Supplies: Locate power supplies as indicated. Verify location with Consultant.

.1 Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

.8 Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant to prevent water and air intrusion beneath the sill and to comply with requirements specified in Section 07 92 00.

.9 Mounting Heights:

.1 Mount door hardware units at heights indicated as follows unless otherwise indicated on Drawings or required to comply with governing regulations and requirements of authorities having jurisdictions.

.1 Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
.2 Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

3.8 FIELD QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Retain the services of an accredited testing and inspection company acceptable to Consultant and authorities having jurisdiction to perform field service review of installation of fire-rated assemblies for proper compliance with NFPA and Building Code requirements.

.2 *Owner* reserves the right to inspect at random, edge finishing of field-cut flush wood core doors.

.3 Non-Conforming Work: Replace damaged work and/or non-conforming work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of *Consultant* at no cost to *Owner*.

.2 Hardware:

.1 Provide services of Architectural Hardware Consultant (AHC) familiar with type of work being performed for preparation of hardware Shop Drawings (schedule), keying, coordination with other trades, consultation with Owner and Consultant and for performing on-site inspections

.1 AHC will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

.2 Verify hardware listed in Schedule is of proper selection for its apparent function and required fire rating or submit alternative proposals.

.3 Ensure hardware for fire-rated openings complies with requirements of authorities having jurisdiction, with door and frame manufacturer's tested and labeled assemblies and that hardware items bear certification labels.

.4 Ensure hardware for fire rated door and frame assemblies conforms to CAN/ULC S104-M, CAN/ULC S105-M and NFPA 80. Ensure electronic hardware such as magnetic locks, power supplies, key switches and alarm panic bolts is ULC labeled.

.5 Ensure hardware for doors in fire separations and exit doors are certified by a Canadian Certification Organization accredited by Standards Council of Canada.

.6 Ensure mortise locks, exit devices and door closers conform to both BMHA certified ANSI A156 Series Grade I classifications, conform to National Building Code of Canada, CAN/CSA B651, requirements and to ADA (American Disabilities Act) standards.

.7 Inspect to verify hardware has been properly installed and is functioning satisfactorily.

.8 Recommend adjustments.

.9 Replace defective hardware.

.10 Check door closers after installation to ensure adjustment such as backchecking degree has been properly made and if not, make such adjustments or instruct those installing hardware to make these adjustments.

.3 Installation Tolerances (Hollow Metal Frames): Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

.1 Squareness: +/- 1.6 mm (1/16”), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

.2 Alignment: +/- 1.6 mm (1/16”), measured at jambs on a horizontal line parallel to plane of wall.

.3 Twist: +/- 1.6 mm (1/16”), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

.4 Plumbness: +/- 1.6 mm (1/16”), measured at jambs at floor.

3.9 ADJUSTING AND CLEANING

.1 Check and readjust operating hardware items immediately before final inspection, leaving doors and frames undamaged and in proper operating condition. Remove and replace defective work, including doors and frames that are warped, bowed, or otherwise unacceptable.

.2 Hardware:

.1 Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

.3 Clean grout and other bonding material off detention doors and frames immediately after installation. Carefully wipe clean doors of dust created due to work of this Project.

.4 Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

.5 Touch-ups:

.1 Immediately after erection clean and repair surfaces in accordance with manufacturer's written instructions

.2 Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

.3 Touch up damaged finishes with compatible coating after sanding smooth.

3.10 DEMONSTRATION

.1 Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01.

END OF SECTION

1 General

1.1 DESCRIPTION

.1 This section specifies the requirements for the supply and installation of the elements required for waterproofing below grade structures.
.2 Waterproofing system: Self-adhesive SBS modified bitumen membrane.

1.2 RELATED SECTIONS

.1 Section 07 92 00- Joint Sealants.

1.3 SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit two (2) copies of the most current technical data sheets. These documents must describe the physical properties of the material.

1.4 QUALITY ASSURANCE

.1 Manufacturer Qualifications:
  .1 The manufacturer of elastomeric bitumen products will provide proof of ISO 9001 and ISO 14001 certifications.
.2 Contractor Qualifications:
  .1 Waterproofing work shall be performed only by skilled applicators, employed by an installation contractor operating all adequate and necessary equipment to execute such work in accordance with the manufacturer's recommendations and recognized standards.
.3 Manufacturer's Representative
  .1 The waterproofing materials manufacturer may delegate a representative to visit the work site at commencement of work.
  .2 At all times, the contractor shall permit and facilitate access to the site by the manufacturer's representative cited above.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
.2 Store materials in accordance with manufacturer's written instructions.
.3 Rolls of materials should be handled with care and proper equipment.
.4 Rolls of materials shall be carefully stored and adequately protected in accordance with the manufacturer's recommendations.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

1.7 WARRANTY

.1 The product manufacturer shall issue a written and signed document in the name of the owner, certifying the product will meet all the physical characteristic published by the manufacturer, for a period of five (5) years, starting from the date of completion of installation of membranes. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.

2 Products

2.1 WATERPROOFING MEMBRANE

.1 Description: A self-adhesive waterproofing membrane composed of SBS modified bitumen and a Tri-Laminate Woven Polyethylene facer. The self-adhesive side is covered by a silicone release sheet.

.2 Characteristics:

.1 Thickness: 1.5 mm

.2 Roll Size: Width: 1 m / Length: 18.7 m

.3 Strain energy (kN/m): (MD) = 3.1 (XD) = 1.7

.4 Ultimate elongation (%): (MD) =40 (XD) =25

.5 Static puncture resistance (N): 400

.6 Tear resistance (N): (MD) = 375 (XD) = 400

.7 Tensile strength (kN/m): (MD) = 11.3 (XD) = 15.4

.3 Acceptable material:

.1 COLPHENE 3000 by Soprema.

2.2 PRIMER FOR SELF-ADHESIVE MEMBRANES

.1 Description: Primer composed of SBS synthetic rubber, adhesive resins and volatile solvents. Used as primer to improve the adhesion of self-adhesive membranes.

.2 Acceptable Material:

.1 Elastocol Stick by Soprema

2.3 ACCESSORIES

.1 Waterproofing Mastic

.1 Description: A black, solvent-based mastic containing SBS modified bitumen, fibres and mineral fillers.

.2 Acceptable material:

.1 SOPRAMASTIC by Soprema

.2 Protection / Insulation Board:

.1 Refer to Section 07 21 13 - Board Insulation.

3 Execution

3.1 EXAMINATION AND PREPARATION OF SURFACES

.1 Surface examination and preparation must be completed in conformance with manufacturer's recommendations.

.2 Before waterproofing work begins, the Owner's Representative and the membrane Contractor's Foreman will inspect and approve substrate condition and ensure that related work has been properly executed. If necessary, a non-conformity notice will be issued to the Contractor so that required corrections can be made. The start of the membrane application will mean that substrate conditions are acceptable for work completion.

.3 Before commencing work, all surfaces must be smooth, dry, clean and free of ice and debris as per manufacturer's recommendations.

.4 No materials will be installed during rain or snowfall.

.5 Concrete must be cured a minimum of fourteen (14) days and an adhesion test is recommended before membrane application.

.6 Verify the compatibility of all membrane components with curing compounds, coatings or other materials which are already installed on the surfaces to be treated.

.7 Any cracks over 3 mm wide should be reported to the design professional. After approval from the qualified authority, the crack should be filled in with waterproofing mastic. A 150 mm (6 inches) wide strip of membrane should be installed, centered over the crack.

3.2 METHOD OF EXECUTION

.1 Work shall be performed on a continuous basis as surface and weather conditions allow.
.2 Adjoining surfaces shall be protected against any damage that could result from the waterproofing installation.

3.3 EQUIPMENT

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

3.4 PRIMER APPLICATION

.1 Surface where membrane is applied shall receive an SBS synthetic rubber primer coating at the rate of: (porous surfaces: 0.3 to 0.5 L/m2, non-porous surfaces: 0.1 to 0.25 L/m2). . If not covered the same day, primed surfaces must be re-primed.

3.5 WATERPROOFING MEMBRANE INSTALLATION

.1 Select the proper product according to temperatures during application. For membrane applications at temperatures below 10º C, contact your local Soprema representative.
.2 All small protrusions (pipes, etc.) through the waterproofing membrane, should be pre-stripped with a membrane and sealed with waterproofing mastic.
.3 To begin application, align the first roll of membrane to a previously drawn chalk line.
.4 All edges must be pre-stripped with a 150 mm (6 in.) wide strip of membrane centered on the corner. This membrane must be installed in direct contact with the substrate not leaving any voids under the membrane strip.
.5 Install the membrane onto the primed surface by peeling back the paper backing on the underside and adhering the membrane to the surface.
.6 Subsequent rolls must be installed in the same manner and should be aligned with the preceding roll with a side lap of at least 75 mm. End laps must be overlapped at least 150 mm.
.7 Holes and tears in the membrane must be repaired with the appropriate membrane material. The repair must exceed the affected surface area by at least 75 mm. The membrane piece applied for the repair must be sealed around its edges with mastic.
.8 Use a roller approved by manufacturer to apply pressure over the entire surface of the membrane to ensure perfect adhesion.
.9 The Contractor shall verify meticulously the membrane installation at the end of each day of work and before backfilling.
.10 All inside corner overlaps should be sealed with a bead of mastic after membrane installation.
.11 The uppermost edge of the membrane is to be mechanically fastened to the concrete substrate using applicable fasteners and termination bars.
.12 Apply mastic on the top edge of membrane to prevent water infiltration.
.13 Any waterproofing membrane left exposed after backfilling shall be protected from ultra violet and mechanical damages.

3.6 INSULATION INSTALLATION- PERIMETER FOUNDATION

.1 Install the panels vertically or horizontally on the foundation wall so as to minimize the number of joints.
.2 Place the panels by offsetting vertical joints and abut the panels to each other perfectly to ensure continuous thermal insulation.
.3 Cut and adjust the insulating panels around pipes, electrical and mechanical elements, openings and any other penetrations.
.4 Stop the insulation at least 75 mm (3") around devices that emit heat.

.5 When another layer of insulation is required, it must be installed with staggered vertical and horizontal joints.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00 - Cast-in-Place Concrete.
.2 Section 06 10 00 - Rough Carpentry.
.3 Section 07 21 16 - Blanket Insulation.
.4 Section 07 26 00 - Vapor Retarders.
.5 Section 07 46 19 - Steel Siding.
.6 Section 07 52 00 - Modified Bituminous Membrane Roofing.
.7 Section 09 21 16 - Gypsum Board Assemblies.
.8 Section 09 22 16 - Non-Structural Metal Framing.
.9 Section 31 23 00 - Excavation and Fill.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
  .1 ASTM E96-00e1, Test Methods for Water Vapor Transmission of Materials.
  .2 ASTM C208-95(R2001), Specification for Cellulosic Fiber Insulating Board.
  .3 ASTM C591-01, Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
  .4 ASTM C612-00a, Specification for Mineral Fiber Block and Board Thermal Insulation.
  .5 ASTM C165 (2012), Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
  .6 ASTM C665 (2011), Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  .7 ASTM C728-97e1, Specification for Perlite Thermal Insulation Board.
  .8 ASTM C1126-00, Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.
  .9 ASTM C1289-02, Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
  .10 ASTM C1338 (2008), Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
.2 Canadian General Standards Board (CGSB).
  .1 CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation.
.3 Underwriters Laboratories of Canada (ULC).
  .1 CAN/ULC-S102 (2010), Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  .2 CAN/ULC-S604-91, Type A Chimneys.
  .3 CAN/ULC-S701-01, Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
  .4 CAN/ULC-S702 (2012), Standard for Thermal Insulation Mineral Fibre for Buildings.
  .5 CAN/ULC-S704-01, Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.3 QUALITY ASSURANCE

.1 Pre-Installation Meetings: attend pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 ROOF INSULATION & TAPERED ROOF INSULATION

.1 Rigid Cellular Poly-isocyanurate, to thickness indicated.
- .1 Faced: to ASTM C 1289-98, glass fiber reinforced polyisocyanurate core, surfaced with glass fiber faces. Minimum two layers with joints staggered.

.2 Tapered insulation minimum 1% slope to drains.
.3 Insulation at roof drains is to be a minimum of R30 at square sump at roof drains.
.4 Thermal Resistance: R Value per inch = 6.0.
.5 Acceptable Material:
- .1 IKO Therm Poly-Isocyanurate Insulation.
- .2 Soprema, Sopra-Iso.

2.2 WALL RIGID INSULATION

.1 Board insulation for exterior cavity wall: to thickness indicated.
- .1 Fire Performance:
  - .1 Non-combustibility: To CAN/ULC S114.
  - .2 Maximum use temperature: 650 degree C.
  - .3 Surface burning characteristics: To CAN/ULC S102.
    - .1 Flame spread: 0.
    - .2 Smoke developed: 0.

.2 Thermal Resistance: (R-5.7) per 25mm / 1 inch
.3 Water vapour permeance: 1555 ng/Pa.s.m2 minimum.
.4 Moisture sorption: 0.03% by volume to ASTM C1104.
.5 Fungi resistance: Zero mould growth to ASTM C1338.
.6 Acoustical performance sound absorption co-efficients to ASTM C423.
.7 Compressive strength: 110 kpa / 16 psi
.8 Acceptable Material:
- .1 Rockwook, Cavityrock.

2.3 CONCRETE FACED FOUNDATION INSULATION

.1 50mm thick insulation, extruded polystyrene.
.2 Latex modified concrete surface, 8mm thick factory bonded to insulation.
.3 Tongue and groove along longitudinal foam edges.
.4 Butt joint lateral edges.
.5 Galvanized steel wall attachments with corrosion proof masonry fasteners.
.6 Install from underside of wall cladding / siding and extend minimum 300mm / 12" below grade.
.7 Acceptable Material:
- .1 Tech-Crete Processors Ltd.
- .2 WallGuard by T. Clear Corporation.

2.4 FOUNDATION WALLS AND CONCRETE SLABS ON GRADE

.1 Extruded polystyrene to CAN/ULC S701-97, Type IV, ship lapped, to thickness indicated.
.2 Minimum compressive strength: 210 kPA (30 psi).
.3 Thermal Resistance: R Value per inch = 5.0.
.4 Compressive Strength: 30 PSI min.
.5 Acceptable Material:
- .1 Celfort Celfortec-300

.2 Dow Styrofoam SM.
.3 Dow Styrofoam High Load 60.
.4 Sopra-XPS 30 by Soprema.

2.5 ADHESIVE

.1 Synthetic rubber base insulated Type A adhesive having a moisture permeability of 1.71 ng/Pa.s.m2.
.2 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

2.6 ACCESSORIES

.1 Mechanical fasteners in accordance with insulation manufacturer's written recommendations.
.2 Insulation clips: in accordance with manufacturer's written recommendations.
.3 Foundation sealing compound: Bitumen sealing compound.
.4 Adhesive: All purpose construction adhesive in accordance with insulation manufacturer's written recommendations.

3 Execution

3.1 EXAMINATION

.1 Examine substrates and immediately inform Consultant in writing of defects.
.2 Prior to commencement of work ensure: substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.
.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys.
.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
.6 Offset both vertical and horizontal joints in multiple layer applications.
.7 Do not enclose insulation until it has been inspected and approved by Consultant.

3.4 RIGID INSULATION INSTALLATION

.1 Apply adhesive in accordance with manufacturer's recommendations.
.2 Embed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.
.3 In addition to adhesive, install insulation boards with insulation clips and disk, per manufacturer requirements.
.4 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.

3.5 UNDERSLAB AND PERIMETER FOUNDATION INSULATION

.1 Under horizontal slab application: extend boards to the dimension indicated on the drawings. Lay boards on level compacted fill.

.2 Exterior vertical application: extend boards on exterior face of perimeter foundation wall with adhesive to the dimension indicated on the drawings.

3.6 WALL INSTALLATION

.1 Install insulation boards on outer surface of wall sheathing / membrane.

3.7 ROOF INSTALLATION

.1 Install to depths indicated on drawings. See Section 07 52 00 - Modified Bitumen Membrane Roofing.

3.8 CLEANING

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

END OF SECTION

1 General

1.1 WORK INCLUDED

.1 Provide and install all thermal and sound insulation and accessories on the interior of the building between the steel studs and as indicated above ceiling necessary to complete all as shown on the drawings or specified.

1.2 RELATED REQUIREMENTS

.1 Section 06 10 00 - Rough Carpentry.
.2 Section 07 21 13 - Board Insulation.
.3 Section 07 26 00 - Vapor Retarders.
.4 Section 07 46 19 - Steel Siding
.5 Section 09 22 16 - Non-Structural Metal Framing

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
  .1 ASTM C167, Standard Test Method for Thickness and Density of Blanket or Batt Thermal Insulations.
  .2 ASTM C356, Standard Test Method for Linear Shrinkage of Performed High-Temperature Thermal Insulation Subjected to Soaking Heat.
  .3 ASTM C423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  .4 ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  .5 ASTM C553-02, Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
  .6 ASTM C665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  .7 ASTM C1320-99, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
  .8 ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  .9 ASTM E413, Classification for Rating Sound Insulation.
  .10 ASTM E1050, Standard Test Method for Impedance and Absorption of Acoustical Materials using a Tube, Two Microphones and a Digital Frequency Analysis System.
.2 Underwriters Laboratories of Canada (ULC).
  .1 CAN/ULC S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  .2 CAN/ULC S114, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
  .3 CAN/ULC S115, Standard Method of Test Firestop Systems.
  .4 CAN/ULC-S604-1991, Type A Chimneys.
  .5 CAN/ULC-S702-1997, Standard for Thermal Insulation Mineral Fiber for Buildings.

1.4 SUBMITTALS

.1 Make submittals in accordance with Contract conditions and Section 01 33 00 - Submittal Procedures.
.2 Product Data: Submit project data including manufacturer's literature for insulation materials and accessories, indicating compliance with specified requirements and material characteristics.
  .1 Submit list on insulation manufacturer's letterhead of materials and accessories to be incorporated into the Work.

.2 MSDS report.
.3 Include product name.
.4 Include preparation instructions and recommendations, installation methods and storage and handing requirements.
.5 Include contact information for manufacturer and their representative for this project.

.3 Samples:
.1 If requested, submit 140mm x 190mm minimum sample of insulation in thickness used on project.

.4 Test Reports:
.1 Submit evaluation service reports or other independent testing agency reports, showing compliance with specified performance characteristics and physical properties.

.5 Field Reports:
.1 Submit manufacturer's field reports within three (3) days of each manufacturer representative's site visit and inspection.

.6 Insulation Installer Qualifications:
.1 Submit letter verifying insulation installer's experience with work similar to work of this Section.

1.5 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: Supply maintenance data for insulation materials for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Record Documentation: In accordance with Section 01 78 00 - Closeout Submittals.
.1 List materials used in insulation work.
.2 Warranty: Submit warranty documents specified.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver and acceptance requirements:
.1 Deliver material in accordance with Section 01 61 00 - Common Product Requirements.
.2 Deliver materials and accessories in insulation manufacturer's original packaging with identification labels intact and in sizes to suit project.
.3 Ensure insulation materials are not exposed to moisture during delivery.
.4 Replace wet or damaged insulation materials.

.2 Storage and handling requirements: Store materials off ground in dry location and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
.1 Store in original packaging until installed.

1.7 QUALITY ASSURANCE

.1 Pre-installation Meetings: attend pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.8 WARRANTY

.1 Manufacturer's warranty: Submit for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights the Owner may have under Contract conditions.

.2 Warranty period, one (1) year commencing on date of Substantial Performance of Work.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 INSULATION - ACOUSTIC

.1 Acoustical and fire batt insulation for walls and floors to CAN/ULC S702, Type 1.
- .1 Fire Performance:
  - .1 Non-combustibility: To CAN/ULC S114.
  - .2 Surface burning characteristics: To CAN/ULC S102.
    - .1 Flame spread: 0.
    - .2 Smoke developed: 0.
- .2 Acoustical Performance:
  - .1 Airborne sound transmission loss: To ASTM E90.
  - .2 Rating sound insulation: To ASTM E413.
  - .3 Sound absorption co-efficients: To ASTM E423.
  - .4 Impedance and absorption of acoustic materials: To ASTM E1050.
- .3 Acceptable Material:
  - .1 Rockwool, AFB, Acoustical Fire Batt.

2.2 INSULATION - THERMAL

.1 Thermal batt insulation for exterior stud walls: To CAN/ULC S702, Type 1.
- .1 Fire performance:
  - .1 Non-combustibility: To CAN/ULC S114.
  - .2 Surface burning characteristics: To CAN/ULC S102.
    - .1 Flame spread: 0.
    - .2 Smoke developed: 0.
  - .3 Thermal Resistance: R Value per 152mm = 24.
- .2 Acceptable Materials:
  - .1 EcoTouch - Owens Corning.
  - .2 Unfaced Fiber Glass Batts - Johns Manville.
  - .3 CertainTeed Insulation Canada.
  - .4 Knauf Insulation - Ecobatt Thermal.

2.3 INSULATION FOR FIRESTOPPING

.1 Insulation for firestopping installations to ASTM C612.
- .1 Fire performance:
  - .1 Non-combustibility: To CAN/ULC S114.
  - .2 Surface burning characteristics: To CAN/ULC S102.
    - .1 Flame spread: 0.
    - .2 Smoke developed: 0.
- .2 Accoustical Performance:
  - .1 Airborne sound transmission loss: To ASTM E90.
  - .2 Rating sound insulation: To ASTM E413.
  - .3 Sound absorption co-efficients: To ASTM E423.
  - .4 Impedance and absorption of acoustic materials: To ASTM E1050.
- .3 Acceptable Material:
  - .1 Rockwool, AFB, Acoustical Fire Batt.

2.4 ACCESSORIES

.1 Staples: 12.7mm minimum leg.
.2 Tape: as recommended by manufacturer.

.3 Mechanical fasteners in accordance with insulation manufacturer's written recommendations.
.4 Acoustical sealant in accordance with Section 07 92 19 - Acoustical Joint Sealants.
.5 Firestopping materials in accordance with Section 07 84 00 - Firestopping.

3 Execution

3.1 INSULATION INSTALLATION

.1 Install thermal or acoustic insulation between studs to maintain continuity of thermal or acoustical protection to building elements and spaces.
.2 Install acoustic insulation above ceiling at locations shown.
.3 Install insulation in areas as indicated. Friction-fit in position installed as recommended by manufacturer.
.4 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
.5 Do not compress insulation to fit into spaces.
.6 Keep insulation minimum 75mm from heat emitting devices such as recessed light fixtures, and minimum 50mm from sidewalls of CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B vents.
.7 Seal joints with acoustical joint sealant.
.8 Do not enclose insulation until it has been inspected and approved by Consultant.
.9 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 33 00 - Cast in Place Concrete
.2 Section 04 22 00 - Concrete Unit Masonry
.3 Section 05 31 00 - Steel Decking
.4 Section 06 10 00 - Rough Carpentry
.5 Section 07 21 13 - Board Insulation
.6 Section 07 21 16 - Blanket Insulation
.7 Section 07 26 00 - Vapor Retarders
.8 Section 07 27 00 - Air Barriers
.9 Section 07 46 19 - Steel Siding
.10 Section 07 84 00 - Fire Stopping
.11 Section 09 21 16 - Gypsum Board Assemblies
.12 Section 09 22 16 - Non-Structural Metal Framing

1.2 REFERENCES

.1 CAN/ULC S705.1-01 (Including amendment 1 & 2 Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
.2 CAN/ULC-S705.2- Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, - Application.
.3 Canadian Urethane Foam Contractors Association, (CFCA) "Manual for Installers of Spray Polyurethane Foam Thermal Insulation".
.4 CUFCA Quality Assurance Program
.5 CCMC 13244 -L Spray Polyurethane Foam Insulation.

1.3 SUBMITTALS AND SAMPLES

.1 Make submissions in accordance with Section 01 33 00 - Submittal Procedures
.2 Result of independent laboratory test reports, data sheets, physical proprieties, meeting or exceed requirements of the standard and specification.
.3 MSDS sheets.
.4 Submit a laboratory report of the adhesion compatibility with: flashing membranes, coatings and substrates.
.5 License under CUFCA and certification applicators under CUFCA/NECA (National Energy Conservation Association) to be submitted to the Consultant upon request, prior to the commencement of work.)
.6 Submit by the manufacturer a conformity certification to NBC of the polyurethane foam system.
.7 Submit independent laboratory results on vapour permeance proprieties (ASTM E96 system) for each composition wall.
.8 Submit test results by independent laboratory on air barrier material performance, conducted in order to prove that the air barrier material rating meets National Building Code requirements.

1.4 QUALITY ASSURANCE

.1 Contractor performing work under this section must be licensed under CUFCA (Canadian Urethane Foam Contractors Association.
.2 Applicators performing work under this section must be trained and certified by CUFCA/NECA (National Energy Conservation Association).
.3 Upon request of consultant, submit a copy of the contractor quality control report as requested in CAN/ULC-S705.2.
.4 Conduct site tests of sprayed work as require by the CUFCA Quality Assurance Program.

.5 Upon request of consultant, submit manufacturer/supplier field applied product quality control report.

1.5 MOCK UP

.1 Provide mock up of insulation air barrier in accordance with Section 01 33 00 - Submittal Procedures.
.2 Construct typical exterior sample wall incorporating window, window frame head jamb and sill, building corner condition with foundation wall junction.
.3 Acceptance mock up sample may form part of the completed work.
.4 Do not commence work until sample installation has been accepted.
.5 Acceptance of sample preparation will be a reference for minimum acceptance of the work. Any need for deviation of the mock up acceptance shall be report in writing.
.6 Upon consultant request, provide manufacturer writing acceptance of the mock up quality.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Materials shall be delivered in manufacturers original sealed containers clearly labeled with manufacturer's name, product identification, safety, information, net weight of contents, and expiration date.
.2 Material is to be stored in a safe manner and where the temperatures are in the limits specified by the material manufacturer.
.3 Empty containers have to be removed from site on a daily basis in accordance with CAN/ULC-S705.2.

1.7 APPLICATION CONDITIONS

.1 At the beginning and during the work, leave access on the job site to manufacture representatives for technical support and assistance
.2 Execute the work of this section when the temperature of the air and substrate are within the limits of the data sheet supplied by the manufacturer.
.3 Apply the spray foam only when the relative humidity is lower than 80%
.4 Prepare all oily surfaces with primer, follow manufacturer's recommendations and CAN/ULC S 705.2 standard.

1.8 PROTECTION

.1 Ventilate area to receive insulation to maintain non-toxic unpolluted, safe working conditions.
.2 Protect workers as recommended by standards and manufacturer's recommendations.
.3 Protect adjacent surfaces, windows, equipment, and site areas from damage of over spray.

1.9 WARRANTY

.1 Warrant work of this section against defects and deficiencies for a period of two years from date work completion.
.2 Provide a CWC warranty certificate in conformity to CUFCA Quality Assurance Program.
.3 Provide manufacturer warranty for the field-applied product.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 ENVIRONMENTAL REQUIREMENTS

.1 The product shall not have any CFC or HCFC or any depletion substance affecting the Ozone layer.

.2 The Spray Polyurethane Foam Insulation shall have a total minimum of 18% recycled content from post-consummation and post-consummation and post-industrial source. The % shall be calculated by weight basis ration of the recycled source to the SPF system to apply on the building.

.3 The Spray Polyurethane Foam shall contain in the formula some renewable vegetable content such as Soya, Linen, Sunflower.

2.2 MATERIALS

.1 Spray Applied Polyurethane Foam Insulation system in accordance with CAN/ULC S705.1-01(Including amendment 1 & 2) "Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification and those specific objectives performances.

.2 Acceptable Material

.1 Polarfoam Soya

2.3 PHYSICAL PROPERTIES

PHYSICAL PROPERTIES	**TEST**
Density	ASTM D1622
Thermal Resistance	ASTM C518 180 days / 23°C
Dimensional Stability	ASTM D-2126 (% of change in volume at 28 days) -20°C 70°C R.H.>97 +/- 3% 80°C
Flames Spread Index	CAN/ULC S 102-03
Smoke Develop Index	CAN/ULC S 102-03
Compressive strength	ASTM D1621
Tensile strength	ASTM D1623
Open cells	ASTM D2856
Water	ASTM D2842 (96 hrs)
Air Barrier Material at 75 Pa	CCMC 07273 (25mm core only)
Fungi Resistance	ASTM C 1338
V.O.C.	CAN/ULC S 774
Water vapour Permeance	ASTM E96 (25mm core only)

OBJECTIVE	**RESULT**	**UNIT**
Min.	33	Kg/M^2
Min.	1.17 / 25mm	RSI R
Min.	6.6 / 1"	RSI R
Min.	-0.03	%
Max.	+9.8	%

Max.	+2.9	%
Max.	200	FSI
Max.	396	SDI
Min.	195	kPa
Min.	335	kPa
Min.	8.0	%
Max.	0.8	%
Max.	0.00004	L/s * M^2 at 75 Pa
Min.	No Fungal Growth	---
Max.	1	Day
Max.	69	ng / Pa s M^2

2.4 PRIMERS

.1 As per manufacturers recommendations and CAN / ULC S705.2 for surfaces conditions.
- .1 For oily steel surface (such as Z-Bar, steel deck roof) use LSC 517 Contact Cement for Lepage, color: red

2.5 EQUIPMENT

.1 Equipment shall be as recommended in CAN/ULC-S705.2 and approved by foam manufacturer for type of application.

3 Execution

3.1 EXAMINATION

.1 According to the prescriptions of the standard CAN/ULC S705.2 verify the conditions of surfaces.
- .1 Surfaces to be covered with spray foam should be free of moisture, frost, oil, rust and any other foreign material able to have a negative affect on the adhesion of the product.
- .2 Make sure of the complete cure of the substrates: concrete, mortar, fillers, membranes, primers, coatings or other surfaces, before pulverizing, taking into account climatic conditions.
- .3 If the thickness of application is greater than 50 mm use mechanical fastener to secure self-adhesive membranes around openings (galvanized steel angle: 13 mm x 25 mm x 0.42 mm in thickness (gypsum corner bead). Fixed at 600 mm C/C.

.2 Respect the moisture content of the different building materials.

.3 In the case of particular conditions follow the recommendations of the manufacturer.

.4 Report in writing, any defects in surfaces or conditions that may adversely affect the performance of products installed under this section to the consultant before commencement of work.

.5 Commencement of work outlined in this section shall be deemed as acceptance of existing work conditions.

3.2 APPLICATION

.1 Apply at locations where batt insulation is not accessible or will not provide a complete application.

.2 Spray application of polyurethane foam shall be performed in accordance with CAN/ULC-S705.2. Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities.

.3 Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer. Refers to technical data sheets.

.4 Apply consecutive passes (min. 15 mm, max. 50 mm) to obtain the thickness as indicated on drawings.
.5 Do not spray closer than 75 mm to chimneys, recess spotlight or other source of heat.

3.3 TOLERANCE

.1 Applied the product to result of an average thickness from (9 readings in 1 M2) ± 6mm of the thickness requirements in the drawings at a minimum of 1M2 readings each 150 m2 surface sprayed.
.2 Applied the insulation uniform in accordance to NBC article 9.25.2.3.1.

3.4 PROTECTION

.1 All plastic insulation must be protected from interior occupancy space by an approved thermal barrier to meet the requirements of local Building Codes.

END OF SECTION

This page intentionally left blank

1 General

1.1 DESCRIPTION OF WORK

.1 The work of this Section involves the provisions of a sheet vapour seals in the following locations:
- .1 At entire warm side of exterior wall framing.
- .2 Between window frames and framing for window openings.
- .3 Between door frames and framing for door openings.
- .4 Slip sheet at concrete foundation wall.
- .5 Under slab vapour retarder.
- .6 All other locations where shown on drawings.

1.2 RELATED REQUIREMENTS

.1 Section 07 21 16 - Blanket Insulation
.2 Section 07 27 00 - Air Barriers
.3 Section 07 92 00 - Joint Sealants.
.4 Section 09 21 16 - Gypsum Board Assemblies
.5 Section 09 22 16 - Non Structural Metal Framing
.6 Section 31 23 00 - Excavation and Fill.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet, for Use in Building Construction.

1.4 PRODUCT DATA

.1 Submit product data in accordance with Division 01 - General Requirements.
.2 Submit product data sheets for sheet vapour retarders. Include the following:
- .1 Product characteristics.
- .2 Performance criteria.
- .3 Limitations.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Place materials defined as hazardous or toxic waste in designated containers.
.5 Use the least toxic sealants and adhesives necessary to comply with requirements of this section.
.6 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials.

2 Products

2.1 SHEET VAPOUR BARRIER

.1 Polyethylene film: 6mil thick above grade, 10mil thick below grade

2.2 SELF ADHESIVE VAPOUR BARRIER

.1 Air/vapour barrier membrane (Self-Adhering): SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, and having the following physical properties:
  .1 Thickness: 1.0 mm;
  .2 Vapour permanence: < 2.5 ng/Pa•s•m² (< 0.04 perm) to ASTM E96;
  .3 Acceptable Materials:
    .1 Henry - Blueskin SA.
    .2 Soprema - Sopraseal Stick 1100 T.

2.3 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, cloth fabric duct tape, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
.2 Sealant: EcoLogo certified, not to contain total of volatile organic compounds in excess of 5 % by weight, asbestos-free sealant, compatible with vapour retarder materials, recommended by vapour retarder manufacturer and as specified in Section 07 92 00 - Joint Sealants.
.3 Staples: minimum 6 mm leg.
.4 Molded box vapour barrier: factory-molded polyethylene box for use with recessed electric switch and outlet device boxes.

3 Execution

3.1 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of retarder.
.2 Install sheet vapour retarder on warm side of exterior wall assemblies prior to installation of gypsum board to form continuous retarder.
.3 Use sheets of largest practical size to minimize joints.
.4 Tie vapor retarder into roof membrane.
.5 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

.1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to all door and window frames.

3.3 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:
  .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
  .2 Lap sheet over sealant and press into sealant bead.
  .3 Install staples through lapped sheets at sealant bead into wood substrate.
  .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:
  .1 Attach first sheet to substrate.
  .2 Apply continuous bead of sealant over solid backing at joint.
  .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
  .4 Install staples through lapped sheets at sealant bead into wood substrate.
  .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install molded box vapour barrier.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

END OF SECTION

This page intentionally left blank

1 General

1.1 SECTION INCLUDES

.1 Materials and installation methods providing primary air vapour barrier materials and assemblies including tie ins to vapor barriers and all other terminations.

.2 Air/vapour barrier materials to provide continuous seal between components of building envelope and building penetrations, including all windows and doors.

1.2 RELATED REQUIREMENTS

.1 Section 04 05 23 - Masonry Accessories.

.2 Section 07 26 00 - Vapor Retarders.

.3 Section 07 92 00 - Joint Sealants.

1.3 SUBMITTALS

.1 At least four (4) weeks prior to commencing installation of air/vapour barrier membrane submit sample of membrane for Consultants review and approval.

1.4 QUALITY ASSURANCE

.1 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials.

.2 Manufacturer's Representative to visit the site during the installation of the preparation for and installation of the first two (2) mock-ups. Manufacturer's Representative to review mock-up and provide a written report confirming the installation is in accordance with Manufacturer's requirements.

1.5 QUALITY ASSURANCE MOCK-UP

.1 Fabricate a mock-up that will demonstrate the various aspects of the air barrier / window connection / cladding (brick, steel, wood, EIFS and/or vinyl) installation and detailing.

.2 The installation is to reflect the intent to have a full tie in of the air barrier to the entire perimeter of all wall openings, including windows, doors and louvers, providing a tight air and water seal and the relationship of the cladding installation to the openings.

.3 The mock-up is to be reviewed by the Contractor, Membrane Installer, Window Installer, Owner and Consultant prior to the Contractor moving forward with the installation of all other windows.

.4 Allow 24 hours to convene the review on site.

.5 Mock-up to be approved prior to fabrication of additional openings.

.6 Openings installed prior to review and approval will be removed at the Contractors expense and rebuilt.

.7 The approved mock-up may remain on site as part of the work and it will form the standard of acceptance for the remainder of the work.

1.6 QUALIFICATIONS

.1 Applicator: Company specializing in performing work of this section with minimum 3 years documented experience with installation of air/vapour barrier systems.

1.7 PRE- INSTALLATION MEETINGS

.1 Attend a pre installation meeting to verify project requirements, manufacturers installation instructions, tie ins & quality expectations.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Division 01 - General Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer(s written instructions.

1.9 SEQUENCING

.1 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.10 GUARANTEES

.1 The product manufacturer shall issue a written and signed document, issued in the name of the Owner, certifying the product will meet all the physical characteristics published by the manufacturer, for a period of five (5) years, starting from the date of Substantial Completion.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 SHEET MATERIALS

.1 Air barrier membrane (Self-Adhering): vapor permeable, water resistive air barrier consisting of an engineered film surface, and having the following physical properties:
  .1 Thickness: 0.58mm;
  .2 Air leakage: Pass, ASTM E2357;
  .3 Vapor permeance: 29 Perms, ASTM E96, Method A;
  .4 Low temperature flexibility: Pass, ICC-ES AC38/3.3.4;
  .5 Acceptable Materials:
    .1 Henry, Blueskin VP160
.2 Through-wall flashing membrane (Self-Adhering): SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:
  .1 Thickness: 1.0 mm;
  .2 Vapour permanence: < 2.5 ng/Pa•s•m² (< 0.04 perm) to ASTM E96;
  .3 Acceptable Materials:
    .1 Henry - Blueskin SA.
    .2 Soprema - Sopraseal Stick 1100 T.
.3 Primer: By manufacturer of membrane, all membranes to be primed.

3 Execution

3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this section.
.2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer(s requirements.
.3 Report any unsatisfactory conditions to the Consultant in writing.
.4 Do not start work until deficiencies have been corrected. Commencement of Work implies acceptance of conditions.

3.2 PREPARATION

.1 Remove loose or foreign matter which might impair adhesion of materials.
.2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.

.3 Ensure all substrates are free of surface moisture prior to application of self-adhesive membrane and primer.
.4 Ensure metal closures are free of sharp edges and burrs.
.5 Prime substrate surfaces to receive adhesive in accordance with manufacturer's instructions.

3.3 INSTALLATION

.1 Apply primer to all surfaces to receive membrane in a manner and at a rate recommended by manufacturer. Primed surfaces not covered by membrane during the same working day must be re-primed.
.2 Apply membrane starting at bottom of wall, lapping both ends and sides in accordance with manufacturer's instructions.
.3 Seal end of membrane to substrate at end of days work and around any projections through membrane using only sealant recommended by membrane manufacturer.
.4 Carry membrane around into all wall openings and seal at frames or other building components. Reinforce all corners with adhesive applied membrane using heated trowel to ensure joint tightness.
.5 Coordinate with installation of roofing vapour barrier to ensure continuity of air/vapour barrier membrane at roof/wall intersections.
.6 Where work of other trades is incomplete leave sufficient membrane to complete work of this Section to ensure continuity and integrity of air/vapour barrier.
.7 Repair damage to membrane at masonry connectors and ties and elsewhere as necessary.

3.4 PROTECTION OF WORK

.1 Do not permit adjacent work to damage work of this section.
.2 Ensure finished Work is protected from climatic conditions.

END OF SECTION

This page intentionally left blank

1 General

1.1 DESCRIPTION OF WORK

.1 The work of this Section comprises the furnishing of materials, labour and equipment necessary for the supply and installation of the sheet metal wall cladding system, as indicated and specified in this Section, which includes, but is not limited to:
- .1 All preformed sheet metal wall siding.
- .2 All non-structural sub-girts, clips and fasteners required to support the wall cladding.
- .3 All flashings and trim related to wall cladding systems.
- .4 All caulking/sealing for the preformed metal wall cladding systems, flashings and trim.

1.2 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrications.
.2 Section 07 21 13 - Board Insulation.
.3 Section 07 21 19 - Foamed-in-Place Insulation.
.4 Section 07 62 00 - Sheet Metal Flashing and Trim.
.5 Section 07 92 00 - Joint Sealants.
.6 Section 08 44 13 - Glazed Aluminum Curtain Walls.

1.3 REFERENCES

.1 American National Standards Institute (ANSI).
- .1 ANSI B18.6.4-99, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws.
- .2 ANSI B18.6.4-1981 (R1991), Screws, Tapping and Metallic Drive, Inch Series, Thread forming and Cutting.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .2 CAN/CGSB-93.4-92, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished, Residential.

.3 Canadian Standards Association (CSA International).
- .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .2 CAN/CSA S16.1-94, Limit States Design of Steel Structures.
- .3 CSA S136-94, Cold Formed Steel Structural Members.
- .4 CSA S136.1-95, Commentary on CSA Standard S136-94, Cold Formed Steel Structural Members.

.4 Environmental Choice Program (ECP).
- .1 CCD-045-95, Sealants and Caulking Compounds.

.5 Underwriters' Laboratories of Canada (ULC).
- .1 CAN/ULC-S706-02, Wood Fiber Thermal Insulation for Buildings.

.6 CSSBI: 20M-91, Sheet Steel Cladding for Architectural and Industrial Applications.
.7 NBCC-2015, National Building Code of Canada.

1.4 DESIGN CRITERIA

.1 Design metal panels in accordance with the requirements of CSA S136-94 and CSA S136.1-95 and NBCC and CSSBI standards.
.2 Design metal wall cladding system to provide for thermal movement of component materials caused by ambient temperature range of 60°C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
.3 Provide an effective air barrier, to prevent infiltration and/or exfiltration of air through wall assembly.

.4 Design system to include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, (wind and snow loads) without permanent distortion, damage to filling materials, racking of joints, breakage of seals, or water penetration.

.5 Design members to withstand dead load and wind loads, and, where applicable, live loads, calculated in accordance with NBC and applicable local regulations, to maximum allowable deflection of 1/180th of span.

.1 Sheet steel base thickness to be as specified with girt spacing determined by design criteria, but NOT to exceed 1800mm o.c.

.2 Design sheets according to the specified tolerances for the erection of the structural support.

.6 Design system to attain water impermeable wall screen assembly for protection against driving wind forces and water capillary action. Incorporate in assembly, system of gaskets, seals and closures to achieve intended design. Provide for positive drainage of condensation occurring within wall construction.

.7 Maintain following installation tolerances:

.1 Maximum variation from plane or location shown on approved shop drawings: 20mm/10m of length.

.2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 1.00 mm.

.8 Permanence through wall system shall not exceed 30 ng/Pa.s.m2

.9 Design wall system to allow for movement of air between exterior and interior side of metal cladding.

1.5 SUBMITTALS

.1 General:

.1 Make submittals in accordance with Division 01 - General Requirements.

.2 Product Data:

.1 Submit product data including manufacturer product sheet, for specified products.

.3 Shop Drawings:

.1 Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors and textures.

.2 Include details showing thickness and dimensions of the various system parts, fastening and anchoring methods, locations of joints and gaskets and location and configuration of joints necessary to accommodate thermal movement.

.3 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, metal furring, and related work.

.4 Indicate elevations of all walls showing wall openings and all pertinent dimensions, materials, and finishes, details at head, jamb and sills at all wall openings and at top, bottom, corners and other intersections including where siding abuts existing work. Include details of girt system including anchoring details, panel fastening details and compliance with design criteria and requirements of other work.

.5 Each shop drawing submitted shall bear stamp and signature of qualified professional engineer registered or licensed to practice in the Province of Prince Edward Island, Canada.

.4 Samples:

.1 Submit selection and verification samples for finishes, colors and textures.

.2 Verification Samples: 203 x 203 mm sample panels in thickness specified, including chips, anchors, supports, fasteners, closures and other panel accessories, for assembly approval.

.3 Include panel assembly samples not less than 305 x 305 mm, showing 4 way joint.

.5 Test Reports:

.1 Certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Certificates:
- .1 Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements.

.7 Manufacturer's Instructions:
- .1 Manufacturer's Installation Instructions
- .2 Manufacturer's Field Reports

.8 Closeout Submittals. Submit the following:
- .1 Warranty documents specified herein.

1.6 QUALITY ASSURANCE

.1 Installer Qualifications:
- .1 Installer experienced in performing work of this section who has specialized in the installation of work similar to that required for this project.

.2 Manufacturer Qualifications
- .1 Manufacturer capable of providing field service representation during construction and approving acceptable fabricator.
- .2 Company with a minimum of five (5) years of continuous experience manufacturing panel material of the type specified and capable of providing the following information.
- .3 List of five (5) other projects of similar size, including approximate date of installation and name of Consultant for each.

.3 Fabricator Qualifications
- .1 Company with at least three (3) years of experience on similar sized metal panel projects and approved by panel material manufacturer.

1.7 QUALITY ASSURANCE MOCK-UP

.1 Fabricate a mock-up that will demonstrate the various aspects of the air barrier / window connection / cladding (brick, steel, wood, EIFS and/or vinyl) installation and detailing.

.2 The installation is to reflect the intent to have a full tie in of the air barrier to the entire perimeter of all wall openings, including windows, doors and louvers, providing a tight air and water seal and the relationship of the cladding installation to the openings.

.3 The mock-up is to be reviewed by the Contractor, Membrane Installer, Window Installer, Owner and Consultant prior to the Contractor moving forward with the installation of all other windows.

.4 Allow 24 hours to convene the review on site.

.5 Mock-up to be approved prior to fabrication of additional openings.

.6 Openings installed prior to review and approval will be removed at the Contractors expense and rebuilt.

.7 The approved mock-up may remain on site as part of the work and it will form the standard of acceptance for the remainder of the work.

1.8 DELIVERY, STORAGE & HANDLING

.1 General:
- .1 Comply with Division 01 - General Requirements.

.2 Ordering:
- .1 Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

.3 Delivery:
- .1 Deliver materials in manufacturer's original, unopened, undamaged, containers with identification labels intact.
- .2 Package wall panels for protection against transportation damage. Provide markings to identify components consistently with drawings.

.4 Storage and Protection:

.1 Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
.2 Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.
.3 Protect panels from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
.4 Slope panels to ensure positive drainage of any accumulated water.
.5 Do not store panels in any enclosed space where ambient temperature can exceed 49°C.
.6 Protect finish of panels by applying heavy duty removable plastic film, during production.
.7 Avoid contact with any other materials that might cause staining, denting, or other surface damage.

1.9 PROTECT CONDITIONS

.1 Field Measurements:
.1 Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate filed measurements, fabrication schedule with construction progress to avoid construction delays.

1.10 WARRANTY

.1 Manufacturer's Warranty:
.1 Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not a limitation of other rights Owner may have under the Contract Documents.
.2 Warranty Period: Two (2) years commencing on Date of Substantial Completion.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 SHEET METAL WALL CLADDING SYSTEM

.1 Exterior sheet metal panels:
.1 Fabricate in accordance with ASTM A653/A653M.
.2 Base metal thickness wall: 24 gauge.
.3 Metal profile wall and soffits:
.1 Acceptable Material:
.1 VicWest - refer to the Drawings for profiles.
.4 Finish:
.1 Acceptable material:
.1 Vicwest WeatherXLTM with Silicone Modified Polyester paint system.
.5 Colour: refer to Drawings.
.2 Sub-Girts:
.1 Designed by wall cladding manufacturer to suit design loading criteria, spans and requirements of specific application.
.2 Fabricate from Grade 230 (33) steel, hot-dip galvanized to ASTM A924/A924M, Z-275 (G-90) designation, one-piece formed to shape shown on drawings.

.3 Thickness of base metal to be determined by structural calculations, in accordance with Par. 1.3 above, with minimum thickness of 1.2 mm.
.4 If alignment of structural framing or substrate is greater than acceptable tolerance for cladding system provide adjustable two-piece sub-girts, for screw stitching in field at maximum 600 mm o.c.

.3 Wall Cladding Flashings:
.1 Visible moldings: corner flashings, cap and drip flashings, ridge caps, starter strips, trim at openings to be of same material, gauge and finish as the adjoining cladding, brake-formed to required profile.
.2 Concealed moldings: all hidden components and clips shall be fabricated from hot-dipped galvanized steel, designation Z-275 (G-90) with minimum base metal thickness of 0.80 mm.

.4 Roof Parapet Flashings:
.1 Same material, thickness, finished and colors as adjacent sheet metal siding and soffits fascias.
.2 Supply to Section 07 62 00 - Sheet Metal Flashings and Trim sufficient flat material for all perimeter roof flashings and miscellaneous roof curb flashings.

.5 Insulation:
.1 Supplied and installed by Section 07 21 13 - Board Insulation, following installation of sub-girt by this Section.

.6 Accessories:
.1 Metal closures: same thickness and finish as adjoining panels.
.2 Foam closures: extruded, closed-cell, flexible PVC, same shape as cladding, arctic climate type.
.3 Thermal breaks: 6 mm thick x minimum 38 mm wide foam rubber, for application between membrane and sub-girts. Provide one at every fastener.
.4 Butyl tape: 100% solid butyl-polyisobutylene tape 3 mm thick x 13 mm wide.
.5 Insulation adhesive: quick drying, synthetic elastomeric base, to ASTM C916-79, Type IV.
.6 Sealing compound: thermoplastic rubber base.

.7 Fasteners:
.1 Screws: to ANSI B18.6 and cladding manufacturer's recommendations.
.2 Exposed screws: Not acceptable, all siding fasteners are to be concealed.
.3 Stitching screws: #14, hexagonal head, cadmium-plated, carbon steel, self tapping screw, 19 mm long.
.4 Screws for structural steel: #14 hexagonal head cadmium-plated carbon steel, self-tapping screws of length to penetrate minimum 13 mm into steel structural support.

.8 Touch-up Materials:
.1 Color matched paint as supplied by cladding manufacturer.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 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 Protect metal surfaces in contact with concrete, masonry, mortar, plaster or other cementitious surfaces with isolation coating.

3.3 INSTALLATION OF SHEET METAL WALL CLADDING

.1 Install cladding to the requirements of CSSBI standards, manufacturer's written instructions and reviewed shop drawings.

.1 Installation shall be performed by a company certified by the manufacturer of the metal cladding as an approved installer.
.2 Install components to allow for thermal expansion and contraction.
.3 Fold visible exposed edges of sheets inward at least 13 mm.
.4 Provide alignment bars, brackets, clips, inserts, shims, as required to securely and permanently fasten wall cladding system to building structure.

.2 Install thermal breaks continuous over length of sub-girts. Screw fasten in accordance with design loading requirements.
.3 Install insulation in strict accordance with the requirements of Section 07 21 13 - Board Insulation.
.4 Install exterior panels c/w all required flashings and trim. Ensure that all fasteners at flashings and trim are concealed. Make sure all laps are perfectly aligned and joined. Use sufficient pressure when installing screws to ensure that the EPDM washers are fully seated, but without buckling the panels.
.5 Stitch the side laps of exterior sheets with screws between sub-girts at maximum 600 mm o.c.
.6 End laps at exterior panels to be minimum 100 mm, located over sub-girts and sealed with tape sealant.
.7 Make all necessary openings in the panels for mechanical and electrical purposes. Cut to fit tight around pipes and other accessories and seal with sealant.
.8 Install notched, shaped and waterproof closures to protect the cladding components against the effects of the weather.

3.4 PANELS

.1 Wall cladding: shop cut to required sizes and to provide openings for doors, windows, grilles and other penetrations. Cuts to be square and clean.
.2 Accessories: brake or bend to shape, of material and finish to match cladding, comprising of cap and ridge flashing, drip flashings, corner flashings, closure flashings at head, jamb and sills at door and window openings, roof edge and gable flashings.
.3 Soffit panels: fabricate from custom perforated sheet metal or provide purpose-made, prefabricated soffit vents acceptable to Consultant.

3.5 CAULKING AND SEALING

.1 Caulk and seal internally as specified in this Section and recommended by system manufacturer.
.2 Caulk and seal between metal siding and adjacent or abutting surfaces in accordance with Section 07 92 00 - Sealants.

3.6 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
.2 Wash down exposed surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
.3 Remove excess sealant with recommended solvent.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 06 10 00 - Rough Carpentry.
.2 Section 07 21 13 - Board Insulation.
.3 Section 07 62 00 - Sheet Metal Flashing and Trim.
.4 Section 07 92 00 - Joint Sealants.
.5 Section 22 42 01 - Plumbing Specialties and Accessories.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
  .1 ASTM C726-00a, Standard Specification for Mineral Fiber Roof Insulation Board.
  .2 ASTM C 1177/C1177M-01, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  .3 ASTM D41-94(2002)e1, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  .4 ASTM D312-00, Asphalt Used in Roofing.
  .5 ASTM D6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
  .6 ASTM D6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
  .7 ASTM D6164-00, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
.2 Canadian Standards Association (CSA):
  .1 CSA A123.23.
  .2 CSA A123.21-14 - Standard test method for the dynamic wind uplift resistance of Membrane - Roofing Systems.
.3 Factory Mutual (FM Global).
  .1 FM Approvals - Roofing Products.
  .2 FM- 4470 Wind Uplift Requirements
.4 Canadian Roofing Contractors Association (CRCA).
  .1 CRCA Roofing Specifications Manual-1997.
.5 Health Canada / Workplace Hazardous Materials Information System (WHMIS).
  .1 Material Safety Data Sheets (MSDS).

1.3 PERFORMANCE REQUIREMENTS

.1 Compatibility between components of roofing system is essential. Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.

1.4 GENERAL REQUIREMENTS FOR ROOFING SYSTEM

.1 SBS modified bituminous membrane. The system used as the Standard of Acceptance for the work consists of:
  .1 Two (2)-ply SBS modified bitumen membrane.
  .2 Protection board
  .3 Polyisocyanurate insulation
  .4 Vapor barrier
  .5 Support panels
.2 The specified roofing system is based on Soprema. Other complete and comparable membrane, insulations and vapor barrier systems will be considered if proposed and accepted as approved equals, prior to tender close.

1.5 SUBMITTALS

.1 Submittals in accordance with Division 01 - General Requirements.
.2 Submit two (2) copies of the most current technical data sheets. These documents must describe the physical properties of materials and explanations about product installation, including restrictions, limitations and other manufacturer recommendations.
.3 Indicate flashing, details.
.4 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
.5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
.6 Manufacturer's field report: in accordance with Division 01 - General Requirements.
.7 Provide shop drawing indicating fastening pattern at field, edges, corners and around roof mounted equipment.
.8 Sub-contractor and installed certificate of approval issued by the system manufacturer.

1.6 QUALITY ASSURANCE

.1 System manufacturer to attend a minimum of three (3) site visits.
.2 Membrane: applied by sub-contractor and installer, certified by manufacturer for application of its products.

1.7 FIRE PROTECTION

.1 All materials will be delivered and stored in their original packaging, in conformance with the requirements described in the manufacturer's technical documentation.
.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 and any harmful substances.
.3 Store adhesives and solvent-based mastics at a minimum of 5°C.
.4 Materials delivered in rolls will be carefully stored upright; flashings will be stored to avoid wrinkling, buckling, scratches or any other possible damage.
.5 Avoid gathering construction materials on the roof, which may affect the structural integrity by imposing loads exceeding what is admissible.

1.8 PROTECTION

.1 Prior to the start of work, conduct a site inspection to ensure its safety in order to minimize fire risks and hazards.
.2 Respect safety measures recommended by the related local authorities.
.3 At the end of each workday, use a heat detector gun to spot any smoldering or concealed fire. Job planning must be organized to ensure workers are still on location at least two (2) hours after welding works. An inspection must be performed by an employee of the roofing contractor who specializes in this kind of job at the end of works and, if necessary, with the help of a member of the fire protection service of the municipality.
.4 Never apply the torch directly to flammable materials.
.5 Throughout roofing installation, maintain a clean site and have a fire hose (when possible) and at least one ULC-approved Class A, B or C fire extinguisher, charged and in perfect operating condition, within 6 m (20 ft) of each torch. Respect all safety measures described in technical data sheets of sealants. Welding torches must never be placed near combustible or flammable products, nor be used where the flame is not visible or cannot be easily controlled.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Do not install roofing when temperature remains below -18ºC for torch application, or to manufacturers recommendations for mop application.
.2 Minimum temperature for solvent-based adhesive is -5ºC.

.3 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.10 FULL SYSTEM WARRANTY

.1 The membrane manufacturer will issue a written document in the Owner's name, valid for a fifteen (15) year period, stating that it will repair any leaks in the roofing membrane to restore the roofing system to a dry and water tight condition, to the extent that manufacturing or installation defects caused such water infiltration. The warranty must cover all roofing components from the deck up to the finish cap sheet and the total cost of repair(s) during the entire warranty period. The warranty must be transferable, at no extra cost, to subsequent building owners. The warranty certificate must reflect these requirements.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Place materials defined as hazardous or toxic in designated containers.

2 Products

2.1 COMPATIBILITY

.1 All roofing waterproofing materials shall be provided by the same manufacturer.

2.2 FASTENING

.1 Roof system to be mechanically fastened to meet CSA A123.21 Standards.
.2 Prior to installation manufacturer to submit their test report, with proposed products, demonstrating compliance with wind uplife resistance standard.

2.3 VAPOUR BARRIER SUPPORT PANELS

.1 Gypsum-Fibre Roof Board:
  .1 Fibre-reinforced gypsum roof board 16mm-thick.
  .2 In conformance with: CAN/ULC S102 and ASTM D3273.
  .3 Acceptable Material:
    .1 Securock Gypsum-Fibre Roof Board by CGC.

2.4 VAPOUR BARRIER

.1 Self-Adhesive Vapour Barrier
  .1 Self-adhesive membrane composed of SBS modified bitumen, with a surface screen made of high-density polyethylene laminated between two layers of polyethylene films. The width of the membrane is 1.14 m to allow the membrane to fit on the top of most structural steel deck profiles. The self-adhesive underface is protected with a silicone plastic release film. Resistance to water vapour transmission: 1.7ng/Pa.5.m² (0.03 perm).
  .2 Acceptable Material:
    .1 Sopravap'r by Soprema.
    .2 M.V.P. by IKO.
    .3 PERMATE STICK by Lexcor.

2.5 INSULATION

.1 The total system from the top of the deck to top of membrane to provide minimum R- value as noted on roof assemblies. Minimum two (2) layers with joints offset.

.2 Polyisocyanurate Insulation:
.1 Refer to Section 07 21 13 - Board Insulation for acceptable material.

2.6 INSULATION SUBSTRATE OVERLAY

.1 Bituminous Board
.1 Semi-rigid roofing support panel composed of a mineral-reinforced asphaltic core between two asphalt-saturated fiberglass liners. Length of 2440 mm long x widest practical width x 4.8mm thick.
.2 Acceptable Material:
.1 Sopraboard by Soprema.
.2 Protectoboard by IKO.
.3 LEXBASE R+ by Lexcor.
.3 2-1 Soprasmart board by Soprema and ShieldBase 180 by IKO may be used in lieu of substrate overlay and base sheet membrane for field surface.

2.7 MEMBRANES

.1 Base Sheet Membrane for Field Surface
.1 Roofing membrane composed of SBS modified bitumen and a non-woven polyester reinforcement. Both sides are covered with a thermofusible plastic film. The surface must be marked with three (3) chalk lines to ensure proper roll alignment.
.2 In conformance with: CGSB 37.56-M (9th Draft).

Properties	**MD**
Strain Energy (kN/m)	9
Breaking Strength (kN/m)	17
Ultimate Elongation (%)	60
Tear Resistance (N)	60
Static Puncture Resistance (N)	400
Dimensional Stability (%)	-0.4
Plastic Flow (°C)	105 (greater than or equal)
Cold Bend at -30°C	No Cracking
Lap Joint Strength (kN/m)	Pass >4 kN/m

.3 Acceptable Materials:
.1 Sopralene Flam 180 by Soprema.
.2 Torchflex TP-180-FF by IKO.
.3 VANGUARD 180 FF by Lexcor.
.4 2-1 Soprasmart board by Soprema and ShieldBase 180 by IKO may be used in lieu of substrate overlay and base sheet membrane for field surface.

.2 Base Sheet Membrane for Flashings and Parapets
.1 Membrane composed of SBS modified bitumen and composite heavy duty reinforcement. The surface is covered with a thermofusible plastic film and the underface is covered with a release protection film. The surface shall be marked with three (3) chalk lines to ensure proper roll alignment.
.2 In conformance with: CGSB 37.56-M (9th Draft).

Properties	**MD**
Strain Energy (kN/m)	9
Breaking Strength (kN/m)	17
Ultimate Elongation (%)	60

Properties	MD
Tear Resistance (N)	60
Static Puncture Resistance (N)	400
Dimensional Stability (%)	-0.4
Plastic Flow (°C)	105 (greater than or equal)
Cold Bend at -30°C	No Cracking
Lap Joint Strength (kN/m)	Pass >4 kN/m

.3 Acceptable Materials:
- .1 Sopralene Flam Stick by Soprema.
- .2 Armourbond Flash by IKO.
- .3 VANGUARD FLASH SA by Lexcor.

.3 Roofing Cap Sheet Membrane for Field Surfaces, Flashings and Parapets
- .1 Use for 15 Year Warranty.
- .2 Roofing membrane composed of SBS modified bitumen with a non-woven polyester reinforcement and elastomeric bitumen . The surface is protected by coloured granules. The underface is covered with a thermofusible plastic film.
- .3 In conformance with: CGSB 37.56-M (9th Draft).

Properties	MD
Strain Energy (kN/m)	10
Breaking Strength (kN/m)	18
Ultimate Elongation (%)	60
Tear Resistance (N)	75
Static Puncture Resistance (N)	420
Dimensional Stability (%)	0.8
Plastic Flow (°C)	105 (greater than or equal)
Cold Bend at -30°C	No Cracking
Lap Joint Strength (kN/m)	Pass >4 kN/m

.4 Acceptable Materials:
- .1 Sopralene Flam 250 GR by Soprema.
- .2 Torchflex TP-250-Cap by IKO.
- .3 VAN GUARD 250 TC by Lexcor.

.4 Starter Roll
- .1 Waterproofing membranes composed of SBS modified bitumen, covered with granules on surface, with a 100 mm (4 in) selvedge on both sides. The underface is covered with a thermofusible plastic film.
- .2 In conformance with: CGSB 37.56-M (9th Draft).

Properties	MD
Strain Energy (kN/m)	13
Breaking Strength (kN/m)	25
Ultimate Elongation (%)	66
Tear Resistance (N)	118
Static Puncture Resistance (N)	432
Dimensional Stability (%)	-0.2
Plastic Flow (°C)	110 (greater than or equal)

Properties	MD
Cold Bend at -30°C	No Cracking
Lap Joint Strength (kN/m)	Pass >4 kN/m

.3 Acceptable Materials:
.1 Starter Flam GR by Soprema.

.5 Colour for Roofing Cap Sheet Membrane Granules:
.1 For field surfaces: light gray.

2.8 ACCESSORIES MEMBRANE

.1 Cover Strip
.1 Membrane strip made of SBS modified bitumen with a composite reinforcement. Both faces are covered with a plastic thermo fusible film. The strip ensures water-tightness in the end laps.
.2 In conformance with: ASTM D6162.
.3 Acceptable Material:
.1 Sopralap by Soprema.
.2 Torchtape 180-FF by IKO.
.3 VANGUARD LAP by Lexcor.

2.9 PRIMER

.1 Primer for Thermofusible Membranes
.1 Primer made of bitumen, volatile solvents and adhesive resins. Used as primer to improve the adhesion of thermofusible waterproofing membranes.
.2 Acceptable Material:
.1 Elastocol 500 by Soprema.
.2 Mod Bit Primter by IKO.
.3 MULTIGRIP by Lexcor.
.2 Primer for Self-Adhesive Membranes
.1 Primer composed of SBS synthetic rubber, adhesive resins and VOC-free solvents. Used as primer to improve the adhesion of self-adhesive membranes.
.2 Acceptable Materials:
.1 Elastocol Stick Zero By Soprema.
.2 S.A.M. LVC Adhesive by IKO.
.3 MULTIGRIP by Lexcor.

2.10 FLAME-STOP MEMBRANE

.1 Self-adhesive membrane composed of SBS modified bitumen and a glass mat reinforcement, designed to prevent flames from penetrating into voids, cavities and openings before installing heat-welded membranes.
.2 Acceptable Materials:
.1 Sopraguard tape by Soprema.
.2 VANGUARD LAP STICK by Lexcor.

2.11 COMPLEMENTARY WATERPROOFING PRODUCTS

.1 Waterproofing Mastic
.1 Description: Multi-purpose mastic composed of SBS modified bitumen, fibres, mineral fillers and solvents.
.2 Acceptable Material:
.1 Sopramastic by Soprema.
.2 Aquabarrier mastic by IKO.
.3 LEXBOND C by Lexcor.

.2 Sealing Product
  .1 Bitumen/polyurethane waterproofing mono-component resin and polyester reinforcement.
  .2 Acceptable Material:
    .1 Alsan Flashing and Alsan Reinforcement by Soprema.
    .2 MS detail by IKO.
    .3 LEXCOAT FLASH by Lexcor.

2.12 CARPENTRY

.1 Refer to Section 06 10 00 - Rough Carpentry

2.13 FASTENERS

.1 Corrosion resistant, with minimum plate diameter of 50 mm and screw length to suit insulation thickness +38 mm.
.2 Acceptable Material:
  .1 Buildex.
  .2 Dekfast.
  .3 Trufast.
  .4 Soprafix.
  .5 LEXGRIP by Lexcor.

3 Execution

3.1 SURFACE EXAMINATION AND PREPARATION

.1 Surface examination and preparation must be completed in conformance with instructions in the membrane manufacturer's technical documentation.
.2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood grounds) as well as flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be carried out. The start of roofing work will be considered as acceptance of conditions for work completion.
.3 Do not begin any portion of work before surfaces are clean, 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 works have been duly completed.
.5 No materials will be installed during rain or snowfall.

3.2 METHOD OF EXECUTION

.1 Roofing work must be completed in a continuous fashion as surfaces are readied and as weather conditions allows it.
.2 It's preferable to seal all joints that are not covered by a cap sheet membrane the same day. A second cap sheet cannot be installed if any moisture is present in joints.
.3 Ensure waterproofing of roofs at all times, including protection during installation work by other trades and protection as work is completed (e.g. vents, drains, etc.).

3.3 SITE PROTECTION

.1 Protect the exposed surfaces of finished work to avoid damage during roof installation and material transportation. Install walkways made of rigid boards over installed roofing materials to enable passage of people and transport of products. Assume full responsibility for any damage.

3.4 INSTALLATION OF BOARDS WITH FACTORY LAMINATED BASE SHEET

.1 Optional installation (Contractor's option).

.2 Adhere base sheet board using adhesive applied in continuous strips spaced as per CSA-123-21 requirements.
.3 Mechanically fasten boards with screws and plates for membranes spaced as per CSA-123-21 requirements.

3.5 APPLICATION OF PRIMER

.1 Wooden, metallic, concrete and masonry surfaces or gypsum insulation substrate will receive a coat of primer at a rate recommended by the manufacturer. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Primed surfaces must be covered with the roofing membrane as soon as possible (on the same day for self-adhesive membranes).

3.6 INSTALLATION OF BASE SHEET FLASHING

.1 Apply base sheet flashing only, once primer coat is dry.
.2 Install base sheet flashing in one (1) meter widths to cover roofing substrate over 100mm overlap side laps by 75mm. Stagger side laps by at least 100mm from base sheet overlaps on roof to avoid excessive layering.
.3 Apply base sheet flashing directly onto substrate by removing silicone paper cover sheet. Torch roof's base-sheet plastic film on installation zone. Proceed from top to bottom. Once in place, apply pressure manually in a uniform fashion to obtain homogenous adherence over entire surface. Preferably seal seams with rubber roller.
.4 Avoid forming wrinkles, air pockets or fishmouths.

3.7 INSTALLATION OF SUPPORT PANEL AND VAPOUR BARRIER

.1 Because of the nature of this system, for this type of vapour barrier, joints can be aligned (no offset) to facilitate the installation of the reinforcing strip.
.2 Adhere the first 60 mm of the self-adhesive side laps using a membrane roller, then heat weld the last 40 mm self-adhesive, heat-welded side laps.
.3 Seal the end laps by welding a 330-mm wide protection strip centered on the joint

3.8 INSTALLATION OF INSULATION

.1 It is not required to fasten insulation boards, to achieve wind uplift performance, under mechanically fastened board with factory laminated base sheet membranes. However in order to prevent any insulation board movement, they can be fastened at a rate of one fastener per 4 sq/ft.
.2 Mechanically fasten boards with screws and plates for membranes. Mechanical fasteners must be installed in the centre of the membrane side selvedge and on board surface as per CSA A123.21-10 requirements.
.3 Surfaces must be dry and free of oil, grease, dirt and debris. The adhesive must be applied using a battery operated applicator in continuous strips of 13 to 19mm wide at time of application. Beads must be spaced CSA 123.21 requirements.

3.9 INSTALLATION OF SUPPORT PANELS

.1 Install in accordance with Manufacturer's recommendations.

3.10 INSTALLATION OF FLAME-STOP MEMBRANE

.1 Adhere the membrane directly onto an approved substrate by removing the silicone release film. Flame-stop membrane is designed to prevent flames from penetrating into voids, cavities and openings while installing heat-welded membranes.

3.11 INSTALLATION OF BASE SHEET ON THE FIELD SURFACE

.1 Unroll base sheet on the substrate, taking care to align the edge of the first selvedge with drain centre (parallel to roof edge).

.2 Cut off corners at end laps to be covered by the next roll.
.3 Weld the base sheet onto prepared substrate.
.4 Each selvedge will overlap the previous one along lines provided for this purpose, and will overlap the ends by 150 mm. Space end laps by a minimum of 300 mm.
.5 Avoid the formation of wrinkles, swellings or fishmouths.

3.12 INSTALLATION OF SELF-ADHESIVE BASE SHEET ON FLASHING AND PARAPETS

.1 Apply base sheet flashing only after primer coat is dry.
.2 Before applying membranes, always burn the plastic film from the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply primer for self-adhesive membranes on the area to be covered at the foot of the parapets.
.3 Cut off corners at end laps of areas to be covered by the next roll.
.4 Each selvedge will overlap the previous one along lines provided for this purpose, and by 150 mm at the ends.
.5 Position the pre-cut membrane. Remove 150mm of the silicone release film to hold the membrane in place at the top of the parapet.
.6 Then, gradually peel off the remaining silicone release film, pressing down on the membrane with an aluminium applicator to ensure good adhesion. Use the aluminium applicator to ensure a perfect transition between the flashing and the field surface.
.1 Smooth the entire membrane surface with a membrane roller for full adhesion.
.7 Install a reinforcing gusset at all inside and outside corners.
.8 Always seal overlaps at the end of the workday.
.9 Avoid the formation of wrinkles, swellings or fishmouths.

3.13 INSTALLATION OF WELDABLE BASE SHEET ON FLASHINGS AND PARAPETS

.1 Apply base sheet flashing only after primer coat is dry.
.2 Cut off corners at end laps to be covered by the next roll.
.3 Each selvedge will overlap along lines provided for this purpose, and by 150 mm at the ends.
.4 This base sheet membrane must be welded directly to the substrate, proceeding from top to bottom using a propane torch.
.5 Avoid the formation of wrinkles, swellings or fishmouths.

3.14 INSTALLATION OF THERMOFUSIBLE CAP SHEET ON FIELD SURFACE

.1 Begin with double-selvedge starter roll. If starter roll is not used, side laps covered with granules must be de-granulated by embedding granules in torch-heated bitumen over a 75 mm width.
.2 Starting at drain, unroll the membrane on the base sheet, taking care to align the edge of the first selvedge with the edge of the roof.
.3 Cut off corners at end laps at areas to be covered by the next roll.
.4 Each selvedge will overlap the previous one along lines provided for this purpose, and will overlap by 150 mm at the ends. Space end laps a minimum of 300 mm.
.5 Heat-weld cap sheet membrane with a torch on the base sheet to create a bleed out of 3 to 6 mm.
.6 During installation, be careful not to overheat the membrane or its reinforcements.
.7 Avoid the formation of wrinkles, swellings or fishmouths.
.8 Avoid walking over finished surfaces; use rigid protective walkways as needed.

3.15 INSTALLATION OF THERMOFUSIBLE CAP SHEET ON FLASHINGS AND PARAPETS

.1 This cap sheet must be installed in one-metre-wide strips.
.2 Each selvedge will overlap the previous one laterally along lines provided for this purpose, and will overlap by 150 mm the field surface. Membranes for flashings must be spaced at least 100 mm with respect to the cap sheet membranes on the field surface, to avoid areas of excessive membrane thickness.

.3 Cut off corners at end laps on areas to be covered by the next roll.
.4 Use a chalk line to draw a straight line on the field surface, 150 mm from flashings and parapets.
.5 Use a torch and round-nose trowel to embed the surface granules in the layer of hot bitumen, starting from the chalk line on the field surface to the bottom edge of the flashing or parapet, as well as on the granulated vertical surfaces to be overlapped.
.6 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top.
.7 Avoid the formation of wrinkles, swellings or fishmouths.
.8 During installation, be careful not to overheat the membrane and its reinforcements.

3.16 INSTALLATION OF VARIOUS DETAILS

.1 Install waterproofing membranes at various roofing details in conformance with typical details indicated in technical documentation of the manufacturer.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 46 19 - Steel Siding.

1.2 REFERENCES

.1 The Aluminum Association Inc. (AA)
- .1 Aluminum Sheet Metal Work in Building Construction-2000.
- .2 AA DAF45-97, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials (ASTM International)
- .1 ASTM A167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A240/A240M-02, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .3 ASTM A591/A591M-98, Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
- .4 ASTM A606-01, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
- .5 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .6 ASTM A792/A792M-02, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .7 ASTM B32-00, Standard Specification for Solder Metal.
- .8 ASTM B370-98, Standard Specification for Copper Sheet and Strip for Building Construction.
- .9 ASTM D523-89(1999), Standard Test Method for Specular Gloss.
- .10 ASTM D822-01, 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-37.5-M89, Cutback Asphalt Plastic Cement.
- .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .3 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.5 Canadian Standards Association (CSA International)
- .1 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.
- .2 CSA-A440-00/A440.1-00 - A440-00, Windows / Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows.
- .3 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 SHEET METAL MATERIALS

.1 Prepainted Zinc coated steel sheet: 24 ga. thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied polyvinylidene fluoride.
- .1 Class F1S.
- .2 Two (2) colors selected by Consultant from manufacturer's standard range.
- .3 Specular gloss: 30 units +/- in accordance with ASTM D523.
- .4 Coating thickness: not less than 22 micrometers.
- .5 Resistance to accelerated weathering for chalk rating of 8, color fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
  - .1 Outdoor exposure period 2500 hours.
  - .2 Humidity resistance exposure period 5000 hours.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.
.2 Plastic cement: to CAN/CGSB 37.5.
.3 Underlay for metal flashing: Membrane flashing by Section 07 52 00 - Modified Bitumen Membrane Roofing.
.4 Sealants: to CAN/;CGSB 19.13, one component. Acceptable Material:
- .1 Tremco A Spectrum 2"
- .2 Pecora 895 NST.

.5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
.6 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.
.7 Washers: of same material as sheet metal, 1 mm thick with rubber or neoprene packings.
.8 Prefabricated flashing at pipes penetrating roofs: purpose-made, neoprene or spun aluminum to CRCA Specification FL/532, minimum 300mm above top of roof membrane.
.9 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details.
- .1 Brake form to profiles indicated and required to suit parapet configurations.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated of 26 ga thick galvanized steel.

2.6 PANS

.1 Form pans to receive roofing plastic from 20 ga thick steel aluminum sheet metal with minimum 75 mm upstand above finished roof and 100 mm continuous flanges with no open corners. Solder joints. Make pans minimum 50 mm wider than member passing through roof membrane.

2.7 REGLETS AND CAP FLASHINGS

.1 Form recessed reglets from 20 ga thick sheet metal to be built-in concrete work for base flashings as detailed. Provide slotted fixing holes and steel/plastic washer fasteners. Cover face and ends with plastic tape.

2.8 SCUPPERS

.1 Form scuppers from 20 ga sheet metal.
.2 Sizes and profiles as indicated.
.3 Provide necessary fastenings.

3 Execution

3.1 INSTALLATION

.1 Install sheet metal work as detailed.
.2 Use concealed fastenings except where approved before installation.
.3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
.4 Counter flash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.
.5 Lock end joints and caulk with sealant.
.6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
.7 Insert metal flashing into reglets to form weather tight junction.
.8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
.9 Caulk flashing at reglet with sealant.
.10 Install pans, where shown and around items projecting through roof membrane.

3.2 SCUPPERS

.1 Install scuppers as indicated.

END OF SECTION

This page intentionally left blank

1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 12 23 - Structural Steel for Buildings.
.2 Section 05 31 00 - Steel Decking
.3 Section 07 84 00 - Firestopping
.4 Section 09 21 16 - Gypsum Board Assemblies

1.2 DESCRIPTION OF WORK

.1 This Section specifies the requirements for the work involved in the supply and application of spray fireproofing to full height of all structural columns and structural steel beams, and joists including all associated struts, bracing and connectors, through all levels.

1.3 REFERENCES

.1 Underwriters Laboratories of Canada (ULC)
  .1 CAN/ULC-S101, 1989.
  .2 CAN/ULC-S102, 1988.
.2 ASTM E605, Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members.
.3 AWCI Publication, Inspection Procedure for Field-Applied Sprayed Fire-Resistive Materials.
.4 UBC Standard No. 7-6, (current addition) Thickness and Density Determination for Spray-Applied Fire Protection.

1.4 QUALIFICATIONS OF APPLICATOR

.1 Licensed by manufacturer of fireproofing materials.

1.5 TEST REPORTS

.1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.
.2 Submit test results in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.6 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit duplicate 300 x 300 mm size sample of exposed fireproofing for approval of texture and color.

1.7 MOCK-UP

.1 Apply fireproofing to approximately 10m2 area of surface of mock-up-matching surface to be treated. The building is suitable for mock-up and if accepted may remain.
.2 Allow 24 hours for inspection of mock-up by Consultant before proceeding with fireproofing work.

1.8 PROTECTION

.1 At outdoor temperatures less than 50 C, ensure that a 50 C air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.
.2 Provide temporary enclosures to prevent spray from contaminating air beyond application area.

.3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site in unopened packages, fully identified as to manufacturer, type and other identifying data. Packages shall bear labels for the fire hazard and fire-resistance classifications.

1.10 WARRANTY

.1 Submit a written warranty, stating that spray fireproofing will remain free from cracks, checking, dusting, spalling, separation and blistering for a period of five (5) years from the date of Substantial Performance for the Work of the Contract. Make good all such defects at no cost to the Owner.

1.11 SITE CONDITIONS

.1 Hangers, inserts, clips and similar items for the connection of ALL elements supported from the deck, joists or structural elements to be receive spray fireproofing shall have been installed before spray fireproofing is installed.
.2 Pipes, ducts, conduits and other equipment above ceilings shall be installed after application of spray fireproofing.
.3 Attend a pre-installation meeting to coordinate site conditions and activities.

1.12 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Sprayed fireproofing: ULC certified cementitious fireproofing, asbestos free, qualified for use in ULC Designs specified.
.2 Fireproofing: minimum dry density and cohesion/adhesion properties as follows:
  .1 In accordance with CAN/ULC 4-S101-M and/or UL263 (ASTM E119) for sprayed fire-resistive materials.
  .2 Density: minimum individual or average density values listed in ASTM E605 and in the specified ULC designs.
  .3 Combustibility: non-combustible in accordance with CAN 4-S114-M80 and ASTM E136.
  .4 Surface burning characteristics: Flame Spread 0 and Smoke Developed 0, in accordance with CAN/ULC 4-S102-M and ASTM E84.
  .5 Deflection shall not crack or delaminate from steel deck subjected to a one-time vertical load resulting in a downward deflection of the steel deck of 1/120th of the span, in accordance with ASTM E759.
  .6 Bond impact: shall not crack of delaminate from concrete topped, galvanized steel deck, in accordance with ASTM E760.
  .7 Bond strength: average bond strength of 9.5 kPa (150 psf) when applied over uncoated or galvanized steel, in accordance with ASTM E761.
  .8 Compressive strength: maximum deformation of 10% when subject to a crushing force of 35.9 kPa (750 psf) in accordance with ASTM E761.

.9 Air erosion: maximum loss of 0.27 g/m2 (0.025 g/ft2), in accordance with ASTM E859.
.10 Corrosion resistance: in accordance with ASTM E937.
.11 Acceptable Material:
.1 A/D Fire Protection Systems, A/D Type 5 GP.

.3 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.
.4 Sealer / topcoat: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.
.1 Color: white.
.5 Bonding adhesive or primer: as recommended by spray fireproofing manufacturer.
.6 Water: clean potable and free of any substances deleterious to the sprayed mineral fiber.

3 Execution

3.1 PREPARATION

.1 Substrate shall be free of material, which would impair bond.
.2 Verify that painted substrates are compatible and have suitable bonding characteristics to receive fireproofing.
.3 Remove incompatible materials.
.4 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.
.5 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.
.6 Notify consultant of any substrates found to be unacceptable for the application of the fire-resistive materials before commencing work. Commencement of work shall imply acceptance of the substrates and work of others as suitable for application of spray fireproofing.

3.2 APPLICATION

.1 Apply bonding adhesive or primer to substrate if recommended by manufacturer.
.2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings.

LOCATION	RATING	ULC DESIGN NO.
Steel Floor Deck	2 hours	F-817
Steel Beams	2 hours	F-817
Steel Columns	2 hours	F-817

.3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.
.4 Apply fireproofing directly to open web joists without use of expanded lath.
.5 Tamp smooth, surfaces visible in finished work.
.6 Apply curing compound to surface of cementitious fireproofing as required by manufacturer.
.7 Apply sealer to surface of mineral fiber fireproofing as required by manufacturer in ventilation plenums and as indicated.

3.3 INSPECTION AND SITE TESTS

.1 Inspection and testing of sprayed fire resistive material will be carried out by a qualified testing firm arranged and paid for by Contractor that the fire protection applicator in accordance with one(1) of the following procedures and Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
.1 ASTM E605: Standard Test Method for Thickness and Density of Sprayed Fire-Resistive Materials.

.2 AWCI: Inspection Procedure for Field-Applied Fire-Resistive Materials.
.3 UBC Standard No. 7-6: Thickness and Density Determination for Spray-Applied Fire Protection.

.2 Submit test reports in accordance with the requirements of Section 01 29 83 Payment Procedures - Testing Laboratory Services.

3.4 PATCHING

.1 Patching of damage to fireproofing caused by testing or by other trades, including failure to install required hangers, inserts and similar items, or through negligence, to be carried out by this Section, before fireproofing is concealed, or if exposed, before final inspection.

3.5 CLEANING

.1 Remove all over spray on surfaces not designated to receive spray fireproofing to an extent acceptable to the Consultant.

END OF SECTION

1 General

1.1 SCOPE OF WORK

.1 Single qualified Trade to provide all firestopping for the entire project, included all mechanical & electrical penetrations, except as noted below.
.2 Fire stopping and smoke seals within mechanical assemblies (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Divisions 21, 22, 23, 25, 26, 27 and 28 respectively.
.3 Refer to Section 09 90 00 - Painting for painting of rated wall assemblies.
.4 Tag each type of firestopping used.

1.2 REFERENCES

.1 Underwriter's Laboratories of Canada (ULC)
  .1 CAN/ULC-S115-Standard Method of Fire Tests of Firestop Systems.
  .2 NBC 3.1.9.1 Fire Stop Requirements
  .3 NBC 3.1.9.3 Fire Stop for Penetrations, Wires & Cables.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit shop drawings indicating:
  .1 ULC listed firestop drawing for each anticipated distinct fire separation penetration and joint. Each ULC system firestop drawing must indicate the actual penetrating products used on site and the required fire stop materials and their proper installation.
  .2 Technical information for each material used in ULC system firestop drawing above.
  .3 Construction details should accurately reflect actual job conditions.

1.4 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.
.3 Material Safety Data Sheets:
  .1 Submit MSDS for inclusion in Operation and Maintenance Manual.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Use purpose designed products for application.
.2 Fire stopping and smoke seal systems: in accordance with CAN/ULC-S115.
  .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN/ULC-S115 and not to exceed opening sizes for which they are intended and conforming to special requirements specified in 3.5.
  .2 All penetrations of fire separations must be fire stopped as per CAN/ULC-S115 standard with F rating and similar for Fire Resistant Rating for closures.

.3 All penetrations of a firewall must be fire stopped per CAN/ULC-S115 standard with FT rating and similar for Fire Resistant Rating for the fire separation.
.4 Acceptable Material:
.1 Tremco Fyre-Shield.
.2 A/D Fire Barrier Sealant.
.3 3M Fire Barrier Products.
.4 Hilti Firestops Products.
.5 DAP Fire Stop Fire-Rated Silicone Sealant.
.6 NUCO Inc. firestopping products.

.3 Service penetration assemblies: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No.40 U19.
.4 Service penetration firestop components: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No.40 U19.13 and ULC Guide No.40 U19.15 under the Label Service of ULC.
.5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
.6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
.7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
.8 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
.9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
.10 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
.11 Sealants for vertical joints: non-sagging.
.12 At rated partitions use 1 outlet box per stud space or where more than 1 outlet box / stud spacer is required use putty pads behind or at inside face of box.
.13 Where rated assemblies are penetrated for drains use rated fire stopping.

3 Execution

3.1 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 INSTALLATION

.1 Install fire stopping and smoke seal material and components in strict accordance with ULC certification and manufacturer's written instructions.
.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
.4 Tool or trowel exposed surfaces to a neat finish.
.5 Remove excess compound promptly as work progresses and upon completion.

3.3 INSPECTION

.1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

.2 Anticipate destructive testing of 2% of firestopping at this Section's cost. Failure of 10% of tests will require replacement of all firestopping and retesting.

3.4 SCHEDULE

.1 Firestop and smoke seal at all penetrations of or joints in fire resistive wall and floor assemblies, including but not limited to:

- .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls as shown on wall schedule.
- .2 Edge of floor slabs at curtain wall and precast concrete panels.
- .3 Top of fire-resistance rated masonry and gypsum board partitions.
- .4 Intersection of fire-resistance rated masonry and gypsum board partitions.
- .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
- .6 Penetrations through fire-resistive floor slabs, ceilings and roofs.
- .7 Outlet boxes in rated walls more than 1 box / stud space.
- .8 Openings and sleeves installed for future use through fire separations.
- .9 Around mechanical and electrical assemblies penetrating fire separations.
- .10 Rigid ducts without fire damper: greater than 129 cm2: fire stopping to consist of bead of fire sealant between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

3.5 CLEAN UP

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

.2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

This page intentionally left blank

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00 - Cast-In-Place Concrete.
.2 Section 04 22 00 - Concrete Unit Masonry.
.3 Section 07 60 00 - Flashing and Sheet Metal.
.4 Section 07 84 00 - Firestopping.
.5 Section 08 41 13 - Aluminium Framed Entrances and Storefronts
.6 Section 08 80 00 - Glazing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
  .1 ASTM C 321 - Standard Test Method for Bond Strength of Chemical- Resistant Mortars.
  .2 ASTM C 834 - Standard Specification for Latex Sealants.
  .3 ASTM C 882 - Standard Test Method for Bond Strength of Epoxy-R Systems used with Concrete by Slant Shear.
  .4 ASTM C 919 - Standard Specification for use of Sealants in Acoustical Applications.
  .5 ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
  .6 ASTM C 1330 - Standard Specification for Cylindrical Sealant Backing for use with Cold Liquid Applied Sealants.
  .7 Sealants and associated materials must conform with the latest version of standards and specifications referenced.
.2 Transport Canada (TC)
  .1 Transportation of Dangerous Goods Act (TDGA).
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-19.21, Sealing and Bedding Compound Acoustical.
.4 Department of Justice Canada (Jus)
  .1 Canadian Environmental Protection Act, 1999 (CEPA).
.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
  .1 Caulking Compound.
  .2 Primers.
  .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
  .4 Installation instructions, surface preparation and product limitations.
.2 Manufacturer's Technical Data Guides and application procedures.
.3 Submit cured samples illustrating colors selected.
.4 Submit laboratory tests or data validating product compliance with performance criteria specified. Include SWRI validation certificate where required.
.5 Upon completion of the project the sealant applicator must submit copies of the Manufacturer's Weatherseal and the Warranty Applicator's Workmanship Warranty.
.6 Before proceeding with work or ordering of material submit the following to the Consultant for review and acceptance:
  .1 Manufacturer's product data for sealants to be used.
  .2 Manufacturer's recommended installation procedures.
.7 Material Safety Data Sheets:
    .1 Submit MSDS for inclusion in Operation and Maintenance Manual.

1.4 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Manufacturer Qualifications: Company regularly engaged in manufacturing and marketing of products specified in this section.

.3 Installer Qualifications: Qualified to perform work specified by reason of experience or training provided by the product manufacturer.

.4 Installer must submit a reference list including a minimum of three projects of similar size and scope.

.5 Mock-ups: Include a minimum of 3m of sealant to show compatibility with substrate, proper adhesion to substrate and chosen color.

- .1 Apply mock-up with specified joint filler types and with other components noted. Installer must provide both primed and un-primed mock up to assess whether a primer is required for the project.
- .2 Locate where directed by Consultant.
- .3 Mock-up may remain as part of the work if acceptable to Consultant.
- .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.

.6 Adhesion pull tests: the number of adhesion pull tests is to be determined by the manufacturer's weatherseal warranty. Adhesion pull tests are to be conducted by or in the presence of the manufacturer's representative. The manufacturer is to supply the Consultant / Owner with the results of the adhesion pull tests. The sealant installer is responsible for repairing areas where adhesion pull tests are conducted.

1.5 FIELD ADHESION / COHESION TESTS

.1 Test Frequency:

- .1 Perform a field test for each type of sealant and substrate combination, for all interior and exterior sealants associated with the building envelope.
- .2 Perform three (3) additional tests for each failed test.

.2 Locate test joints as directed by Owner's Representative. Tests to be performed in the presence of the Owner's Representative and/or manufacturer's representative.

.3 Notify Owner's Representative seven (7) days prior to dates tests are to be performed.

.4 Test joint sealants by hand-pull methods #1 and #2. Record results in Field Adhesion / Cohesion Test Form.

- .1 Test Method #1:
  - .1 Make a knife cut horizontally from one side of the joint to the other.
  - .2 Make two (2) vertical cuts (from the horizontal cut) approximately 75mm long on each side of the joint.
  - .3 Pry out flap created from cuts.
  - .4 Firmly grasp flap and slowing pull at 90 degrees from sealant plane.
  - .5 Pull flap until adhesive or cohesive failure occurs.
    - .1 Adhesive failure will be evidenced by the sealant pulling off clean from the substrate.
    - .2 Cohesion failure will be evidenced by the sealant ripping or failing within itself, leaving well-adhered sealant to the substrate, (cohesive failure is considered a positive result).
- .2 Test Method #2:
  - .1 Follow steps #1 to #4 (inclusive) of Test Method #1 above.
  - .2 Mark a benchmark on the sealant, 25mm from the plane of the installed sealant.
  - .3 Firmly grasp the flap and pull slowly, while holding a ruler parallel to the sealant flap. Note the position of the benchmark on the ruler.

.4 Refer to manufacturer's printed literature for each sealant tested for the required extension factor pass criteria; (i.e. if the 25mm benchmark on the sealant can be pulled to 100mm and held with no failure of sealant, 400% elongation is achieved).

.5 If no failure occurs prior to the manufacturer's stated extension factor, the test is successful. Extension factor should be three (3) times the movement capability of the sealant.

.5 Inspect joints for:
- .1 Complete fill.
- .2 Absence of voids.
- .3 Primer.
- .4 Proper width / depth ratio.
- .5 Backup material.

.6 Repair sealants pulled in test area by applying new sealants following same procedures used to original seal joints.

.7 Contactor shall repair test areas at no additional cost to the Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets (MSDS) for each product.

.3 Store products in location protected from freezing, damage, construction activity, precipitation and direct sunlight in strict accordance with manufacturer's recommendations.

.4 Condition products to approximately 16 to 21 degrees C, for use in accordance with manufacturer's recommendations.

.5 Handle all product with appropriate precautions and care as stated on Material Safety Data Sheet (MSDS).

1.7 PROJECT CONDITIONS

.1 Do not use products under conditions of precipitation or freezing weather. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

.2 Ensure substrate is dry.

.3 Protect adjacent work from contamination due to mixing, handling and application.

.4 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.

.5 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 labeling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

1.9 WARRANTY

.1 Provide manufacturer's five (5) year standard material warranty.

.2 Include coverage for replacement of sealant materials which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

.3 Warranty Exclusions: Failure resulting from concrete shrinkage, structural cracks or defects, faulty construction, faulty design, faulty materials (other than sealant), misuse of structure, settlement or accident, fire or other casualty, or physical damage.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Provincial and Municipal regulations.

2 Products

2.1 MANUFACTURERS

.1 Acceptable material:
  .1 BASF Building Systems.
  .2 Pecora Corporation.
  .3 Tremco Sealant and Waterproofing.
  .4 Sika Canada Inc.
  .5 Dow Corning.
.2 Provide all joint materials of the same type form a single manufacturer.

2.2 MATERIALS

.1 Single Component, Non-Sag Polyurethane Sealant with plus or minus 25 percent movement capability for vertical joints; ASTM C 920, Type S, Grade NS, Class 35, uses NT, M, A, O & I.
  .1 Acceptable Materials:
    .1 MasterSeal NP1 by BASF Building Systems.
    .2 Pecora DynaTrol 1-XL by Pecora Corporation.
    .3 Sikaflex 1a by Sika Canada Inc.
  .2 [Substrates: concrete, masonry, aluminum, wood, copper, stainless steel, galvanized steel and some stone. Expected service life: 7 - 12 years. Possible uses: Wall joints, window frames, precast joints, parapets etc.]
.2 Single component texturized polyurethane sealant with plus or minus 25 percent joint movement capability for horizontal or vertical joints, ASTM C 920, Type S, Grade NS, Class 25, uses NT, M, A, O.
  .1 Acceptable Materials:
    .1 MasterSeal TX1 by BASF Building Systems.
    .2 Vulkem 116 by Tremco Sealant & Waterproofing.
  .2 [Substrates: concrete, masonry, aluminum, wood, stucco, copper, stainless steel, galvanized steel and some stone. Expected service life: 7 - 12 years. Possible uses: Wall joints, HVAC, roofing, precast joints, parapets etc.]
.3 Single component low modulus high movement fast-curing silyl terminated polyether sealant with plus 100 and minus 50 percent joint movement capability; ASTM C 920, Type S, Grade NS, Class 50, uses NT, M, A, G, O; ASTM C 1382.
  .1 Acceptable Materials:
    .1 MasterSeal NP 150 by BASF Building Systems.
  .2 [Substrates: concrete, masonry, aluminum, glass, stone, EIFS, wood. Expected service life: 20 years. Possible uses: Wall joints, caulking windows, window & door frames, wet glazing, sanitary applications etc.]
.4 Multi-component field tintable low modulus high movement fast-curing sealant with plus 100 and minus 50 percent joint movement capability; ASTM C 920, Type M, Grade NS, Class 50.
  .1 Acceptable Materials:

.1 MasterSeal 150 Tint Base by BASF Building Systems.
.2 Pecora 890FTS by Pecora Corporation.

.2 [Substrates: concrete, masonry, aluminum, glass, stone, EIFS, wood. Expected service life: 20 years +. Possible uses: Wall joints, caulking windows, window & door frames, wet glazing, sanitary applications etc.]

.5 Field tintable low modulus high movement fast-curing textured sealant with plus and minus 50 percent joint movement capability; ASTM C 920, Type M, Grade NS, Class 50.

.1 Acceptable Materials:

.1 Pecora 890FTS-TXTR by Pecora Corporation.

.2 [Substrates: concrete, masonry, stone, EIFS. Expected service life: 20 years +. Possible uses: Wall joints, mortar joints.]

.6 Multi-component, Polyurethane Sealant with plus or minus 50 percent joint movement capability; ASTM C 920, Type M, Grade NS, Class 25, uses NT, T, M, A, O, G and I; UL classified (fire resistance).

.1 Acceptable Materials:

.1 DynaTrol ll by Pecora Corporation.
.2 MasterSeal NP2 by BASF Building Systems.
.3 Dymeric 240 by Tremco Sealant & Waterproofing.
.4 Sikaflex 2C NS by Sika Canada Inc.

.2 [Substrates: concrete, masonry, aluminum, vinyl siding, copper, stainless steel, galvanized steel, marble, granite and limestone. Expected service life: 7 - 12 years. Possible uses: Wall joints, window frames, structural components, etc.]

.7 Single component self-leveling polyurethane sealant with plus or minus 25 percent movement capability for horizontal joints; ASTM C 920, Type S, Grade P, Class 25 uses T&M.

.1 Acceptable Materials:

.1 Urexpan NR-201b by Pecora Corporation.
.2 MasterSeal SL1 by BASF Building Systems.
.3 Vulkem 45 by Tremco Sealant & Waterproofing.
.4 Sikaflex 1C SL by Sika Canada Inc.

.2 [Substrates: concrete & metal. Expected service life: 7 - 12 years. Possible uses: floor joints, sidewalks, driveways, decks, parking areas, etc.]

.8 Multi-component, Self-Leveling Polyurethane Sealant with plus or minus 25 percent movement capability for horizontal joints, ASTM C 920, Type M, Grade P, Class 25 uses NT. T, A, I & M.

.1 Acceptable Materials:

.1 Urexpan NR-200 by Pecora Corporation.
.2 MasterSeal SL2 by BASF Building Systems.
.3 Vulkem THC 900 by Tremco Sealant & Waterproofing.
.4 Sikaflex 2C SL by Sika Canada Inc.

.2 [Substrates: concrete, and metal. Expected service life: 7 - 12 years. Possible uses: floor joints, cantilever decks, driveways, decks, parking ramps, industrial floors, precast double T's, metal expansion joints etc.

.9 Single component neutral cure silicone sealant for non-structural glazing applications with plus / minus 50 percent joint movement capability; ASTM C 920, Type S, Grade NS, Class 50, Use NT, M, G and A.

.1 Acceptable Materials:

.1 Pecora 864NST or 895NST by Pecora Corporation.
.2 Dow Corning 795 by Dow Corning.
.3 Spectrum 2 by Tremco Sealant & Waterproofing.

.2 [Substrates: concrete, masonry, aluminum, glass & plastics. Expected service life: 20 years +. Possible uses: conventional glazing, window & door frames, window perimeters, curtain walls, expansion & control joints etc.

.10 Single component neutral cure silicone sealant for non-structural glazing applications with plus 100% minus 50% joint movement capability; ASTM C 920, Type S, Grade NS, Class 100/50, use T, NT, M, G, A and O. SWRI validated.
- .1 Acceptable Materials:
  - .1 Pecora 890NST by Pecora Corporation.
  - .2 Spectrum 1 by Tremco Sealant & Waterproofing.
  - .3 Dow Corning 790 by Dow Corning.
- .2 [Substrates: concrete, masonry, stone, ceramics, granite, wood, steel, aluminum and plastics. Expected service life: 20 years +. Possible uses: precast panels, curtain walls, mullions, expansion joints, EIFS, etc.

.11 Single component mildew resistant silicone sealant plus/minus 25% movement capability; ASTM C 920, Type S, Grade NS, Class 25, Use NT, G and A.
- .1 Acceptable Materials:
  - .1 Pecora 898 by Pecora Corporation.
  - .2 Tremsil 200 by Tremco Sealant & Waterproofing.
  - .3 Dow Corning 786.
- .2 [Substrates: glass, aluminum, tile and fiberglass. Possible uses: countertops, kitchen & bath areas, non-structural glazing, etc.

.12 Single component silicone structural adhesive with plus/minus 50% joint movement capability; ASTM C 920, Type S, Grade NS, Class 25, Use NT, G and A.
- .1 Acceptable Materials:
  - .1 Dow Corning 995 by Dow Corning.
  - .2 Pecora 895NST by Pecora Corporation.
- .2 [Substrates: glass, aluminum, anodized aluminum, paints. Structural glazing applications must be reviewed by Pecora Corp Technical Service Staff. Contact your local manufacturer's representative for more information. Possible uses: two sided or four sided structural glazing.]

.13 Single component synthetic rubber sealant purpose made for use in acoustical applications.
- .1 Acceptable Materials:
  - .1 Tremco Acoustical Sealant.
  - .2 Pecora BA-98.

.14 Single-Component, Nonsag, Urethane Tamper-resistant Security Joint Sealant, ASTM C920, Type S or Type M, Grade NS, Class 12.5, for Use NT, Shore A hardness 40 +/- 5 in accordance with ASTM C661.
- .1 Interior tamper-resistant security joints as follows:
  - .1 Moving (e.g. perimeters of exterior openings) and non-moving (e.g. fixture joints) in public and supervised locations.
  - .2 Acceptable Products:
    - .1 “Pecora Dynaflex™ SC” by Pecora Corporation
    - .2 “Masterseal CR195” by Master Builders Solutions.
    - .3 "DOWSIL™ 995 Silicone Structural Sealant” by Dow Chemical of Canada ULC
    - .4 “Sikaflex 11FC” or “Sika Construction Adhesive”]

.15 Multi-component, non-sag pickproof epoxy security joint sealant, Shore D hardness 70 +/- 5 in accordance with ASTM C661.
- .1 Interior pick-proof security joints as follows:
  - .1 Non-moving (e.g. fixture joints) in isolated areas such as patient rooms, seclusion rooms and similar locations.
  - .2 Acceptable Products:
    - .1 "Pecora Dynapoxy EP 1200” by Pecora Corp.
    - .2 “Sika Anchorfix 3001” or “Sikadur 31High-Mod Gel” by Sika Canada Inc.

.16 Gunned 100% solids epoxy joint filler. Two component gun-grade pick proof epoxy joint filler for sloped, vertical areas and security applications.

.1 Tensile Strength: 13.8 MPa
.2 Slant Shear Strength: 34.5 MPa.
.3 Bond Strength: 10.3 MPa.
.4 Acceptable Materials:
.1 Dynapoxy EP-1200 by Pecora Corporation.
.2 MasterEmaco ADH 327 by BASF Building Systems.

.17 Two-component self leveling, 100 percent solids Polyurea control joint filler.
.1 Shore A Hardness: 85 to 90.
.2 Tensile Strength: 1183 psi.
.3 Elongation: 240 percent.
.4 Acceptable Materials:
.1 MasterSeal CR 100 by BASF Building Systems.
.2 Sika Loadflex Polyurea by Sika Canada Inc.
.3 PenJoint 3004 (ASTC)

2.3 ACCESSORIES

.1 Primer: Type recommended by the sealant manufacturer and compatible with joint forming materials.
.2 Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.
.3 Soft Backer Rod: non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants.
.1 Comply with ASTM C 1330.
.2 Size required for joint design.
.4 Closed-Cell Backer Rod: closed-cell polyethylene rod designed for use with cold-applied joint sealants for on-grade or below-grade applications.
.1 Comply with ASTM C 1330.
.2 Size required for joint design.
.5 Joint Filler: closed-cell polyethylene joint filler, designed for use in cold joints, construction joints or isolation joints wider than 1/4 inch (6mm).
.1 Size required for joint design.
.6 Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

2.4 COLOR

.1 Sealant Colors: Selected by Consultant.
.1 Manufacturer's standard color range.
.2 Custom color matching submittal of job site substrate samples.

3 Execution

3.1 PROTECTION

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

3.2 EXAMINATION

.1 Inspect all areas involved in work to establish extent of work, access and need for protection of surrounding construction.
.2 Conduct pre-application inspection of site verification with an authorized manufacturer's representative.
.3 Occupied areas: where high VOC materials are utilized, investigate occupants to determine the measures to be taken to accommodate them.

3.3 PREPARATION

.1 Remove loose materials and foreign matter which could impair adhesion of the sealant.
.2 Clean joint and saw cuts by grinding, sandblasting or wire brushing to expose a sound surface free of contamination and laitance.
.3 Ensure structurally sound surfaces are dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials and other foreign matter.
.4 Where the possibility of sealants staining adjacent areas or materials exist, mask joints prior to application.
    .1 Do not remove masking tape before joints have been tooled and initial cure of joint filler has taken place.
    .2 Work stained due to failure of proper masking precautions will not be accepted.

3.4 INSTALLATION:

.1 Priming:
    .1 Prime all surfaces to receive sealant with recommended primer unless the mockup proves otherwise.
.2 Back-Up Material:
    .1 Install appropriate size backer rod, larger than joint where necessary according to manufacturer's recommendations.
    .2 Install polyethylene joint filler in joints wider than 1/4 inch (6mm) to back-up material per manufacturer's recommendations.
.3 Bond Breaker:
    .1 Install bond-breaker strip in joint to be sealed on top of back-up material to prevent adhesion of sealant to back-up material; install per manufacturer's recommendations.
.4 Sealant:
    .1 Prepare sealants that require mixing; follow manufacturer's recommended procedures, mixing thoroughly.
    .2 Mix only as much material as can be applied within manufacturer's recommended procedures, mixing thoroughly.
    .3 Apply materials in accordance with manufacturer's recommendations; take care to produce beads of proper width and depth, tool as recommended by manufacturer and immediately remove surplus sealant.
    .4 Apply materials only within manufacturer's specified application life period. Discard sealant after application life is expired or if prescribed application period has elapsed.

3.5 CLEANING

.1 Remove uncured sealant with Reducer 990, xylene, toluene or MEK. Remove cured sealant by razor, scraping or mechanically.
.2 Remove all debris related to application of sealants from job site in accordance with all applicable regulations for hazardous waste disposal.

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 Cleanup.

.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

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Provide labour, materials, products, equipment and services to complete the steel doors and frames work specified herein. This includes, but is not necessarily limited, to:

.1 Interior hollow-metal doors and pressed steel frames

.2 Pressed steel frames for borrowed lites and screens.

.3 Frame anchors, glass mouldings and stops, inserts, in-fill panels and other auxiliary materials required for a complete installation.

.4 Preparation of steel doors and frames for CSA approved wiring system and conduits for electronic hardware and automatic door operators.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Minimum base steel thicknesses for gauges: in accordance with Appendix 1 of CSDMA “Recommended Specifications for Commercial Steel Door and Frame Products”. Steel sheet thicknesses specified herein are base metal thicknesses prior to galvanizing.

.3 CSDMA: Canadian Steel Door Manufacturers Association

.4 NAAMM: National Association of Architectural Metal Manufacturers

.5 HMMA: Hollow Metal Manufacturer’s Association.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 DEFINITIONS

.1 Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: Schedule, and conduct pre-installation meeting at Project Site, in order to coordinate work of this Section, with work of related Subcontractors.

.1 Ensure attendance of Subcontractor performing work of this Section and representatives of manufacturers and fabricators involved in, or affected by, installation and coordination with other materials and installations that have preceded or will follow. Advise Consultant and Owner in advance of scheduled meeting dates.

.2 Agenda: Review progress of other construction activities and preparations for the particular activity under consideration.

.3 Record significant discussions, agreements, and disagreements, including required corrective measures and actions.

.4 Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

.2 Coordination

.1 Coordinate anchorage installation for pressed steel frames. Supply setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

.1 Product Data: Submit product data in accordance with Division 01 for the following:

.1 Submit manufacturer's instructions, printed product literature and data sheets for the steel doors and frames work and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

.2 Shop Drawings: Submit Shop Drawings in accordance with Division 01. Include the following:

.1 Indicate each type of door, frame, steel, construction and core clearly demonstrating the following:

.1 Show dimensioned door and frame product elevations and sections.

.2 Show listing of opening descriptions including locations, material thickness, and anchors.

.3 Show location and details of openings.

.4 Provide manufacturer's recommended installation instructions and procedures.

.2 Indicate material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, paneled or louvered) and arrangement of standard hardware.

.3 Include schedule identifying each unit, with door marks and numbers relating to Consultant’s numbering on Drawings and Door Schedule.

.3 Samples:

.1 When requested by Consultant, submit fabrication Samples approximately 203 by 254 mm (8 by 10 inches) to demonstrate compliance with requirements for quality of materials and construction:

.1 Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.

.2 Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

.3 Samples submitted must represent, in all respects, the minimum quality of work to be supplied by the manufacturer. Do not fabricate any work represented by samples until the samples are reviewed. Deviation of fabrication quality, compared to reviewed samples, will be cause for rejection of work.

.4 Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

.1 Product Test Reports: Submit product test reports in accordance with Division 01 for each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency. As a minimum, submit the following test reports:

.1 Confirmation of Physical Endurance Test to ANSI/SDI A250.4, "Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, and Frame Anchors" to minimum Level A - 1,000,000 cycles.

.2 Ensure reports include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of test.

1.7 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Execute work in this Section by a manufacturer who is a member of CSDMA.

.1 Ensure product is manufactured by a firm experienced in design and production of standard and custom commercial steel door and frame assemblies, integration of builders' or electronic hardware and glazing assemblies, and other items affecting work.

.2 Supplier Qualifications: Ensure Product Supplier has Architectural Hardware Consultant (AHC) or person of equivalent experience, available at reasonable times to consult with Consultant, Contractor and Owner.

.3 Installer Qualifications:

.1 Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of Product manufacturers.

.2 Ensure retained installers are familiar with Product manufacturers specified herein and with ANSI/NFPA 80 requirements for installation of labeled fire rated steel doors, frames and hardware.

.4 Welding:

.1 Provide welding in accordance with CSA W59-M performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau as specified herein.

.2 Ensure fabricator is fully certified by Canadian Welding Bureau for fusion welding of steel structures to CSA W47.1 and for fusion welding of aluminum to CSA W47.2.

.5 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

.2 Provide additional protection to prevent damage to factory-finished units.

.3 Deliver welded frames with two temporary shipping spreader bars across bottom of frames, tack welded to jambs and mullions. Temporary spreader bars are intended for shipping and handling purposes only, and must not be used for installation purposes.

.2 Storage and Handling Requirements:

.1 Provide site storage and protection of materials in accordance with NAAMM-HMMA 840. Store items in dry, secure location on planks or dunnage.

.2 Store Door and frame Products in vertical position, spaced with blocking. Cover materials to protect them from damage but in such a manner as to permit air circulation.

.3 Immediately Make Good any damage acquired during shipping or handling. Clean scratches and touch up with rust-inhibitive primer. Replace damaged work which cannot be repaired, restored or cleaned.

.4 For welded frames, weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling. Do not use temporary jamb spreaders for installation.

1.9 FIELD CONDITIONS

.1 Verify actual opening sizes and field conditions by field measurement before fabrication. Submittal drawings must reflect measurements and conditions provided, and product manufactured accordingly. Coordinate field measurements with fabrication and construction schedules to avoid delays.

.2 Verify that substrate conditions, whether existing or otherwise, are as detailed on Drawings, and are acceptable for product installation in accordance with manufacturer's instructions.

.3 Do not proceed with fabrication without receipt of reviewed Shop Drawings and reviewed construction hardware schedule.

1.10 WARRANTY

.1 Extended Rust-perforation Warranty: manufacturer’s standard form in which manufacturer agrees to repair finishes or replace doors that show evidence of excessive rusting within specified warranty period.

.1 Warranty Period: 5 years from date of Substantial Performance of the Work.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Artek Door Limited; www.artekdoor.com

.2 Baron Hollow Metal; www.baronmetal.com

.3 Daybar Industries Limited; www.daybar.com

.4 Fleming Door Products; an Assa Abloy Group company; www.flemingdoor.com.

.5 Gensteel Doors; www.gensteeldoors.com

.6 LMT Group inc.; www.groupelmt.com

.2 Substitution Limitations: This Specification is based on Products by Fleming Door Products.

.3 Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 REGULATORY REQUIREMENTS

.1 Labelling requirements:

.1 Provide label of recognized testing agency having factory inspection service, and constructed as listed or classified for labeling in accordance with NFPA 80, listing authority's policies and label materials.

.2 Listing must identify manufacturer.

.3 Construct fire-rated doors and frames as listed for labeling in "Follow-Up Service Procedures/Factory Inspection Manuals" issued by listing agency.

.2 Fire-Rated Door Assemblies:

.1 Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings and Schedules, based on testing according to CAN4-S104.

.3 Fire-Rated, Frame Assemblies:

.1 Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings and Schedules, based on testing according to CAN4-S104 (Frames, transom and sidelight assemblies) and CAN4-S106 (window assemblies).

.4 Smoke- and Draft-Control Assemblies:

.1 Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

.5 Temperature Rise Rated Assemblies: Provide fire and temperature rise rated steel doors for those openings as determined and scheduled by Consultant.

.1 As a minimum, Provide fire and temperature rise rated steel doors and frames at following locations and as indicated on Drawings and schedules:

.1 between dead end corridor and adjacent occupied spaces;

.2 between exit enclosures (stairs) and remainder of floor areas;

.3 in firewalls and other specific locations noted on Drawings or Schedules.

2.3 DESIGN AND PERFORMANCE REQUIREMENTS

.1 Unless otherwise indicated, construct doors to be minimum 44.5 mm (1-3/4 inches) thick.

.2 Construct doors to meet requirements of NAAMM-HMMA 861 and CSDMA specifications. Ensure door and frame Products are fabricated in strict accordance with reviewed Shop Drawings. Ensure steel is free of scale, pitting, coil breaks, surface blemishes, buckles, waves and other defects.

.3 Doors must meet ANSI/SDI A250.4, for Level A performance (1,000,000 cycles).

.4 Facilitate installation of electrical components complete with arrangement so conduits and wiring can be readily removed and replaced.

.5 Ensue exterior door assemblies can meet the following performance requirements as a minimum:

.1 Thermal resistance (R-Value)

.1 Nominal: Not less than RSI 1.94 K x sq. m/W (R11 deg F x h x sq. ft./Btu) in accordance with ASTM C518.

.2 Actual: Not less than RSI 0.6 K x sq. m/W (R3.4 deg F x h x sq. ft./Btu) in accordance with ASTM C1363.

.2 Thermal transmittance (U value):

.1 Nominal: Not more than 0.5 W/(sq.m· K) (0.09 BTU/(sq.ft · deg F) in accordance with ASTM C518.

.2 Actual: Not more than 3.45 W/(sq.m· K) (0.29 BTU/(sq.ft · deg F) in accordance with ASTM C1363.

.3 Air Infiltration: Maximum air leakage of 0.20 L/s per sq. m (0.04 cfm/sq. ft.) at a static-air-pressure differential of 75 Pa (1.57 lbf/sq. ft.).

2.4 MATERIALS

.1 Galvanized Steel Sheet: ASTM A653/A 653M, Commercial Steel (CS), Type B.

.1 Interior doors and frames unless indicated otherwise: Comply with A 653/A 653M, Designation ZF 120 (A40)

.2 Frame Anchors: ASTM A879/A 879M, Commercial Steel (CS), 12G (04Z) coating designation; mill phosphatized.

.1 For anchors built into exterior walls, steel sheet complying with ASTM A1008/A 1008M or ASTM A1011/A 1011M, hot-dip galvanized according to ASTM A153/A 153M, Class B.

.3 Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A 153M.

.4 Grout: ASTM C476, except with a maximum slump of 102 mm (4 inches), as measured according to ASTM C143/C 143M.

.5 Mineral-Fiber Insulation: CAN/ULC S702 or equivalent to ASTM C665 (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing CAN/ULC-S114 for combustion characteristics.

.6 Glazing: Comply with requirements in Section 08 80 00, Glazing.

.7 Bituminous Coating: Cold-applied asphalt mastic, compounded for 0.4-mm (15-mil) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 COMPONENTS

.1 Door Core Materials:

.1 Honeycomb: Structural small cell 25.4 mm (1 inch) maximum kraft paper 'honeycomb'. Weight: 36.3 kg (80 lb.) per ream minimum, density: 16.5 kg/m3 (1.03 pcf) minimum, sanded to required thickness.

.2 Polystyrene: Rigid extruded, fire retardant, closed cell board, Type 1 with a minimum density of 16 kg/m3 (1.0 lbs/cu ft) and minimum R-value of RSI 1.05 (R6.0).

.3 Polyurethane: CAN/ULC-S702, Rigid, polyurethane, board with a density of 32 kg/m3 (2.0 lbs/cu ft) and minimum thermal resistance rating of RSI 1.92 (R11)

.4 Steel stiffened core: Continuous vertically formed steel sections, full thickness of interior space between door faces.

.1 Stiffeners: Minimum thickness 0.6 mm (22 ga. - 0.026 in) spaced 152 mm (6 in) apart and securely fastened to both face sheets by industrial glue or spot welded spaced a maximum of 127 mm (5 in) o. c. vertically.

.2 Fill spaces between stiffeners with fiberglass core (interior locations) or polyurethane core (exterior locations) as specified herein.

.5 Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated on Drawings and Schedules.

.1 Temperature Rise Rated (TRR) Core: Where TRR cores are required, ensure core composition provides fire protection rating and limits temperature rise on unexposed side of door to 121 deg C (250 deg F) above ambient temperature after 30 minutes and 250 deg C (421 deg F) after 60 minutes, as determined by National Building Code of Canada requirements in accordance with testing per CAN4-S104-M or equivalent to NFPA 252.

2.6 INTERIOR DOORS AND FRAMES

.1 Construct interior doors and frames to comply with the standards indicated in this Section for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

.2 Extra Heavy-Duty Doors and Frames:

.1 Doors:

.1 Materials: Galvanized steel sheet, minimum 1.34 mm (16 ga - 0.053 inch); galvannealed as specified herein.

.2 Edge Construction: Seamless; continuously welded and ground smooth with no visible seams.

.3 Core: Vertical steel stiffened

.4 Basis-of-Design: “H-Series” by Fleming or approved equivalent.

.2 Frames:

.1 Materials: Galvanized steel sheet, minimum 1.70 mm (14 ga - 0.067 inch); galvannealed as specified herein.

.2 Construction: Face welded or full profile welded unless indicated otherwise.

.3 Basis-of-Design:

.1 “M Series” by Fleming or approved equivalent for frames occurring in masonry construction.
.2 “DW Series” by Fleming or approved equivalent for frames occurring in gypsum board construction.
.3 “EXP Series” by Fleming or approved equivalent for frames occurring in existing partitions.

.3 Exposed Finish: Factory-primed for site finishing.

.4 Locations: All locations, unless indicated otherwise.

.3 Maximum-Duty/Security Doors and Frames:

.1 Doors:

.1 Materials: Galvanized steel sheet, minimum 1.70 mm (14 ga - 0.067 inch); galvannealed as specified herein.

.2 Edge Construction: Seamless; continuously welded and ground smooth with no visible seams.

.3 Core: Vertical steel stiffened

.4 Basis-of-Design: “H-Series” by Fleming or approved equivalent.

.2 Frames:

.1 Materials: Galvanized steel sheet, minimum 1.70 mm (14 ga - 0.067 inch); galvannealed as specified herein.

.2 Construction: full profile welded unless indicated otherwise.

.3 Basis-of-Design:

.1 “M Series” by Fleming or approved equivalent for frames occurring in masonry construction.
.2 “DW Series” by Fleming or approved equivalent for frames occurring in gypsum board construction.
.3 “EXP Series” by Fleming or approved equivalent for frames occurring in existing partitions.

.3 Exposed Finish: Factory-primed for site finishing.

.4 Locations: Patient-accessible locations.

2.7 HOLLOW-METAL PANELS

.1 Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.8 FABRICATION

.1 Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

.1 Provide factory-preparation and reinforcements for doors and frames including mortising, blanking, drilling and tapping for templated hardware only, in accordance with the reviewed hardware schedule and templates provided by hardware supplier.

.2 Reinforce doors and frames in factory only where required, for surface-mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Perform drilling and tapping on site, at time of installation.

.3 Prior to shipment, mark each door and frame with identification number as shown on approved Shop Drawings.

.2 Hollow-Metal Doors:

.1 Holes 12.7 mm (0.5") diameter and larger must be factory-prepared, except mounting and through-bolt holes, which are made on site, at time of hardware installation. Holes less than 12.7 mm (0.5") diameter will be factory-prepared only when required for device (for knob, lever, cylinder, thumb or turn pieces) or when holes overlap function holes.

.2 Vertical Edges for Single-Acting Doors: Bevel edges 3 mm in 50 mm (1/8 inch in 2 inches) unless otherwise required to suit finish hardware or door swings.

.3 Top Edge Closures:

.1 [Exterior Locations: Sealed, flush PVC closures.]

.2 Interior locations (typical): Sealed, flush steel closures, continuously welded.

.4 Bottom Edge Closures: Close bottom edges of door with end closures or channels of same material as face sheets.

.1 Exterior Locations: Sealed, flush PVC closures. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

.2 Interior locations (typical): Sealed, flush steel closures, continuously welded.

.5 Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated on Drawings and Schedules. Extend minimum 19 mm (3/4 inch) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

.3 Pressed Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

.1 Protect mortised cutouts in frames with steel guard boxes.

.2 Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

.3 Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

.4 Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

.5 Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.

.6 Jamb Anchors: Provide anchorage appropriate to floor, wall and frame construction. Locate each anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite strike jamb.

.1 Provide number and spacing of anchors as follows:

.1 Two anchors per jamb up to 1520 mm (60 inches) high.
.2 Provide additional anchor for each additional 760 mm (30 inches) of height or fraction thereof up to 3050 mm (120 inches) high.
.3 Provide four anchors per jamb plus one additional anchor per jamb for each 610 mm (24 inches) or fraction thereof above 3050 mm (120 inches) high.

.2 Frames in previously placed concrete, masonry or structural steel: Locate anchors not more than 150 mm (6 inches) from the top and bottom of each jamb, and intermediate anchors at 660 mm (26 inches) o.c. maximum.

.3 Frames in stud-Wall Type: Locate anchors not more than 457 mm (18 inches) from top and bottom of frame, and intermediate anchors at 813 mm (32 inches) o.c. maximum.

.4 Where frame product is installed prior to adjacent partition, securely attach floor anchor to the inside of each jamb profile.

.1 Provide each floor anchor with two (2) holes for securing to floor. For conditions that do not permit the use of floor anchors, provide additional wall anchor, located within 150 mm (6 inches) of base of jamb.

.7 Door Silencers: Except on weather-stripped and gasketed frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

.1 Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

.2 Double-Door Frames: Drill stop in head jamb to receive two door silencers.

.3 Exterior Door Frames: Thermally broken.

.8 Welded Type Frames (interior locations as noted herein):

.1 Frame products must be accurately mitered or mechanically jointed.

.2 Full Profile welded: punch-mitered - continuously welded on profile faces, rabbets, returns and soffit intersections, or saw-mitered - continuously welded on the profile faces, rabbets, returns, stops and soffit intersections.

.1 Punch or saw-mitered, at the manufacturer's discretion.
.2 All profile welded frame product exposed faces must be filled and ground to a smooth, uniform, seamless surface.

.3 Face welded: continuously welded on the profile faces, with exposed faces filled and ground to a smooth, uniform, seamless surface.

.4 Joints at mullions, sills and center rails:

.1 Must be coped accurately, butted and tightly fitted.
.2 At intersecting flush profile faces, be securely welded, filled and ground to a smooth, uniform, seamless surface.
.3 At intersecting recessed profile faces, be securely welded to concealed reinforcements, with exposed hairline face seams.
.4 At all other intersecting profile elements, have exposed hairline face seams.

.5 Glazing stops must be formed steel channels, minimum 16 mm (0.625 inch) height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.4 Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, CSDMA Specifications, Door Hardware Schedule, and templates. Refer to Section 08 71 00 for additional requirements:

.1 Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

.2 Steel thickness for hardware reinforcements to be manufacturer's standard as required to adequately support the door and hardware, but not less than the following:

.1 Lock and Strike Reinforcements:

.1 Typical: 1.34 mm
.2 Heavy-duty (or stronger) doors and frames: 2.36 mm.

.2 Hinge Reinforcements:

.1 Typical: 2.36 mm
.2 Heavy-duty (or stronger) doors and frames: 3.12 mm

.3 Flush Bolt Reinforcements:

.1 Typical: 1.34 mm
.2 Heavy-duty (or stronger) doors and frames: 2.36 mm

.4 Reinforcements for Surface Applied Hardware:

.1 Typical: 1.06 mm
.2 Heavy-duty (or stronger) doors and frames: 1.34 mm

.5 Top and Bottom Channels: 1.06 mm

.6 Steel Top Caps: 0.81 mm

.7 Mortar Guard Boxes: 0.66 mm

.8 Floor Anchors: 1.34 mm

.9 Wall Anchors:

.1 Masonry Strap Type: 1.06 mm
.2 Masonry Wire Type: 4.0 mm (0.156") dia.
.3 Masonry Stirrup-Strap Type: 1.34 mm
.4 Steel/Wood Stud Type: 0.81 mm
.5 Existing Masonry /Concrete Wall Type: 0.81 mm
.6 Jamb Spreaders: 0.81 mm

.3 Where electrified hardware is specified on Hardware Schedule, Provide CSA-approved system consisting of CSA-approved conduit, junction boxes and wire harnesses complete with modular plugs for coordinated connection directly to electrified hardware.

.5 Stops and Mouldings for Glazing: Provide accurately fitted stops and mouldings around glazed lites and louvers where indicated on Drawings and Schedules. Form corners of stops and mouldings with butted hairline joints.

.1 Single Glazed Lites: Provide fixed stops and mouldings welded on secure side of hollow-metal work.

.2 Multiple Glazed Lites: Provide fixed and removable stops and mouldings so that each glazed lite is capable of being removed independently.

.3 Provide fixed frame mouldings on outside of exterior and on secure side of interior doors and frames.

.4 Provide loose stops and mouldings on inside of hollow-metal work.

.5 Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated on Drawings and Schedules.

.6 Glass Trim (Screw Fixed or Snap-In Types): 0.81 mm (20 ga - 0.032 inch)

.1 For glazing up to 8 mm (5/16 inch) thick: steel glazing trim and snap-in glazing stops as specified herein.

.2 For glazing thicker than 8 mm (5/16 inch): steel glazing trim and screwed-in glazing stops as specified herein. Screws must be #6 x 1-1/4" oval head self-drilling type at 300 mm (12 inch) o.c. maximum.

2.9 STEEL FINISHES

.1 Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

.1 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

3 - EXECUTION

3.1 EXAMINATION:

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Supply steel doors and frames to Section 06 90 00 for installation.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* medium-duty interior aluminum glazed doors and screens including but not limited to following:

- .1 interior aluminum frames for doors.
- .2 interior aluminum frames for glazing.
- .3 glazed aluminum swing doors.
- .4 glazed aluminum fixed screens.
- .5 back painting.
- .6 blocking and shims.
- .7 glass and glazing complete with glazing gaskets and glazing stops
- .8 sealant within aluminum work and between aluminum framing and adjacent construction.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

- .1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Shop Drawings: Submit Shop Drawings for interior aluminum glazed door and screen work in accordance with requirements of Division 01 based on testing and engineering analysis. Ensure Shop Drawings indicate material characteristics, details of construction, connections and relationship with adjacent construction. In addition to minimum requirements, also show following information:

.1 construction and back-up,

.2 joint sealants locations,

.3 interior structure and reinforcements,

.4 glazing modules,

.5 head and frame details,

.6 extrusion sections,

.7 glazing and glass stop details,

.8 anchorage and assembly fixings,

.9 other pertinent data.

.4 Field Measurements: Take field measurements and levels required to verify or supplement those shown on *Drawings* for proper layout and installation of work. Coordinate dimensional tolerances in adjacent building elements and confirm prior to commencement of work.

.5 Samples: Submit samples of materials and *Products* with their respective finish before fabrication. Samples shall fully represent the physical and chemical properties of the materials to be supplied. Submit to *Consultant*, duplicate sample sections of component parts of glass in specified finish. Samples of extruded shapes shall be 300 mm (12") long; samples of each type of glass shall be 300 mm (12") square.

.6 Certificates:

.1 Submit certification from registered professional structural Engineer registered in the Province of Prince Edward Island, complete with seal and signature affixed to certificate, substantiating that structure is capable of supporting its own weight and specified design loads.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers**.**

.3 Licensed Professionals: Employ a full time professional structural engineer registered in the Province of Prince Edward Island, carrying minimum $2,000,000.00 professional liability insurance to:

.1 design the components of the work of this Section requiring structural performance,

.2 be responsible for production and review of *Shop Drawings*,

.3 stamp and sign each shop drawing,

.4 Mock-Up:

.1 If requested, erect a full-size panel of glazing screen assembly on *Project* complete with finish and glazing. Ensure *Mock-ups* shall show anchors, shims, brackets and other related items.

.2 Revise or replace *Mock-ups* at no additional cost as directed until accepted. Do not proceed with job fabrication until sample installations are approved.

.3 Accepted *Mock-ups* shall be standard for remainder of work of this Section and may form part of finished installation.

.5 Welding:

.1 Provide welding in accordance with CSA W59-M performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau as specified herein.

.2 Ensure fabricator is fully certified by Canadian Welding Bureau for fusion welding of steel structures to CSA W47.1 and for fusion welding of aluminum to CSA W47.2.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Transport materials to site storage in a manner to prevent in-transit damage. These measures include, but are not limited to, crating, polyethylene wrapping system, etc.

.2 Store in a dry, protected area on site, in original undamaged containers with manufacturer's labels and seals intact.

.3 Store and protect fabricated units from damage until required for actual building in. Replace damaged units.

.4 Remove damaged or unsatisfactory materials from the site and replace with new materials to satisfaction of *Consultant* at no cost to *Owner*.

.5 Protect *The Work* of this Section from damage. Protect work of other trades resulting from *The Work* of this Section.

.6 *Provide* at factory, strippable coatings on exposed surfaces of aluminum. This coating and protective wrappings shall remain on the surfaces through the period other trades' works proceed on the building, and removed by this trade on completion of building.

.7 Comply with unpacking procedures as recommended by framing and glass manufacturers.

.8 *Make Good* damaged work caused by failure and to *Provide* adequate protection. Remove unsatisfactory work and replace at no expense to *Owner*.

1.7 WARRANTY

.1 Warrant work of this Section for period of 5 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the *Contract*. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of *Consultant* and at no expense to *Owner*. Defects include but are not limited to; glass breakage due to structural deflection, anodized finish will be non-fading, nonconvertible and permanently a part of the metal surface.

1.8 MAINTENANCE

.1 Maintenance Instructions:

.1 *Provide* in form of a manual, maintenance instructions for aluminum glazed doors, screens and frames in accordance with Division 01,

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Framing System:

.1 Alumicor Limited; www.alumicor.com
.2 Kawneer Company Canada Limited; www.kawneer.com
.3 Trulite Industries Limited; www.trulite.com
.4 US Aluminum; www.usalum.com

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Comply with requirements of National Building Code of Canada, applicable laws, bylaws, fire regulations, health and safety regulations of authorities having jurisdiction or requirements of this Specification. Standards used for work of this Section are considered a minimum.
.2 Glass and glazing shall conform to requirements of these Specifications, CAN/CGSB-12.20-M, ASTM E1300, the National Building Code of Canada and regulations of authorities having jurisdiction. In case of conflict, comply with most stringent requirements.

.2 Design and Performance Requirements:

.1 Architectural Drawings and details are diagrammatic and are only intended to show design concept, aesthetics, interfacing requirements, configuration, components and arrangements. They are not intended to identify or solve completely problems of thermal and structural movements, assembly framing, engineering design, fixings and anchorages

.2 Seismic Performance: Design work of this Section to withstand seismic motions determined in accordance with requirements of National Building Code of Canada and CAN/CSA S832.

.3 Design members and their connections to withstand within acceptable deflection limitations their own weight, the weight of the glass, loads imposed by the motion of operable elements and the minimum design loads, and combinations of loads, in accordance with the applicable building code, and interior pressure changes.

.1 Limit maximum deflection of member to 1/175 of span or 12 mm (1/2") whichever is less, under full design loading.
.2 Ensure deflection of any member in direction parallel to wall plane under full design load, does not exceed 75% of design clearance dimension between given member and panel, glass or other part immediately below it.
.3 Make provisions for structure deflection to ensure that structural loads are not transmitted to glazing and related work.
.4 Ensure glass, sealants and interior finishes do not contribute to framing member strength, stiffness or lateral stability.

.4 Ensure no glass breakage or permanent set in framing members in excess of 0.2% of clear spans occurs when system is tested at design test load equal to 1.5 times specified design load.

.5 Ensure glazing assemblies are capable of accommodating expansion and contraction without causing buckling, opening of joints, undue strain on fasteners or other detrimental effects. Make allowance for horizontal expansion in each vertical mullion.

.6 Secure components through concealed means unless otherwise indicated. Attach items in a manner which will permit replacement of components or units during construction and in subsequent usage of building without dismantling or disturbing adjoining components or units and without the use or addition of extra screws, splices, covers and similar items; that may alter original design features. Provide tamper-resistant at all exposed locations fasteners unless otherwise indicated.

.7 Glazing: Provide glass for work of this Section free from bubbles, waves, discolouration and other defects, of types specified herein for locations indicated on Drawings or noted on Door Schedules. Ensure glass bears manufacturer's label indicating quality and testing agency certifications. Leave labels in place until final cleaning.

.8 Attack Resistance: In all patient-accessible areas, ensure glazing materials, including framing, are capable of resisting attack in accordance with requirements of AAMA 501.8 for minimum impact resistance of [1,000 ft-lbs] [2,000 ft-lbs].

2.3 MATERIALS

.1 Aluminum sheet and plate: ASTM B209, 1100-H14 alloy, anodizing quality and temper, suitable for purpose and finish required, special hardness for flat panel application, and resquared raw cut edges unless required otherwise.

.2 Extruded Aluminum: ASTM B221, 6063-T5 alloy.

.3 Internal Steel Reinforcing: If necessary, Provide manufacturer's shapes and profiles conforming to requirements specified to meet security performance criteria stipulated herein complete with corrosion-resistant primer applied immediately after surface preparation and pretreatment. Prepare surfaces according to applicable SSPC standards.

.1 Zinc-Coated Steel Sheet: ASTM A653/A653M, CS, Type B; with Z275 (G90) galvanized coating designation.

.2 Steel Plates, Shapes, and Bars: ASTM A36/A36M or CSA G40.20/G40.21.

.4 Treated wood blocking: at top and base of framing in accordance with requirements of Section 06 10 00 and as indicated on *Drawings*.

.5 [Glazing: Refer to section 08 80 00 and Schedules for applicable types.

2.4 COMPONENTS

.1 Interior Frames and Screens: ASTM B221 (ASTM B221M), Alloy 6063-T5 or alloy and temper required to suit structural and finish requirements, not less than 2.4 mm (3/32").

.1 Mullion Section: Provide cross-section dimensions of frames as detailed on Drawings, but with minimum dimensions of 44 mm x 102 mm (1-3/4" x 4").

.2 Door Frames: *Provide* reinforcement for hinges, strikes and other specified hardware.

.3 Glazing Frames: *Provide* suitable for glazing types and thicknesses indicated.

.4 Acceptable Products:

.1 Mullion Size: 44 mm x 114 mm (1-3/4" x 4-1/2")

.1 "Trifab 450 Series" by Kawneer
.2 "1800/800 Series" by Alumicor

.3 "450 Series" by US Aluminum (CR Laurence)

.2 Doors: 44.5-mm (1-3/4") thick glazed doors with minimum 3.2-mm (0.125") thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods. Provide snap-on extruded-aluminum glazing stops, and preformed gaskets. Design aluminum doors with bevelled glazing beads for neoprene glazing system.

.1 Interior Doors: Provide BHMA A156.16 silencers, three on strike jamb of single-door frames and two on head of double-door frames.

.2 *Provide* doors and frames complete with necessary internal reinforcements, recesses, mortising or milling operations required for a rigid assembly and to accommodate finish hardware. Check hardware schedule for requirements.

.3 Acceptable Products:

.1 "350/500 Series" by Kawneer
.2 "400A/500 Series" by Alumicor
.3 "400/550 Series" by US Aluminum (CR Laurence)]

.3 Hardware:

.1 Unless otherwise specified herein, prepare, *Supply* and *Install* all finishing hardware associated with aluminum doors as specified in Section 08 71 00 including but not limited to: concealed closers, floor and wall stops, offset pivots as shown, concealed bolt panic hardware, pushes, pulls, cylinder locks etc.

.2 Machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required, and fastened within frame with concealed screws.

.3 Ligature Resistant Hardware: Where required, provide non-loopable, tamper-resistant security grade hardware. Conform to requirements of Section 08 71 00.

2.5 ACCESSORIES

.1 Fasteners: Manufacturer's standard nonmagnetic stainless-steel 300 Series with not less than 12% chromium content to prevent galvanic action, and of sufficient strength for purpose and compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.

.1 Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

.2 Reinforce members as required to receive fastener threads.

.3 Provide tamper-resistant fasteners at all locations

.2 Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A123/A 123M or ASTM A153/A 153M.

.3 Sound Seals: Manufacturer's standard continuous mohair, wool pile, or vinyl seals.

.4 Smoke Seals: Intumescent strip or fire-rated gaskets as required by authorities having jurisdiction.

.5 Glazing Gaskets, tape, shims, spacers, setting blocks and miscellaneous materials: Manufacturer's standard items, designed to be compatible with each other and to accommodate glazing thickness indicated. Provide tamper-resistant materials at all locations.

.6 Sealants: Non-bleeding and capable of supporting their own weight; meeting minimum requirements of Section 07 92 00.

.1 Ensure compatibility between sealant materials, primers and cleaning solvents

.2 Provide tamper-resistant fasteners at all locations.

.3 Joint backing: To requirements of Section 07 92 00.

.4 Primers: As recommended by the sealant manufacturer to suit the various job conditions.

.5 Colours: As selected by *Consultant* at a later from manufacturer's standard range.

.7 Cleaning material: Xylol, Methyl-ethyl-ketone, Toluol or as recommended by manufacturer.

.8 Insulation for packing into frame cavities: CAN/ULC S702, Resilient, fibrous glass having a minimum nominal density of 12 kg/m² (0.75 lbs/ft^3).

.9 Zinc Chromate Primer: CAN/CGSB-1.40.

2.6 FABRICATION

.1 Fasten frames to support framing specified under Section 05 50 00. *Provide* slotted connections as required to accommodate deflection of opening components.

.1 Where frame assemblies exceed 6000 mm (20'-0") Provide one split frame expansion/contraction mullion per assembly unless other provision is indicated. Make width of the expansion/contraction mullion the same as that of the other mullions.

.2 Provide steel support brackets at 600 mm (2'-0") maximum o.c. to support screen assemblies at sills where an aluminum base occurs under the sill.

.3 Where mullions are extended and connected to the underside of the building structure above, Provide slotted connections to accommodate structure deflection.

.4 Reinforce frames by concealed means as necessary to meet the specified design requirements and as shown. *Provide* devices for anchoring the frame assemblies to the building structure with sufficient adjustment to permit correct and accurate alignment.

.2 Fabricate frame systems designed for glazing complete with mullions, head and sill frames, spigots, and plugs for horizontals, spline gaskets, pressure plates, filler pieces, snap-on caps and other necessary components.

.1 Ensure extruded forms are true to detail, free from defects impairing appearance, strength and durability.

.2 *Provide* members possessing defined profiles, straight, square and true with surfaces and with no sharp edges. Ensure member are in proper planes and exposed finished surfaces and edges smooth and free from defects.

.3 *Provide* hairline joints at junctions of frame members. *Provide* snap-on aluminum extrusion glazing stops for frames. Fabricate all components to allow secure installation without exposed fasteners.

.4 Make joints weathertight. Metal in contact shall have hairline joints unless otherwise shown on reviewed *Shop Drawings*. Location of exposed joints shall be subject to the approval of the *Consultant*. No exposed fixings are permitted.

.3 *Provide* continuous extruded aluminum angles to form a reveal at junctions of head frames and suspended ceilings where applicable and junctions of jamb frames and adjacent construction.

.4 Fabricate transoms where applicable, corner pieces, filler panels, bases, and fascias from 3 mm (1/8") thick aluminum plate to the profiles shown by welding. Make all planes true, and corners square and sharp. *Provide* concealed clips for fastening plate assemblies in place.

.5 Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted or mitered connections.

.6 Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.

.7 Do all fitting and assembly in factory. Trial fit units in shop if permanent shop assembly is not practical.

.8 Metal sections drilled, tapped, welded, holed or slotted as may be required for proper installation and fixing of all components and accessories and supplied complete with all necessary anchors, clips, bolts, screws, etc. Framing, bracing, reinforcing and anchors having structural properties adequate to safely sustain and withstand strains and stresses to which they will be subjected.

.9 Corners of formed work must be mitred and closely fitted. Back-up sealants designed for this purpose, shall be applied on inside of joints in aluminum work by this Section.

2.7 FINISHES

.1 General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

.2 Interior Aluminum Finishes:

.1 Architectural Class II; Clear anodized in accordance with Aluminum Association Finish Designation AA-M12-C22-A31.

.3 Exposed Stainless Steel Finish: ASTM A167, Series Type 304, ANSI No. 4 brushed finish.

.4 Pretreatments: Recommended by finish coat manufacturer suitable for application and accepted by *Consultant*.

.5 Colours and sheens: To be selected by *Consultant*. Include for texture and specialty finishes. Colour and sheen to be uniform with no visible variations.

.6 Bituminous Paint: CAN/CGSB 1.108, heavy bodied bituminous isolation coating to *Provide* acid and alkali resistant separator. Isolation coating shall be acid and alkali resistant material.

.7 Painting:

.1 Steel at building interior and not exposed to view or to exterior environmental conditions shall be primed with oil alkyd primer.

.2 Concealed surfaces of aluminum and galvanized steel which would otherwise come in direct contact with structural steel, concrete, masonry shall be given a heavy coating of dielectric separator paint.

.3 Paint welded, galvanized items where galvanizing has been removed for welding. Make Good corrosion protection using 2 coats of touch-up primer for galvanized steel. Make Good protection on steel primed with oil alkyd primer using same primer.

.8 Galvanizing:

.1 Ensure steel is blast cleaned and hot dip galvanized in accordance with ASTM A123/A123M or CAN/CSA-G164-M, minimum coating designation of 610 g/m². Thread dimensions to be be such that nuts will thread over bolts without rethreading or chasing galvanized threads.

.2 Galvanize after fabrication where possible. Follow standard precautions to avoid brittlement of the base metal by overpickling or overheating during galvanizing.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 PREPARATION

.1 Provide heavy protective coating of bituminous paint or zinc chromate primer prior to installation, to concealed surfaces of aluminum which would otherwise come in direct contact with structural steel, concrete, masonry, plaster or other dissimilar materials.

3.3 INSTALLATION

.1 Frames

.1 *Provide* treated wood blocking and shims at top and bottom of frame. After alignment, positively lock anchorage devices to prevent movement other than that designed to accommodate deflection and thermal expansion and contraction.

.2 Set frames and screens plumb and true in openings securely wedged and held in alignment during construction and provided with suitable and adequate anchorage to adjoining work.

.3 Fasten fixed frames to support structural framing specified under Section 05 50 00. Provide slotted connections as required to accommodate deflection of opening components.

.4 Perform necessary drilling of concrete, masonry and steel necessary to install the work of this Section. Site located fixings to the masonry and concrete shall be stainless steel lag screws and lead expansion shields. Bear cost of repair satisfactory to the *Consultant* of concrete chipped by drilling or fixing operations.

.5 Group components with coloured aluminum finish so that those which relate most closely to one another, with regard to colour, will be installed adjacent to each other.

.6 As erection progresses, pack cavities of frames and assemblies with low density fibrous glass insulation.

.7 Ensure completed installation remains free from objectionable noise, rattles, creak or noise due to thermal movement.

.8 Gun-apply 3 continuous beads of sealant under extruded aluminum thresholds. Make bead diameter sufficient to ensure a full-width seal. Remove excess sealant by acceptable means.

.9 Tolerances:

.1 Erection tolerances for frame assemblies relate to the structural grid of the building and apply to each individual assembly.

.1 vertical position; plus/minus 3 mm (1/8")
.2 horizontal position; plus/minus 3 mm (1/8")
.3 deviation from plumb; 3 mm (1/8") maximum each plane
.4 racking of face; 6 mm (1/4") maximum
.5 racking in elevation; nil.

.2 Erection tolerances for operable elements: Consistent with smooth operation and weatherproof performance.

.2 Doors:

.1 *Install* doors plumb, square, level free from warp, twist and superimposed loads. Install doors without warp or rack. Adjust doors and hardware to provide tight fit at contact points and smooth operation.

.2 Secure work adequately and accurately to structure in the required position, in a manner not restricting thermal movement.

.3 *Provide* compressible filler over aluminum work at locations shown on *Drawings*.

.4 *Install* doors complete with finish hardware supplied by hardware *Supplier*, in accordance with templates supplied.

.5 After installation of hardware, have hardware *Supplier* check operation of hardware. Do readjustments as required.

.6 Door Glazing:

.1 Use extruded gaskets for door glazing and of type compatible with secondary sealant in insulating glass unit locations.
.2 Thoroughly wipe surfaces receiving glazing materials with a cloth dampened in xylol to assure a clean surface.
.3 Place setting blocks at quarter points from each corner, center sealed unit in opening and press firmly against tape. *Provide* isolation tape at edges of laminated glass to prevent staining of interply plastic from glazing materials. Roll-in inside resilient extrusion.

.3 Sealants: At interior joints between aluminum framing and adjacent work of others execute following work:

.1 Thoroughly clean joints and spaces to be sealed of foreign matter and keep them dry before applying gaskets, tapes and sealants.

.2 Apply surface primers in accordance with manufacturer's instructions.

.3 Use methods specified in Section 07 92 00, Sealants.

.4 *Install* backer rod over compressible filler material or perimeter blocking to provide sealant joints of proper form, thickness to width ratios, and bond break at back side of sealant. Where backer rod cannot be used or is not shown *Provide* bond breaker tape to back side of sealant joint substrate.

.5 Apply gun grade sealants with an approved type of pressure gun having nozzles of proper size and shape to fit the various joints; drive sealants in with sufficient pressure to fill the joints full.

.6 Seal joints between masonry or other adjacent material and frames and between frames, sills and other material. Caulk inside and outside

.7 Seal joints continuous to produce weatherproof and visually acceptable joint installation.

.8 Clean adjacent surfaces which have been soiled by tapes and sealants immediately before hardening.

.4 Glazing:

.1 Perform glazing with *The Work* of this Section in accordance with requirements of Section 08 80 00 unless greater requirements are specified herein.

.2 Leave labels on glass until it has been set and inspected and accepted. Leave glass whole and without cracks, scratches or other defects and with settings in perfect condition at completion, to the approval of the *Consultant*.

.3 Remove rejected, broken or damaged glass due to defective materials or improper setting and replace with perfect materials. Units producing distorted vision may be rejected and replaced at the reasonable discretion of the *Consultant*.

.4 Use spacers, setting blocks and shims of proper size to support and hold glass in position independent of the glazing materials. Place two setting blocks under each unit at the quarter points.

.5 Place spacers on edges of glass, directly opposite each other when on both sides of the glass, located at maximum 600 mm (24") from corners and uniformly spaced. Arrange spacers, setting blocks and shims so as to avoid blocking water transfer inside frames.

.6 *Install* preformed glazing tape to ensure complete contact on surface of glass and stops. Make joints only at corners of sash or frame. Cut tape to fit close around spacers. Fit tape accurately with tight joints, free from tension, gaps and cracks.

.7 After installation of the glass, the glazing tape shall not extend more than 3 mm (1/8") above the line of the fixed stop. Remove and reglaze units where tape exceeds this tolerance.

.8 Set glass properly centred with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress. Set glass with labels facing the interior wherever possible.

3.4 ADJUSTMENTS

.1 Upon completion of *The Work* and just prior to the handling over to the *Owner* or at a time as directed, inspect, test and adjust installation.

.2 Inspect all units for damage and correct same immediately.

.3 Test and adjust hardware and replace or repair faulty items.

.4 Adjust weatherstripping so as to leave each opening unit in its most weathertight position.

.5 Test operable elements and ensure easy and smooth operation.

3.5 CLEANING

.1 Maintain aluminum work in a clean condition throughout construction period, so it will be without deterioration or damage at time of acceptance. Select methods of cleaning which will promote achievement of uniform appearance and stabilized colours and textures for anodized aluminum.

.2 Immediately before time of Substantial Performance of the Work, clean aluminum work thoroughly, inside and out. Demonstrate proper cleaning methods to *Owner* during this final cleaning.

.3 Remove protective covering and coating from aluminum surfaces, inside and out, and clean surfaces, remove labels, stripes and protective devices and polish glass surfaces, immediately prior to final acceptance of *The Work* by *Consultant*.

.4 Upon completion of *The Work*, remove all debris, equipment and excess material resulting from *The Work* of this Section from the site.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: Provide flush wood core doors including but not limited to following:

.1 solid core flush wood core doors, including fire-rated types as noted on Drawings and Schedules.

.2 glass mouldings and stops, inserts, in-fill panels and other auxiliary materials required for a complete installation.

.3 Preparation of flush wood doors for CSA approved wiring system and conduits for electronic hardware and automatic door operators.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 Coordination

.1 Coordinate anchorage installation for flush wood doors. Supply setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for Project in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Shop Drawings: Submit Shop Drawings in accordance with Division 01 illustrating door opening criteria, elevations, sizes, types, fire rating, swings, undercuts required, special bevelling, and special blocking for hardware as applicable. Identify cut outs for glazing and other openings.

.4 Samples: Submit samples in accordance with Division 01.

.1 Submit color selection samples, minimum 76 by 127 mm in size representing final door finish for selection by Consultant.

.2 Fabrication Samples: When requested by Consultant, submit fabrication Samples approximately 203 by 254 mm (8 by 10 inches) to demonstrate compliance with requirements for quality of materials and construction:

.1 core.

.2 head rail and jamb stile blocking.

.3 cross band and facing layers.

.4 corner section with door faces, edges and core.

1.5 INFORMATIONAL SUBMITTALS

.1 Product Test Reports: Submit product test reports in accordance with Division 01 for each type of wood door assembly, for tests performed by a qualified testing agency. As a minimum, submit the following test reports:

.1 Confirmation that doors comply with fire-rated requirements specified in this Section.

.2 Ensure reports include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of test.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.3 Ensure retained installers are familiar with Product manufacturers specified herein and with ANSI/NFPA 80 requirements for installation of labeled fire rated plastic laminate wood doors, steel frames and hardware.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Do not deliver finished Products during rainy or damp weather.

.2 Do not deliver Work of this Section until the building and storage areas are sufficiently dry so Products will not be damaged by excessive changes in moisture content.

.3 Do not deliver and Install damaged Products. Replace in accordance with the requirements of this Section.

.2 Storage and Handling Requirements:

.1 Deliver, store and handle Products of this Section in accordance with NAAWS Section 2.

.2 Remove from the Place of The Work, doors having scratches or other blemishes which cannot be removed by sanding and replace with new unblemished doors.

1.8 WARRANTY

.1 Provide manufacturer's standard lifetime warranty for Work of this Section from Substantial Performance of the Work against defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to: buckling, opening of seams, warping in excess of 6 mm (1/4"), delamination of facings, telegraphing of core construction or sagging.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Baillargeon Doors, www.baillargeondoors.com

.2 Lambton Doors, www.lambtondoors.com

.3 Lynden Door Inc, www.lyndendoor.com

.4 Marshfield Door Systems, Inc., www.marshfielddoors.com

.5 V.T. Industries, www.vtindustries.com

.2 Substitution Limitations: This Specification is based on Baillargeon's Products. Comparable Products from manufacturers listed herein offering functionally, aesthetically equivalent products in Consultant's opinion and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 REGULATORY REQUIREMENTS

.1 Labelling requirements:

.1 Provide label of recognized testing agency having factory inspection service, and constructed as listed or classified for labeling in accordance with NFPA 80, listing authority's policies and label materials.

.2 Listing must identify manufacturer.

.2 Fire-Rated Door Assemblies:

.1 Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings and Schedules, based on testing according to CAN4-S104.

.3 Smoke- and Draft-Control Assemblies:

.1 Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2.3 DESIGN AND PERFORMANCE REQUIREMENTS

.1 Products must not contain added urea formaldehyde.

.2 Construct doors specified in this Section with 5 ply construction in accordance with ANSI/WDMA I.S 1A unless otherwise indicated. Where doors are schedule to receive MDO faces or where manufacturer's standard fabrication methods require it, 3 ply construction is acceptable.

.3 Ensure cores are bonded and sanded to stiles and rails. Floating cores are not acceptable.

.4 Performance Duty Levels:

.1 Typical Flush Wood Core Doors: Extra Heavy Duty in accordance with WDMA I.S 1A, Section P-1 and Security Grade 4 in accordance with ASTM F1450.

2.4 FLUSH WOOD CORE DOORS (TYPICAL)

.1 Facing: as specified herein.

.2 Core: 3 ply laminated veneer lumber core (LVLC) capable of meeting Grade 4 per ASTM F1450.

.3 Stiles: Minimum 22 mm thick (7/8”) thick, hardwood bonded to core with matching sealed hardwood edge strips. Total Thickness: Manufacturer’s standard thickness required to meet performance requirements specified herein.

.4 Rails: Integrated.

.5 Vertical Edges: factory-painted or stained vertical edges in colour/stain selected by Consultant. Colour must be such that application of coating is clearly visible.

.6 Crossbands: Provide high-density composite crossbands in manufacturer’s standard thicknesses required to meet performance requirements specified herein. Ensure crossbands extend full width of door.

.7 Adhesive: Type I, Waterproof, as recommended by Product manufacturer for designated application and containing no added urea-formaldehyde.

.8 Location: Mental health areas.

.9 Basis-of-Design: “Model No. 7600-CE” by Baillargeon Doors or approved equivalent.

2.5 FIRE-RATED FLUSH WOOD CORE DOORS

.1 Facing: as specified herein.

.2 Core: Incombustible mineral core (FD) to meet fire-resistance rating requirements specified herein.

.3 Stiles: Manufacturer’s standard stiles as required for fire rating.

.4 Rails: Manufacturer’s standard rails as required for fire rating.

.5 Interior Blocking: Approved fire retardant reinforcement minimum 120 mm (4-3/4") high at top, bottom rails and at mid height of doors as required to secure surface applied hardware with screw meeting WDMA Extra Heavy Duty Performance. Provide minimum 11 mm (7/16") hardwood blocking in accordance with WDMA standards. On doors over 900 mm (36") wide, Provide additional approved fire retardant reinforcement to hinge stile of door.

.6 Vertical Edges: factory-painted or stained vertical edges in colour/stain selected by Consultant at a later date.

.7 Crossbands: As required to conform to door manufacturer’s labelling authority.

.8 Vision Framing: ULC labeled, prime painted metal framing or fire rated wooden molding kit to match door faces.

.9 Fire-ratings: As noted on Drawings and Schedules.

.10 Location: Fire-rated openings.

.11 Basis-of-Design: "Model No. AF 45/60" or “Model No. 5045/60/90” by Baillargeon Doors or "5-FD45/60/90" by Lambton Doors with factory-painted edges or approved equivalent.

2.6 DOOR FACINGS

.1 High Pressure, Paper Base, Decorative Laminate Facing (PLAM):

.1 Provide types and thicknesses conforming to ANSI/NEMA LD3, minimum 1.2 mm thick (GP type).

.2 Colours and Finishes: To be selected by Consultant at a later date from manufacturer’s full colour range (including solid, printed and wood look), texture and finish.

.3 Acceptable Manufacturers:

.1 Formica Inc.; www.formica.com

.2 Nevamar Company, LLC; www.nevamar.com

.3 Wilsonart Canada; www.wilsonart.com

2.7 HARDWARE

.1 Coordinate location of interior blocking with work of Section 08 71 00. Hardware is supplied by Section 08 71 00 for installation as part of the work of Section 06 90 00.

.2 Coordinate electrical requirements for electronic hardware with Division 26.

2.8 ACCESSORIES

.1 Glazing: Provided as part of The Work of Section 08 80 00.

.2 Astragals: Provide formed steel edges and astragals between pairs of double doors.

2.9 FABRICATION

.1 Fabricate flush wood core doors 45 mm (1-3/4") thick, unless otherwise indicated.

.2 Factory machine doors for finish hardware in accordance with hardware requirements and dimensions.

.3 Factory cut openings. Ensure openings are square with internal corners slightly rounded. Ensure portion between cutout and door edge is not less than 125 mm (5") wide at any point based on fire-rating application. Ensure cut out area is not greater than 40% of area of door face. Ensure cut out does not exceed half height of door.

.4 Provide hardwood glass stops, finished to match facing, for vision panels in unrated doors.

.5 Provide manufacturer’s standard metal glass stops, finished to match face, for vision panels in unrated doors. Provide fire-rated metal glass stops for vision panels in fire-rated labelled doors. Ensure glass size conforms to National Building Code of Canada requirements.

.6 Fabricate flush wood core doors with necessary interior blocking to suit hardware installation.

.7 Fabricate following bevels at 1.5 mm (1/16") in 50 mm (2"):

.1 Single Doors: Bevel both stiles.

.2 Double Doors: Bevel hanging styles, and bevel and rebate meeting styles.

.8 Fabricate flush wood core doors with following edge clearances:

.1 3 mm (1/8") clearance at top and sides.

.2 6 mm (1/4") clearance at bottom to top of floor finish and thresholds unless doors are indicated in the Door Schedule to be undercut.

.9 Fabricate fire rated doors to comply with NFPA 80. Cut and trim openings through doors to comply with NFPA 80 requirements where indicated.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Installation of doors and finish hardware forms part of The Work of Section 06 90 00.

END OF SECTION

1 General

1.1 SUMMARY OF WORK

.1 This Section specifies thermally broken, stick-built, glazed aluminum curtain wall and accessories.

1.2 RELATED REQUIREMENTS

.1 Section 07 26 00 - Vapor Retarders.
.2 Section 07 27 00 - Air Barriers.
.3 Section 07 62 00 - Sheet Metal Flashing and Trim.
.4 Section 07 92 00 - Joint Sealants.
.5 Section 08 80 00 - Glazing

1.3 REFERENCE STANDARDS

.1 Aluminum Association (AA).
  .1 DAF 45-03, Designation System for Aluminum Finishes.
.2 American Architectural Manufacturers Association (AAMA).
  .1 AAMA-501-05, Methods of Test for Exterior Walls.
  .2 AAMA CW DG-1-96, Aluminum Curtain Wall Design Guide Manual.
  .3 AAMA CW-11-85, Design Windloads for Buildings and Boundary Layer Wind
.3 ASTM International (ASTM).
  .1 ASTM A653 / A653M - [09a], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  .2 ASTM B209-[2010], Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  .3 ASTM B221-[2013], Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  .4 ASTM E283 [2012], Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  .5 ASTM E331 [2009], Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
  .6 ASTM E1105 - [2008], Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
  .7 ASTM D2240 - [2010], Standard Test Method for Rubber Property-Durometer Hardness.
.4 Canadian General Standards Board (CGSB).
  .1 CAN/CGSB-12.8-[97], Insulating Glass Units.
  .2 CAN/CGSB-12.20-[M89], Structural Design of Glass for Buildings.
  .3 CAN/CGSB-19.13-[M87], Sealing Compound, One-Component, Elastomeric, Chemical Curing.
.5 Canadian Standards Association (CSA International).
  .1 CAN/CSA-S157 [2005], Strength Design in Aluminum.
  .2 CAN/CSA W59.2 [M1991(R2003)], Welded Aluminum Construction.
.6 Underwriter's Laboratories of Canada (ULC)
  .1 CAN/ULC-S710.1 [2005], Standard for Thermal Insulation - Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials.

1.4 QUALITY CONTROL

.1 Co-ordination: Co-ordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays.

.2 Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and one week prior to commencing work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.

- .1 Comply with Section 01 32 13 - Scheduling of Work and co-ordinate with other similar pre installation meetings.
- .2 Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
  - .1 Owner;
  - .2 Consultant;
  - .3 Glazing subcontractor;
  - .4 Manufacturer's Technical Representative.

.3 Ensure meeting agenda includes review of methods and procedures related to glazed aluminum curtain wall installation including co-ordination with related work.

.4 Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

1.5 SUBMITTALS

.1 Submit shop details and erection drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: Submit product data including manufacturer's literature for glazed aluminum curtain wall extruded members, panels, components and accessories, indicating compliance with specified requirements and material characteristics.

- .1 Submit list on curtain wall manufacturer's letterhead of materials, components and accessories to be incorporated into Work.
- .2 Include product names, types and series numbers.
- .3 Include contact information for manufacturer and their representative for this Project.

.3 Each shop drawing submitted shall bear stamp and signature of qualified professional engineer registered or licensed to practice in the Province of Prince Edward Island, Canada. Include on shop drawings:

- .1 Curtain wall panel and component dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required. Manufacturer's nameplates not acceptable.

.4 Samples:

- .1 Submit duplicate 300 x 300 mm sample sections showing prefinished aluminum surface, finish, colour and texture, and including section of infill panel.
- .2 Submit duplicate 300 x 300 mm sample sections of insulating glass unit showing glazing materials and edge and corner details.

.5 Thermal Performance: Submit verification that Insulating Glass Units used in curtain wall system meet RSI values specified.

.6 Test Reports:

- .1 Submit test reports showing compliance with specified performance characteristics and physical properties including air infiltration, water infiltration and structural performance.

.7 Field Reports: Submit manufacturer's field reports within 3 days of manufacturer representatives site visit and inspection.

.8 Installer Qualifications:

.1 Submit letter verifying installer's experience with work similar to work of this Section.

1.6 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: Supply maintenance data for curtain wall for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
.2 Record Documentation: In accordance with Section 01 78 00 - Closeout Submittals.
  .1 List materials used in curtain wall work.
  .2 Warranty: Submit warranty documents specified.

1.7 DELIVERY STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:
  .1 Deliver material in accordance with Section 01 61 00 - Common Product Requirements.
  .2 Deliver glazed aluminum curtain wall materials and components in manufacturer's original packaging with identification labels intact and in sizes to suit project.
.2 Material Handling: To AAMA CW-10.
.3 Storage and Handling Requirements: Store materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
  .1 Material storage: To AAMA CW-10.

1.8 WARRANTY

.1 Project Warranty: Refer to Contract Conditions for project warranty provisions.
.2 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.
.3 Warranty period: 2 years commencing on Date of Substantial Performance of Work.
  .1 Insulating glass units: 10 years, on Date of Substantial Performance of Work.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MANUFACTURER

.1 Specification is based on: Alumicor Limited, 290 Humberline Drive, Toronto, Ontario, Canada M9W 5S2, Phone: (416) 745-4222 or (877) ALUMICOR, e-mail: info@Alumicor.com, website: www.Alumicor.com.
.2 Other equal manufacturers products are acceptable.

2.2 DESCRIPTION

.1 Thermally broken, vertical stick-built glazed aluminum curtain wall system of tubular aluminum sections with supplementary supported framing, shop fabricated, factory prefinished, vision glass; related flashings, anchorage and attachment devices.
.2 Ensure assembled system design permits re-glazing of individual glass and infill panels from exterior without requiring removal of structural mullions.

2.3 DESIGN CRITERIA

.1 Design curtain wall to AAMA CW-DG-1.
  .1 Design glazed aluminum curtain wall following rainscreen principles.

.2 Ensure horizontal members are sealed to vertical members to form individual compartments in accordance with rainscreen principles.
.3 Ventilate and pressure equalize air space outside exterior surface of insulation to exterior.

.2 Design aluminum components to CAN/CSA S157.

.3 Design and size curtain wall components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of wall using design pressure of 0.95 kPa to ASTM E330.
.1 Design curtain wall system for expansion and contraction caused by cycling temperature range of 95 degrees C over 12-hour period without causing detrimental effect to system components.
.2 Thermal expansion: Ensure curtain wall system can withstand temperature differential of 95 degrees C and is able to accommodate interior and exterior system expansion and contraction without damage to components or deterioration of seals.
.3 Design vertical expansion joints with baffled overlaps and compressed resilient air seal laid between mullion ends.
.4 Ensure system is designed to accommodate:
.1 Movement within curtain wall assembly.
.2 Movement between system and perimeter framing components.
.3 Dynamic loading and release of loads.
.4 Deflection of structural support framing.
.5 Vision glass areas: Insulating Glass Unit as identified in Section 08 80 00 - Glazing, Par 2.3 and 2.4.
.5 Limit mullion deflection to flexure limit of glass maximum with full recovery of glazing materials.
.6 Deadload prevention: Design curtain wall system with separate, integrated support for insulating glass units.
.7 Sound attenuation through wall system (exterior to interior): STC 33.
.8 Glass dimensions: Size glass units to CAN/CGSB-12.20.
.9 Flatness criteria: 6 mm maximum in 6 m for each panel.
.10 Air infiltration: 0.3 L/s/m2 maximum of wall area to ASTM E283 at differential pressure across assembly of 300 Pa.
.11 Water infiltration: None to ASTM E331 at differential pressure across assembly of 720 Pa.
.12 Maintain continuous air barrier and vapour retarder throughout building envelope and curtain wall assembly.
.13 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.
.14 Reinforce curtain wall system to accommodate window washing guide rails where indicated.

2.4 MATERIALS

.1 Curtain Wall System and Components:
.1 Extruded aluminum: To ASTM B221, 6063 alloy with T5 temper.
.1 Finish coatings: To AA DAF 45 Architectural Class I 18 µm thick minimum.
.2 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces.
.3 Air barrier liner: Reinforce panels to maintain flat surface.
.1 Concealed locations: 0.952 mm steel sheet to CSA S136M with 458 g/m2 galvanized coating and corners sealed at concealed locations.
.2 Interior exposed locations: 1.588 mm (16 gauge) clear anodized aluminum sheet.
.4 Fasteners, screws and bolts: Tamperproof, cadmium plated stainless steel 300 series to meet curtain wall requirements and as recommended by manufacturer.

.5 Anchors: Ensure anchors have three-way adjustment.
.6 Insulating glass units: In accordance with Section 08 80 00 - Glazing.

.2 Acceptable Material:
.1 Alumicor Ltd., ThermaWall 2600 Series.
.2 Kawneer 7500 Wall System.

2.5 CURTAIN WALL SYSTEM FABRICATION

.1 Do aluminum welding to CAN/CSA W59.2.
.2 Fabricate aluminum assemblies of extruded sections to sizes and profiles indicated.
.1 Ensure vertical and horizontal members are tubular extrusions designed for shear block corner construction.
.2 Mullion depth sizes as indicated.
.3 Cap depth sizes: 19 mm.
.4 Structural silicone joints where indicated.
.5 Ensure caps for mullion assemblies are constructed without gap.
.3 Construct units square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.
.1 Ensure curtain wall is fabricated with separate, integrated support for insulating glass unit.
.2 Do glazing in accordance with Section 08 80 00 - Glazing.
.3 Site glazing is permitted.
.4 Fabricate curtain wall with minimum clearances and shim spacing around panel perimeter and ensure installation and dynamic movement of perimeter seal is enabled.
.5 Fabricate infill panels with metal covered edge seals around perimeter of panel assembly, enabling installation and minor movement of perimeter seal.
.1 Reinforce interior surface of exterior infill panel sheet from deflection caused by wind and suction loads.
.2 Place insulation within infill panel adhered to exterior face of interior panel sheet over entire area of sheet using impale fasteners with integral discs.
.6 Accurately fit and secure joints and corners.
.1 Ensure joints are flush, hairline, and weatherproof.
.7 Prepare curtain wall to receive anchor devices.
.8 Use only concealed fasteners
.1 Ensure fasteners do not penetrate thermal break.
.9 Prepare components to receive doors and openings as indicated.
.10 Visible manufacturer's labels are not permitted.

2.6 FINISHES

.1 Exposed aluminum surfaces: clear anodized aluminum. Colour: Refer to Material / Finish schedule.

2.7 ACCESSORIES

.1 Gasketing: To CCD-45 Silicone compatible rubber or extruded silicone gaskets.
.2 Setting Blocks: To ASTM D2240, EPDM 80 - 90 Shore A Durometer hardness.
.3 Spacers: To ASTM D2240, EPDM 50 - 60 Shore A Durometer hardness.
.4 Sealant: To CAN/CGSB-19.13, Class 40, one-component, cold-applied, non-sagging silicone.
.1 Acceptable Material: Dow Corning 795.
.5 Sealant Bond Breaker: Open cell foam backer rod sized to suit project requirements.
.6 Flashings: 3 mm thick aluminum flashing and in accordance with Section 07 62 00 Sheet Metal Flashing and Trim.
.7 Liquid Foam Insulation: Single component, moisture cure, low expansion rate spray-in-place polyurethane liquid foam insulation to ULC-S710.1 and in accordance with manufacturer's written recommendations.

.8 Miscellaneous Components: Covers, copings, special flashings, filler pieces, termination pieces, cap closures, expansion joint covers, and metal bellows to match curtain wall system as indicated.

2.8 PRODUCT SUBSTITUTIONS

.1 No substitutions permitted.
.2 Ensure components come from one manufacturer.

3 Execution

3.1 INSTALLERS

.1 Use only authorized installers with 2 years minimum experience in work similar to work of this Section.

3.2 EXAMINATION

.1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for curtain wall installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform 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 Consultant.

3.3 INSTALLATION

.1 Install curtain wall in accordance with manufacturer's written instructions.
.2 Do aluminum welding to CAN/CSA W59.2.
.3 Attach curtain wall assemblies to structure plumb and level, free from warp, and allow for sufficient adjustment to accommodate construction tolerances and other irregularities.
  .1 Maintain dimensional tolerances and align with adjacent work.
  .2 Use alignment attachments and shims to permanently fasten elements to building structure.
  .3 Clean welded surfaces and apply protective primer to field welds and adjacent surfaces.
.4 Install thermal isolation where components penetrate or disrupt building insulation.
.5 Install sill flashings.
.6 Co-ordinate attachment and seal of perimeter air barrier in accordance with Section 07 27 00 - Air Barriers.
.7 Co-ordinate attachment and seal of perimeter vapour retarder in accordance with Section 07 26 00 - Vapour Retarders.
.8 Install liquid foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
.9 Install insulating glass units and infill panels in accordance with Section 08 80 00 Glazing and to manufacturer's written instructions.
.10 Install perimeter sealant to method required to achieve performance criteria, backing materials, and installation criteria in accordance with Section 07 92 00 - Joint Sealing.

3.4 FIELD QUALITY CONTROL

.1 Field Inspection: Coordinate field inspection in accordance with Section 01 45 00 Quality Control.
.2 Site Installation Tolerances:
  .1 Variation from plumb: 12 mm per 30 m maximum.
  .2 Misalignment of two adjacent panels or members: 0.8 mm maximum.
  .3 Sealant space between curtain wall and adjacent construction: 13 mm maximum.

3.5 CLEANING

.1 Progress Cleaning: Perform cleanup as work progresses in accordance with Division 01 - General Requirements.
  .1 Leave work area clean end of each day.

.2 Final leaning: Upon completion, remove surplus materials, rubbish, tools, and equipment in accordance with Division 01 - General Requirements.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by glazed aluminum curtain wall installation.

END OF SECTION

This page intentionally left blank

1 General

1.1 DESCRIPTION OF WORK

.1 The work of this Section comprises the provision of all equipment, labour and materials necessary for the supply and installation of all interior and exterior glass and glazing as follows:
- .1 Glazing for doors.
- .2 Glazing for interior hollow metal windows (borrowed lights).
- .3 Glazing for exterior windows.
- .4 Borrowed lights and screens with fire rated glass.
- .5 Window film.
- .6 Miscellaneous specialty glass, gaskets, tapes and glazing materials.

1.2 RELATED REQUIREMENTS

.1 Section 06 41 00 - Architectural Wood Casework.
.2 Section 08 11 13 - Hollow Metal Doors and Frames
.3 Section 08 14 16 - Flush Wood Doors

1.3 REFERENCES

.1 American National Standards Institute (ANSI).
- .1 ANSI/ASTM E330-02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.2 American Society for Testing and Materials International, (ASTM).
- .1 ASTM C542-94(1999), Specification for Lock-Strip Gaskets.
- .2 ASTM D1003-00, Test Method for Haze and Luminous Transmittance of Plastics.
- .3 ASTM D2240-02b, Test Method for Rubber Property - Durometer Hardness.
- .4 ASTM E84-01, Test Method for Surface Burning Characteristics of Building Materials.
- .5 ASTM F1233-98, Test Method for Security Glazing Materials and Systems.
- .6 ASTM C509-06, Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
- .7 ASTM C510-05a, Standard Test Method for Staining and Colour Change of Single or Multicomponents Joint Sealants.
- .8 ASTM C794-06, Standard Test Method for Adhesion in Peel of Elastomeric Joint Sealants.
- .9 ASTM C864-05, Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- .10 ASTM C920-05, Standard Specification for Elastomeric Joint Sealants.
- .11 ASTM C1036-06, Standard Specification for Flat Glass.
- .12 ASTM C1048-04, Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
- .13 ASTM C1115-06, Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
- .14 ASTM C1349-04, Specification for Architectural Float Glass Clad Polycarbonate.
- .15 ASTM C1376-03, Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
- .16 ASTM E1300-07e1, Practice of Determining Load Resistance of Glass in Buildings.

.3 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
- .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.
- .3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
- .4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.
- .5 CAN/CGSB-12.8-97, Insulating Glass Units.
- .6 CAN/CGSB-12.9-M91, Spandrel Glass.

.7 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.
.8 CAN/CGSB-12.11-M90, Wired Safety Glass.
.9 CAN/CGSB-12.12-M90, Plastic Safety Glazing.
.10 CAN/CGSB-12.13-M91, Patterned Glass.
.11 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
.12 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing.
.13 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
.14 CAN4-S104-M80, Fire Test of Door Assemblies.
.15 CAN4-S106-M80, Fire Test of Windows and Glass Assembles.

.4 Canadian Standards Association (CSA International).
.1 CSA A440.4, Energy Performance Evaluation of Windows and Sliding Glass Doors.
.2 CSA Certification Program for Windows and Doors 2000.

.5 Flat Glass Manufacturers Association (FGMA).
.1 FGMA Glazing Manual - 1997.

.6 Laminators Safety Glass Association (LSGA).
.1 LSGA Laminated Glass Design Guide 2000.

.7 NFPA
.1 NFPA 80-99, Standard for Fire Doors and Fire Windows.
.2 ULC, Underwriters Laboratories of Canada Building Materials and Systems Directory, Fire Resistance Directory, Current Edition including Supplements to date.

1.4 DEFINITIONS

.1 Pattern Glass: One type of glass having pattern impressed on 1 or both sides for decorative purpose. Sometimes called “rolled”, “figured”, or “Obscure” glass.
.2 Etched: Surface treatment for flat glass obtained by spraying glass with hard particles or treating with acid wash to roughen 1 or both surfaces of glass. Effect is to increase obscurity and diffusion.
.3 United Inches: Total of 1 width and 1 height of glass panels in inches.

1.5 SYSTEM DESCRIPTION

.1 Design Requirements:
.1 Design glass and glazing to CAN/CGSB-12.20-M.
.2 Provide accessories, closures and trims required and necessary to complete work.

.2 Performance Requirements:
.1 Ensure solvents and/or other volatile elements in glazing system do not affect properties and performance of materials used for edge seal and sealant glass bond.
.2 Ensure materials used for edge seals are compatible with other materials they come in contact within glazing system. If required, perform compatibility tests to ASTM C510, ASTM C794 and ASTM C1087, or others as applicable.
.3 Use sealants and other materials in glazing system which are unaffected by long term UV light exposure.

1.6 SUBMITTALS

.1 Submit Product Data, Samples, Manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and data sheets.

.3 Samples:
.1 Submit duplicate 300 mm size samples of each sealed glazing unit.
.2 Submit duplicate 100 x 100 mm size samples of colored glass unit specified.

.4 Material Safety Data Sheets:
.1 Submit MSDS for inclusion in Operation and Maintenance Manual.

.5 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.6 Closeout Submittals:

.1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.7 QUALITY ASSURANCE

.1 Test Reports: provide certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: provide product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-installation Meetings: attend pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.4 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals

.5 Perform work in accordance with FGMA Glazing Manual, IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver glass and associated materials to site in original crates and containers with manufacturer's name and brand distinctly marked thereon and with glass labelled as to types. Do not remove labels on glass until after work is accepted by Consultant.

.2 Store materials within the building, in a clean, dry location, acceptable or as designated by Consultant. Fully protect materials from damage of any kind until ready for use.

1.9 PROJECT CONDITIONS

.1 Environmental Requirements: No glazing done when temperature is less than 7 deg C or sash or frames are wet, damp or frosted.

.2 Protect work of other trades from damage resulting from work of this Section.

.3 Identify glazed openings immediately following glass installation. Use coloured tapes or flags suspended near, but not in contact with glass. Attach to frames or surround with suitable non-staining strippable adhesives or tapes.

1.10 WARRANTY

.1 Warrant factory sealed insulating units for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract.

.2 Warrant that factory sealed insulating units be free from material obstruction of vision as result of dust or film formation on internal glass surfaces by any cause, under normal conditions anticipated under this Project, other extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass or glazing fault.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 ACCEPTABLE MATERIALS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 AGC Flat Glass North America, Ltd.; www.na.agc-flatglass.com.
.2 Ace Security Laminates; www.acesecuritylaminates.com.
.3 Barber Glass Industries; www.barberglass.com.
.4 GE Silicones; www.gesilicones.com.
.5 Guardian Industries Corp.; www.guardian.com.
.6 PPG Canada Inc.; www.ppgglass.com.
.7 Pilkington Special Glass Limited; www.pilkington.com.
.8 Prelco Inc.; www.prelco.com.
.9 Schott North America Inc.; www.us.schott.com.
.10 Viracon Inc.; www.viracon.com.
.11 Tremco Canada; www.tremcosealants.com.
.12 Trulite Industries Limited; www.trulite.com.

2.2 MATERIALS: FLAT GLASS

.1 Glass: Free from bubbles, waves, discolouration and other defects and of following types for locations indicated on Drawings or noted on Door Schedule. Ensure glass bears manufacturer's label indicating quality. Leave labels in place until final cleaning.

.2 Single Glazed Glass Types:

.1 Float Glass: Conforming to CAN/CGSB-12.3-M, clear transparent float glass, minimum 6 mm.

.2 Tempered Glass:

.1 Minimum 6 mm.

.2 Conforming to ASTM C1048, CAN/CGSB-12.1-M, Type 2 tempered, Class B float glass, Category II.

.3 Perform heat strengthening using horizontal tong free method; surface compression not less than 7500 psi.

.3 Tempered Laminated Glass:

.1 Minimum 6 mm.

.2 Two layers of fully tempered safety glass conforming to ANSI Z97.1, ASTM C1048 and CAN/CGSB-12.1-M, Type 2, Class B, Category II laminated together under heat and pressure with clear PVB interlayer of 0.8 mm thick between them to create single unit.

.3 Perform heat strengthening using horizontal tong free method; surface compression less than (7500 psi).

.4 Clear, ceramic, wireless safety glass: to CAN4-S104, CAN4-S-106, ASTM-E-152, ASTM-E-163, of 5 mm thickness, with polished surfaces.

.1 Acceptable Material:

.2 Premium Firelite.

.3 Structural Glazing Sealant:

.1 One component silicone base sealant, chemical curing conforming to CAN/CGSB-19.13-M, Classification MCG-2-25-A-N and ASTM C1184 unless otherwise approved and/or directed.

.2 Suitable for metal, concrete and glass, non- sagging for vertical joints, capable to resist 25% movement with total loss of bond as specified in Standard, suitable for glazing, resists UV through glass, normal temperature, minimum application temperature 5 deg C.

.3 Sealant shall be UV resistant, ozone resistant, non-bleeding, non-staining and capable of supporting their own weight, structural glass units and all specified or referenced loads to meet design criteria and in conformance of OBC requirements.

.4 Cutting back or silicone based spandrel opacification at structural glazing shall not be permitted.

.5 Acceptable Material for shop glazing::

.1 "Proglaze II Multi Component" by Tremco Canada;

.2 "Ultraglaze 4400" (where recommended by manufacturer) by GE Silicones;

.3 "DC-983" by Dow Corning Canada.

.6 Acceptable Material for field glazing:
- .1 "Spectrum® 2 or Proglaze SG" by Tremco Canada;
- .2 "Ultraglaze 4400" or "Ultraglaze 4000" by GE Silicones;
- .3 "DC-795" by Dow Corning Canada.

.7 Sealant for Heel Bead Airseal at Windows:
- .1 Acceptable Material:
  - .1 One component, medium modulus silicone sealant.
  - .2 "SilGlaze II SCS2800" by GE Silicones.
  - .3 "Tremsil 600" by Tremco Canada.

.4 Window Film:
- .1 Translucent opacity, transparent synthetic liner, clear pressure sensitive adhesive.
- .2 Film shall have cutouts to suit design and be located as indicated on Drawings.
- .3 Provide "3M Scotchcal ElectroCut Special Effects Film" by 3M; www.3m.com in colour "7725-314 Dusted Crystal".

.5 Glazing, Sealing Compounds and Accessories:
- .1 Ensure glazing, sealing compounds and accessories are compatible with all contact surfaces of frames, other accessories used in glazing system and contact surfaces of compounds used on insulated glass units.
- .2 Wood or other organic materials are not acceptable for use in glazing systems including spacer blocks.
- .3 Glazing Compound:
  - .1 Non-hardening modified oil type.
  - .2 Colour to match adjacent surfaces unless indicated otherwise.
- .4 Sealant Compound: One component type, elastomeric chemical curing, CAN/CGSB-19.13-M, Class G-2-25-A-N. Colour to match adjacent surfaces unless indicated otherwise.
- .5 Sealant Compound:
  - .1 CAN/CGSB-19.24-M, multi-component chemical curing, Type 2, Class A.
  - .2 Colour to match adjacent surfaces.
- .6 Sealant Compound:
  - .1 One component, silicone base solvent curing.
  - .2 Colour to match adjacent surfaces.
- .7 Elastomeric Joint Sealants: ASTM C920.
- .8 Sealant for Interior Glass-to-Glass Butt Glazing Installation:
  - .1 Translucent 1 part silicone sealant conforming to U.S. Federal Specification TT-S-001543 (Silicone Building Sealant) and TT-S-0230, CAN/CGSB-19.13-M and ASTM C920, (One Component Building Sealant).
  - .2 "Tremsil 200" by Tremco Canada;
  - .3 "DC 999" by Dow Corning Canada.

.6 Sealant for Use With Plastic Polymer Glazing:
- .1 One component silicone base sealant, chemical curing conforming to CAN/CGSB-19.13- M, Classification MGC-2-25-A-N or BN unless otherwise directed.
- .2 Acceptable Material;
  - .1 "LexSil SPS 2900 Primerless Silicone.
  - .2 Plastic Sealant" by GE Silicones
  - .3 "Spectrum I" by Tremco Canada.

.7 Cellular Gaskets for Compression Glazing:
- .1 ASTM C509 cellular, elastomeric, preformed, black.
- .2 Closed cell neoprene or EPDM extrusions including molded corners where applicable by Cellular Rubber Extrusions Tremco Canada.

.8 Dense Gaskets for Compression Glazing:
- .1 ASTM C864, Option II or ASTM C1115, Type C, dense neoprene or EPDM extrusions, 60 and 70 Durometer density including molded corners where applicable.

.2 Poly-Wej Gaskets Tremco Canada.

.9 Glazing Splines:
- .1 Neoprene or EPDM manufacturer's standard dry glazing splines to suit aluminum extrusions.
- .2 Colour to match adjacent surfaces unless indicated otherwise

.10 Glazing Points and Wire Spring Clips:
- .1 Corrosion resistant, manufacturer's standards.

.11 Edge Blocking, Setting Blocks, Later Shims, Gaskets and Tapes:
- .1 Edge Blocking for Glass:
  - .1 60 - 70 Durometer neoprene, silicone or EPDM, channel shaped, 100 mm - 150 mm long.
- .2 Setting Blocks:
  - .1 7 mm x 100 mm EPDM or extruded 80-90 Durometer neoprene; at insulating glass, use EPDM only. At fire-rated glazed doors and partitions, use similar sized fire-rated silicone GE "Gel 516" or asbestos cement blocks.
  - .2 Width; 1.6 mm to 3 mm less than design glazing pocket width.
  - .3 For 4 sided structural glazing, use silicone compatible rubber or silicone.
- .3 Lateral Shims:
  - .1 Neoprene, silicone or EPDM, 40 - 60 Durometer, 100 mm long or as required.
- .4 Non-Compression Glazing Tape for Interior Aluminum Screen Glazing:
  - .1 Preformed, 100% solids, cross linked butyl rubber, polyisobutylene, hardness 65 Durometer, unaffected by UV through glass.
  - .2 Tape shall be sufficiently wide and thick as to completely cover bite area of glazing unit when the unit is pushed into place.
  - .3 Acceptable Material shall be "Tremco 440 Tape" by Tremco Canada.
- .5 Compression Glazing Gaskets for Interior Aluminum Screen Glazing:
  - .1 EPDM, neoprene, thermoplastic or other acceptable material with Shore A Durometer of 35, ± 5.
  - .2 Dual Durometer gaskets of a specific acceptable type are also acceptable.
  - .3 Ensure material has sufficient thickness or be of a configuration to allow 25% compression when installed, have a minimum 2000 psi (1500 psi for silicone) tensile strength, resistance to permanent set of 30% maximum, minimum elongation at break of 300% (700% for silicone) and resistance to ozone showing no cracks. "VISIONstrip®" by Tremco Canada.
  - .4 Acceptable material: Armet, Dow Corning and PTI.
- .6 Compression Glazing Tape:
  - .1 Preformed, ribbon-shaped, non-skinning, 100% solids, non-oxidizing polyisobutylene: butyl, paper release, EPDM shim with continuous synthetic rubber spacer rod of 60 Durometer hardness.
  - .2 Ensure tape is sufficiently wide and thick to completely cover bite area of glazing unit when unit is pushed into place.
  - .3 Acceptable material: Polyshim II Tape" by Tremco Canada.

.12 Primer Sealers and Cleaners: To glass and plastic glazing manufacturer's standards.

2.3 MATERIALS: SEALED INSULATING GLASS

.1 Insulating glass units: At all exterior doors, exterior sidelights and exterior windows.

.2 Triple glazed units: to CAN2-12.8M76(R1979) with all 3 panes of 6mm thick high performance glass, two 12mm air spaces, glass with 0.10 low emissivity coating on surface 5, argon gas filled interspaces and insulating silicone-foam edge spacer. Metal edge spacers not acceptable.

.3 Tempered glass to be provided at all interior and exterior aluminum doors and side lights. Tempered glass at both inner and outer pane.

.4 Tempered glass to be provided at all interior and exterior glazed units where the glass is within 1500mm of floor level.
.5 Acceptable Material:
.1 PPG, Solarban 60 Solar Control Low-E glass, VLT 70, SHGC 0.39.

2.4 MATERIALS: SECURITY GLASS (SGL)

.1 Provide security glazing designed to withstand impact loads and forces without damage to the glazing conforming to the requirements of the New York Office of Mental Health Patient Safety Standards.
.1 Construction: Clear laminated glass with multiple plies of heat-strengthened glass as follows.
.2 4.0 mm heat-strengthened glass
.3 Interlayer type: 2.29 mm (0.090 inch) ionoplast interlayer (SentryGlas)
.4 4.0 mm heat-strengthened glass
.5 Nominal Unit Thickness: 10 mm (3/8 inch)
.6 Provide 0.15 mm (6 mil) spall protective layer; “Safety & Security Window Film Ultra S600” by 3M™ complete with tamper-resistant structural silicone securement system.
.7 Install in frames with a 25 mm (1”) continuous edge bite if dry glazed or 19 mm (3/4” continuous edge bite if silicone glazed.

2.5 ACCESSORIES

.1 Qualified products: only compounds listed on the CGSB Qualified Products list are acceptable for use on this project.
.2 Glazing compound: oil base, to CAN/CGSB-19.6, Type 1, color to match adjacent metal.
.3 Sealant compound: one component acrylic base, to CGSB 19-GP-5M, gun grade, color to match adjacent material.
.4 Sealant compound: two-component polysulphide base, to CAN2-19.24, gun grade, color to match adjacent metal.
.5 Glazing splines: E.P.D.M. or neoprene. Manufacturer's standard dry glazing splines to suit aluminum extrusions, black color.
.6 Glazing points and wire spring clips: corrosion resistant, manufacturer's standard.
.7 Cap bead: one component silicone, neutral cure, CGSB 19-GP-23, gun grade, color white.
.1 Acceptable material:
.1 Tremco "Spectrum 2".
.2 Sonneborn "Omniseal".
.8 Setting blocks: Neoprene, 80-90 Shore A durometer hardness to ASTM D2240, length of 25 mm for each square meter of glazing.
.9 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
.10 Glazing tape:
.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; size as required; black/ bronze color.
.11 Glazing clips: manufacturer's standard type.
.12 Glazing points and wire spring clips: corrosion resistant, manufacturer's standard.
.13 Lock-strip gaskets: to ASTM C542.
.14 Cap bead: one component silicone, neutral cure, to CGSB 19-GP-23, gun grade, color white.
Acceptable material:
.1 Trecmo "Spectrum 2"
.2 Sonneborn "Omniseal"
.15 Primer-sealers and cleaners: to glass manufacturer's standard.

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 FABRICATION

.1 Label each light of glass and/or plastic glazing with registered name of Product and weight and quality of glass and/or plastic glazing.
.2 Check dimensions on job site before cutting materials.
.3 Ensure minimum bite or lap of glass and/or plastic glazing on stops and rabbets as recommended by glass and/or plastic glazing manufacturer.

3.3 EXAMINATION

.1 Verify that openings for glazing are correctly sized and within tolerance.
.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.4 PREPARATION

.1 Thoroughly clean glass rebates and glass of dust, dirt, mortar and other foreign materials prior to glazing. Remove oils and grease with non-staining solvents such as Xycol or Methyl Ethyl Ketone solutions.

3.5 WORKMANSHIP

.1 Remove protective coatings and clean contact surfaces with solvent and wipe dry.
.2 Apply primer-sealer to contact surfaces.
.3 Place setting blocks as per manufacturer's instructions
.4 Install glass, rest on setting blocks, ensure full contact and adhesion at perimeter.
.5 Install removable stops, without displacing tape or sealant.
.6 Provide edge clearance of 3 mm minimum.
.7 Insert spacer shims to center glass in space. Place shims at 600 mm oc and keep 6 mm below sight line.
.8 Apply cap bead of sealant at full perimeter of exterior, at all aluminum window glazing.
.9 Apply sealant to uniform and level line, flush with sight line and tooled or wiped with, solvent to smooth appearance.
.10 Do not cut or abrade tempered, heat treated, or coated glass.

3.6 INSTALLATION: INTERIOR GLAZING

.1 If required, thoroughly mix glazing compound as recommended by manufacturer. Thinning of glazing compound will not be permitted.
.2 Carefully remove glazing stops and replace after glazing. Take care to prevent damage to stops.
.3 Doors, Screens, Sidelites and Interior Windows:
  .1 Place setting blocks on sill at 1/4 points from each corner unless otherwise directed by glazing manufacturer.
  .2 Place continuous glazing gaskets on edges of glass.
  .3 Centre and space each piece of glass with spacers located and installed according to manufacturer's directions.
  .4 Place glass so no voids occur between glass and glazing material, and glazing stops.
  .5 Secure glass in place with stops, secured in place with screws.
.4 Glazing Sealant:

.1 Apply glazing sealant to clean, dry, grease and oil free surfaces. Provide exposed glazing sealant smooth, free from ridges, wrinkles, air pockets and embedded foreign materials.
.2 Prime surfaces if required by glazing sealant manufacturer.
.3 Trim glazing sealant flush with tops of stops and glazing channels.
.4 Remove excess glazing sealant or droppings which would set up or become difficult to remove from finished surfaces. Remove excessive sealant immediately. Do not use chemicals, scrapers, or other tools which would affect finished surfaces.

.5 Interior Glazing:
.1 Fire Rated Hollow Metal Doors and Screens:
.1 Set glass in fire rated metals doors and screens on continuous setting block with 3 mm gap between glazing stop glass and embed in glazing compound in accordance with NFPA 80 and OBC requirements. Strike and point exposed joints between metal and glass or Install glass in accordance to ULC tested proprietary methods of installation.
.2 Combination Method-Tape/Sealant:
.1 Cut glazing tape to proper length and Install against permanent stop projecting 1.5 mm above sightline.
.2 Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass to uniform and level line.
.3 Trim off excess tape to sightline.
.3 Two Sided Butt - Joint Glazing:
.1 2 side glazing at head and sill use wet, dry, or wet/dry glazing systems.
.2 Position glazing so that vertical edges are spaced slightly apart and seal with silicone sealant.
.3 Grind vertical joint with slight kerf and polish for aesthetics.

.6 Window Film:
.1 Install window film in accordance with manufacturer's printed instructions by experienced film applicators as recommended by glass film manufacturer.
.2 Ensure glass surfaces are clean and ambient temperature is between 16 deg C and 38 deg C.
.3 Whenever 2 or more pieces of same colour translucent film are seamed together as a continuous band of colour, they shall be matched to assure uniform reflected daytime colour and transmitted night appearance.

3.7 ALUMINUM DOORS, TRANSOMS LIGHTS AND SIDELIGHTS

.1 All doors and transoms lights to be glazed with 25mm insulating units, in accordance with the requirements of this Section, to door manufacturer's standard glazing installation practice unless noted otherwise on drawings.

3.8 ALUMINUM WINDOWS

.1 All windows to be glazed with 25mm thickness insulating units in accordance with the requirements in this Section, to window manufacturer's standard glazing installation practice.
.1 Provide cap bead of sealant at all four (4) sides, at exterior of each unit.
.2 All doors transoms and side lights to be glazed with 25 mm insulating units, in accordance with the requirements of this Section, to door manufacturer's standard glazing installation practice unless noted otherwise on drawings.
.3 All partitions and borrowed lights, to be glazed with 6 mm thickness clear wired safety glass, in accordance with the requirements of this Section.
.4 All partitions and borrowed lights, to be glazed with 6 mm thickness clear, laminated safety glass, in accordance with the requirements of this Section.
.5 Where indicated on drawings, frames to be glazed with wired safety glass in accordance with the requirements of this Section.

.6 All fire-rated hollow metal doors to be glazed with 6 mm thickness clear, wired safety glass, in accordance with the requirements of this Section.
.7 Use insulated glass units for all exterior doors in heated spaces.
.8 All non-fire rated hollow metal doors to be glazed with 6 mm thickness clear laminated or tempered safety glass in accordance with the requirements of this Section.
.9 Where indicated on drawings, Doors to be glazed with wired safety glass in accordance with the requirements of this Section.
.10 Use tempered insulated glass doors for all exterior doors.

3.9 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
.2 Remove traces of primer, caulking.
.3 Remove glazing materials from finish surfaces.
.4 Remove labels after work is complete.
.5 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
.6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.10 PROTECTION OF FINISHED WORK

.1 Provide and maintain necessary protection of completed work against damage.
.2 Do not mark or attach anything directly to exposed glass and framing surfaces.
.3 If welding is to take place above or near completed glazing work, protect glass with plywood or other suitable means to reduce likelihood of weld spatter damaging glass surfaces.
.4 Protect glass from other trades, workers, tools and other similar materials.
.5 Replace cracked, broken, or defective glass at no additional cost to the Owner and to Consultant's satisfaction.
.6 Identification of Glazing: Mark glass lites with temporary, easily removable, large safety markings, immediately after glass installation. Maintain safety markings until final clean-up.

END OF SECTION

1 General

1.1 WORK INCLUDED

.1 All drywall work shown or implied on drawings and/or specifications. The work includes but is not necessarily limited to the following:

- .1 Supply and installation of gypsum wallboard to all stud partitions, ceilings and bulkheads, as indicated on the drawings.
- .2 Supply and installation of exterior gypsum board sheathing.
- .3 Supply and installation of fiberglass thermal insulation and acoustic blankets in walls and ceiling, as indicated on the drawings.
- .4 Supply and installation of gypsum wallboard on strapping.
- .5 Allow openings for equipment installed in drywall construction by others.
- .6 Supply and installation of gypsum board column enclosure.
- .7 Installation of access panels in gypsum wallboard partitions and ceilings as supplied by Mechanical and Electrical trades.
- .8 Provide supplementary steel supports for ceilings, as required.
- .9 Supply and installation of gypsum board directly applied to masonry and concrete surfaces.
- .10 Supply and installation of shaft wall.
- .11 Supply and installation of corner beads, casing beads, trim, control joints and corner reinforcement.
- .12 Supply and installation of taping and filling.
- .13 Supply and installation of acoustic caulking to acoustically insulated gypsum board partitions.
- .14 Supply and installation of fire rated wall assemblies.
- .15 Supply and installation of access hatches, panels and door frames supplied by other trades.

1.2 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrications.
.2 Section 07 21 16 - Blanket Insulation.
.3 Section 07 26 00 - Vapor Retarders.
.4 Section 08 11 13 - Steel Doors and Frames.
.5 Section 09 22 16 - Non-Structural Metal Framing.
.6 Section 09 91 00 - Painting.
.7 Division 23 - Mechanical - Supply of access doors.
.8 Division 26 - Electrical - Supply of access doors.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM C36/C36M-01, Specification for Gypsum Wallboard.
- .2 ASTM C79/C79M-01, Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board.
- .3 ASTM C442/C442M-01, Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
- .4 ASTM C475-01, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .5 ASTM C514-01, Specification for Nails for the Application of Gypsum Board.
- .6 ASTM C557-99, Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- .7 ASTM 1396, Specification for Water-Resistant Gypsum Backing Board.
- .8 ASTM C840-01, Specification for Application and Finishing of Gypsum Board.
- .9 ASTM C931/C931M-01, Specification for Exterior Gypsum Soffit Board.

.10 ASTM C954-00, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
.11 ASTM C1002-01, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
.12 ASTM C1047-99, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
.13 ASTM C1280-99, Specification for Application of Gypsum Sheathing Board.
.14 ASTM C1177-01, Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
.15 ASTM C1178/C1178M-01, Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.2 Association of the Wall and Ceilings Industries International (AWEI)

.3 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-51.34-M86(R1988), Vapor Barrier, Polyethylene Sheet for Use in Building Construction.
.2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.4 Underwriters' Laboratories of Canada (ULC)
.1 CAN/ULC-S102-1988(R2000), Surface Burning Characteristics of Building Materials and Assemblies.

1.4 DEFINITIONS

.1 Drywall = Gypsum Board = Gypsum Wall Board = GB = GWB

1.5 SYSTEM DESCRIPTION

.1 Design Requirements:
.1 Obtain services of professional engineer with experience in type of work of comparable complexity and scope, licensed to practice in Province of Prince Edward Island to design, review and Provide professional services for work of this Section.
.2 Design ceiling suspension system in accordance with manufacturer's printed directions and conforming to ASTM C754 requirements. Do not suspend any items from structural steel deck. Do not support work of this Section from, nor make attachments to, ducts, pipes, conduits or support framing of other trades.
.3 Design exposed to view ceiling suspension system for 'floating ceiling' and take extra care to ensure that hanger rods are vertically plumb, evenly and neatly spaced and neatly tied with tie wire free of any kinks complete with fascia trim. Install fascia trim in accordance with manufacturer's recommendations.
.4 Design suspended ceiling system for adequate support of electrical fixtures as required by current bulletin of Electrical Inspection Authority.
.5 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.
.6 Design suspension system to support weight of mechanical and electrical items such as air grilles, lighting fixtures, drapery track, drapes and with adequate support to allow rotation / relocation of light fixtures.
.7 Design exterior soffit and ceiling system where applicable to withstand positive and negative wind loads effect to suit Project design requirements.
.8 Design sub-framing as necessary to accommodate, and to circumvent, conflicts and interferences where ducts or other equipment prevent regular spacing of hangers.

.9 Design metal stud reinforcements from hollow structural steel, stud, angle and steel plate sections, galvanized sheet steel minimum 1.214 mm (designation thickness 43 mils/minimum base steel thickness 1.087 mm (colour yellow / 18 ga) where required to support of manufactured components without limitations items such as washroom accessories, expansion control covers and similar items. Design weld connections ensuring rigid and secure installation capable of offering resistance to minimum 227 kg pull force. Consider galvanized items in moist areas. Do not design using wood blocking for this purpose.

.10 Design fire rated construction including ceiling, partition or fire protective membranes and furring to approved ULC design or other design acceptable to authorities having jurisdiction, to provide design fire rating indicated and/or required. Submit written evidence of acceptable test design.

.11 Provide sound rated construction having STC rating indicated and tested in accordance with ASTM E90.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10°C, maximum 21°C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Ensure relative humidity in building is acceptable to material suppliers prior to commencement of installation.

.3 Apply board and joint treatment to dry, frost free surfaces.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site with manufacturer’s original labels intact. Do not remove wrappings until ready for use.

.2 No outside storage permitted. Store in clean, dry area, off ground. Provide adequate ventilation to avoid excess moisture, surface relative humidity and mould or fungal growth. Remove immediately any board showing signs of mould, mildew or fungal growth.

.3 Stack gypsum board flat on level and dry surface without overhanging boards. Prevent sagging and damage to edges, ends and surfaces. Protect bagged products from moisture or wetting.

1.8 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's literature, data sheets for each type of material provided under this Section for Project. Data sheets shall provide all required information. Submit manufacturer's installation instructions.

.3 Material Safety Data Sheets:

.1 Submit MSDS for inclusion in Operation and Maintenance Manual without limitations for adhesives, sealants, patching and leveling compound, solid polymer and as designated later by Consultant.

.4 Shop Drawings:

.1 Submit Shop Drawings showing design, construction, sound attenuating construction, adjacent construction, locations of access panels, elevations, finishes and relevant details of furring, enclosures and partitions which require fire rating.

.5 Certificates:

.1 Submit certification from structural engineer registered in Province of Prince Edward Island, who shall affix his/her seal and signature to certificate, stating that installed suspended ceiling system is capable of supporting its own weight and weight of lighting, grilles and other mechanical and electrical fixtures required by Mechanical and Electrical Divisions.

.2 Obtain approval of electrical utility authorities having jurisdiction for support of light fixtures, by ceiling grid and supports, to satisfy requirements of electrical inspection authority having jurisdiction. Adjust grid, fixing devices and support hangers as required to obtain approval.

.3 Samples:

.1 When requested, submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Each trim accessory minimum 300 mm long.

.6 Quality Assurance:

.1 Applicator Qualifications: Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified.

.2 Comply with ASTM C840 for application and finishing gypsum board and manufacturer's written information.

.3 Comply with following guide recommendations unless specified otherwise:

.1 Applications Guide CGC folder SA-130;

.2 Fire Resistant Assemblies CGC folder SA-100;

.3 Acoustical Assemblies CGC folder SA-200;

.4 Abuse-Resistant Assemblies CGC folder SA-929;

.5 Moisture Resistant Assemblies CGC folder SA-934;

.6 Shaft Wall Systems CGC folder SA-926;

.7 Gypsum Fire Wall Systems CGC folder SA-925.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MANUFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Bailey Metal Products Ltd.; www.bmp-group.com.

.2 CertainTeed Gypsum Canada Inc.; www.certainteed.com

.3 CGC Inc.; www.cgcinc.com

.4 Georgia-Pacific Canada, Inc.; www.gpgypsum.com

.5 Acadia Drywall Supplies Ltd; www.acadiadrywall.com

.6 Gordon Incorporated; www.gordongrid.com

.7 Roll Formed Specialty; www.rollformed.com

.8 Cabot Gypsum.

2.2 ACCEPTABLE MATERIALS

.1 Fire Rated Gypsum Board (where identified):

.1 Fire Rated Gypsum Board having Testing Agency Fire Rating Identification Stamp on Each Sheet

.2 ASTM C1396M, Type X, 15.9 mm thick gypsum board 1200 mm wide, maximum practical length and tapered edge as required by each fire resistance assembly.

.3 Acceptable Material:

.1 CGC Gyproc Firecode C.

.2 Georgia Pacific Gyproc Fireguard Type X.

.3 CertainTeed Fi-Rock Type X.

.4 Temple-Inland Gypsum Board Fire-Resistant Type X.

.2 Standard Gypsum Board:
- .1 To ASTM C 3696. 15.9 mm thick, 1219 mm wide x maximum practical length, Ends square cut, edges tapered.
- .2 Acceptable Materials:
  - .1 CGC Inc.
  - .2 CertainTeed Gypsum Canada.
  - .3 G-P Gypsum.
  - .4 Temple Island.
  - .5 Cabot Gypsum.

.3 Moisture Resistant Gypsum Board:
- .1 Use Type X where rating requires ASTM C 1658 regular, 15.9 mm thick, 1219 mm wide x maximum practical length. Use in rooms containing a shower (except where shown to receive cementitious backer board), all washrooms, shower rooms, tubroom, soiled utility and behind sinks (450 mm from center line of fixture, both directions to above ceiling.
- .2 Sink area at janitor closets (1219 mm both directions from center line of sink to above ceiling).
- .3 Acceptable Materials:
  - .1 Georgia Pacific DensArmor Plus.
  - .2 Georgia Pacific DenShield Tile Backer.
  - .3 CertainTeed ProRoc Moisture and Mold Resistant Board.
  - .4 CertainTeed M2 Tech.
  - .5 GreenGlass Interior Gypsum Board by Temple-Inland.
  - .6 Fiberock Aqua Tough by CGC.
  - .7 Sheetrock Mold Tough, by CGC.

.4 Tile and Seamless Wall Coating Backer:
- .1 Use behind all ceramic tile wall finishes.
- .2 Conform to ASTM C1178M and ASTM C1396M, paperless, glass mat reinforced, water resistant treated core gypsum board.
- .3 Rating of 10,' no mold growth' as tested for 4 weeks according to ASTM D3273.
- .4 Permeance of
- .5 Acceptable Materials:
  - .1 DensShield Tile BackerTM by Georgia-Pacific Canada, Inc.
  - .2 Green Glass Tile Backer by Temple-Inland.
  - .3 Sheetrock Mold Tough, by CGC.

.5 Cementitious Backer Board:
- .1 Use at locations noted.
- .2 Glass mesh mortar unit to ANSI A11/.9, 12.7 mm thick, 914 mm width, round tapered edges.
- .3 Acceptable Materials:
  - .1 Canadian Gypsum Durock Tile Backer Board;
  - .2 Domtar DonCrete Cementitious Tile Backer Board;
  - .3 Laticrete International Inc. Wonderboard;
  - .4 Louisiana-Pacific Canada Ltd. Gypsheathing.
  - .5 National Gypsum Perma Base Cement Board.

.6 Impact Resistant Gypsum Board:
- .1 Multipurpose board, core of fibre-reinforced gypsum and perlite between layers of fibre- reinforced gypsum with fibreglass mesh reinforcement embedded; 12.7 mm or 15.9 mm thickness equivalent to Type X gypsum board when tested in accordance with ASTM E119 and CAN/ULCS101-M.
- .2 To CAN/CAS-A82.27, 16 mm thick, 1219 mm wide x maximum practical lengths to be used where indicated on finish schedule and:
  - .1 All corridors to 1219mm Above Finished Floor.

.2 All janitor closets to 1219mm Above Finished Floor (except sink area) to be moisture resistant.
.3 All soiled utility rooms to 1219mm Above Finished Floor (except sink areas) to be moisture resistant.
.4 All patient-accessible areas where concrete masonry units are not provided.

.3 Acceptable Materials:
.1 Sheetrock Mold Tough VHI Firecode X manufactured by CGC.
.2 Air Renew Extreme Impact Gypsum Board as manufactured by CertainTeed,
.3 ToughRock Fireguard Type X Abuse Guard Gypsum Board as manufactured by Dens Armour Plus,
.4 ComfortGuard IR by Temple-Inland

.7 Gypsum Exterior Soffit Board:
.1 Glass mat reinforced, treated core gypsum board conforming to ASTM C1177M and ASTM D3273 with a rating of 10, no mould growth after 4 weeks exposure, Type X 15.9 mm thick exterior ceiling panel, weather and sag resistant.
.2 Acceptable Materials:
.1 DensGuard Dens Glass Gold by Georgia-Pacific Canada, Inc.
.2 GreenGlass Exterior Sheathing by Temple-Inland.

.8 Exterior Gypsum Sheathing Board:
.1 Glass mat reinforced, treated core gypsum board conforming to ASTM C1177M, non combustible according to ASTM E136/CAN4-S114-M, flame spread 0, smoke developed 0 to ASTM E84/CAN/ULC-S102-M and ASTM D3273 with a rating of 10, no mould growth after 4 weeks exposure, 16 mm thick Type X gypsum board 1200 mm wide by maximum practical length, tapered edge as required.
.2 Acceptable Materials:
.1 DensGuard DensGlass Gold Exterior Guard by Georgia-Pacific Canada, Inc.
.2 GlasRoc Sheathing by CertainTeed Gypsum, Canada Inc.
.3 Securock Glass Mat Sheathing by CGC Inc.
.4 GreenGlass Exterior Sheathing by Temple-Inland.

.9 Drywall Furring Channels:
.1 0.5 mm (25 gauge) core thickness galvanized steel channels for screw attachment of gypsum board.

.10 Resilient Drywall Furring Channels:
.1 0.5 mm (25 gauge) base steel thickness galvanized steel for resilient attachment of gypsum board.

.11 Nails:
.1 To ASTM C 514.

.12 Steel drill screws:
.1 To ASTM C 1002.

.13 Polyethylene:
.1 To CAN/CGSB-51.34, 10 mil.

.14 Insulating Strip:
.1 Rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 13 mm wide, with self sticking permanent adhesive on one face, lengths as required.

.15 Plywood:
.1 19 mm Douglas Fir Shop Grade.

.16 Laminating compound:
.1 To CSA A82-31 asbestos free.

.17 Joint Compound:
.1 Special setting type compound: chemically setting, sandable, to ASTM C475.
.2 Acceptable Material:
.1 Canadian Gypsum Company Sheetrock 90.
.2 CertainTeed ProRoc Moisture and Mould resistant 90 Setting Compound with M2Tech.

.3 Acadia Drywall Sandable 90.

.18 Taping compound:
- .1 Pre-mixed, to ASTM C475.
- .2 Acceptable Materials:
  - .1 Canadian Gypsum Company All Purpose Ready-to-Use Joint Compound.
  - .2 CertainTeed ProRoc Moisture and Mould resistant 90 Setting Compound with M2Tech.
  - .3 Acadia Drywall Platinum Lite.

.19 Tape:
- .1 50mm wide x 0.25mm thick, perforated paper, with chamfered edges.

.20 Bonding Adhesive:
- .1 Type for purpose intended and as recommended and approved by manufacturer (Lepage PL 200 or PL 400).

.21 Metal Accessories:
- .1 Corner Beads Minimum 0.40mm, Z180 zinc coated sheet steel to ASTM A525; beaded angle; flanges 32mm for 16mm board.
- .2 Casing Beads: Minimum 0.40mm, Z180 zinc coated sheet steel to ASTM A525; "L" type; beaded angle or casing with one (1) side knurled for joint filling; suitable for 15.9mm wallboard, as specified.
- .3 Casing Beads, corner beads, control joints and edge trim: to ASTMC 1047, Zinc metal, zinc-coated by hot-dip process zinc-coated by electrolytic process aluminum coated phosphatized, 0.5mm base thickness, perforated flanges, one piece length per location.
- .4 Flexible Casing Beads:
  - .1 0.531 mm (designation thickness 18mils/minimum base steel thickness 0.455 mm /25 ga) steel, wipe coated, angle shaped in size to fit over edge of gypsum board, to suit curved applications.
- .5 Control joint strip: Roll formed from galvanized steel sheet, with a tape-protected recess, 6mm wide x 41mm deep.

.22 Access Doors and Panels:
- .1 Supplied as part of Division 21, 22 23 and 26 for installation as part of this Section.
- .2 Sized to suit requirements of other Sections, but minimum size 406 mm x 406 mm with drywall bead frame and key operated cylinder lock.
- .3 Provide closed cell neoprene gaskets to provide air tight fit.
- .4 Fire rated access panels shall conform to requirements of authorities having jurisdiction under law and shall be labeled.

.23 Water:
- .1 Fresh clean potable water, free from deleterious matter, acids or alkalies.

.24 Fire Wall Identification:
- .1 Paint to be ICI Dulux 14030 Interior Acrylic Low sheen eggshell.

.25 Acoustical/Fire Insulation:
- .1 Refer to Section 07 21 16 - Blanket Insulation.

.26 Shaft Wall:
- .1 Materials:
  - .1 Materials and framing members listed by ULC or WHI for use as a component within tested design assemblies to provide the specified fire resistance rating.
- .2 Stud and Track Components:
  - .1 Fabricated from steel meeting ASTM A446, Grade A, Z180 zinc coating to ASTM A525. Steel "I" or "CH" studs, "J" tracks. "T" splines, "L" runners with steel I and J tracks 100mm deep and 20 gauge thick and fasteners of design and gauge as used within tested assembly.
- .3 Coreboard:
  - .1 19mm or 25mm thick, Type X gypsum coreboard.

.4 Facing:
.1 15mm UL labeled gypsum wallboard.
.5 Rating Required:
.1 Fire-resistance rating as shown on Drawings.
.6 Fire Resistive Sealant:
.1 Low modulus, high performance, one part silicone rubber sealant conforming to CAN2-19.13 and listed by ULC as firestop sealant when tested in accordance with CAN4-S115 and bearing FT rating.
.7 Supply components from same manufacturer. Ensure components are compatible and tested by approved independent testing facilities acceptable to authorities having jurisdiction.
.8 Shaftwall framing, shaftliner, gypsum board and joint treatment materials shall provide 1 or 2 or 3 hour fire resistance rating as noted on Drawings when tested in accordance with ASTM E119.
.9 Shaftwall Framing including Galvanized Metal Studs and Runners: 64 mm, minimum 0.531 mm (designation thickness 18mils / minimum base steel thickness 0.836 mm (colour-White/20 ga) thick galvanized steel, designed for use in shaft wall construction.
.1 C-T Studs, J-L Corner and J track and other associated components by Georgia-Pacific Canada, Inc.
.2 C-H or CT and E studs, J runners and other associated components.
.10 Liner Panels:
.1 25 mm shaft wall liner panels with bevelled edges.
.2 Fabricated specially for gypsum shaftliner and facing boards in lengths up to 3600 mm
.11 Face Boards:
.1 15.9 mm thick firerated gypsum boards.
.12 Location:
.1 Fire rated vertical duct enclosures as shown on the Drawings.
.13 Acceptable Material:
.1 CGC Sheetrock Enhanced Gypsum Liner Panels.
.2 Dens Glass Ultra Shaftliner by Georgia-Pacific Canada, Inc.
.3 Cavity Shaft Wall by CGC Inc.
.4 GreenGlass Liner Panels by Temple-Inland.
.5 SilentGuard ShaftLiner by Temple-Inland.

.27 Sound Control Materials:
.1 Sound Attenuation Batts: Refer to and conform to requirements of Section 07 21 16 - Blanket Insulation to meet design requirements.
.2 Strip Impalement Clips:
.1 25 mm wide strip of Insul-Hold by Insul-Hold Canada Ltd., fabricated from 0.531 mm (designation thickness 18mils / minimum base steel thickness 0.455 mm (25 ga) galvanized sheet metal in 30 m rolls with punch-out insulation securement arrows. Alternatively, use special studs with punch-out impalement strips.
.3 Acoustic Sealant: ASTM C834 and ASTM C920, Class 25, Non-hardening.
.1 "QuietZone Acoustic Sealant" by Owens-Corning Canada Inc.
.2 "Tremco Acoustical Sealant" by Tremco Ltd.
.4 Elastomeric Sealant:
.1 As recommended by manufacturer of fibre-reinforced gypsum sheathing board.
.5 Gaskets:
.1 Closed cell neoprene, 3 mm thick x 64 mm wide.
.6 Asphalt Felt:
.1 CSA A123.3; No. 15 Type.

.28 Sealants:
.1 In accordance with Section 07 92 00 - Joint Sealants.
.29 Suspension System for Ceilings:
.1 Standard of Acceptance: Armstrong - Drywall suspension system.

3 Execution

3.1 PARTITION TYPES

.1 Refer to Drawings for partition types.
.2 Provide partitions complete to underside of structure, unless otherwise indicated on Drawings.

3.2 EXAMINATION

.1 Examine substrate for compliance with applicable requirements, installation tolerances and other conditions affecting installation of fibre-reinforced gypsum board or sheathing. Do not proceed until unsatisfactory conditions have been corrected. Beginning of installation shall indicate acceptance of substrate conditions.

3.3 INSTALLATION

.1 Give minimum 48 hours notice for Consultant's inspection of internal wall insulation, vapour barriers and services prior to concealing with gypsum board.
.2 Carry out work using skilled tradesmen carefully supervised by competent foremen.
.3 Take all measurements accurately.
.4 Comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation. Install framing, blocking and furring in accordance with ASTM C645, ASTM C1280.
.5 Maintain wallboard panels minimum 6 mm and maximum 13 mm above floor to prevent moisture transfer.
.6 Extend panels to underside of deck or structure and at fire rated and sound control partitions.
.7 Do taping and filling of concealed surfaces above ceiling line, except at fire rated and sound control partitions and walls.
.8 Keep end joints away from prominent locations and central portions of ceilings.
.9 Locate vertical joints at least 300 mm from jamb lines of openings.
.10 Space screws for regular wallboard at 300 mm oc along board edges and in board field on walls and ceilings; at fire-rated assemblies, reduce spacings to comply with labelling authorities assembly listings.
.11 For other specialty boards screw spacing shall be in accordance with manufacturer's recommendations.
.12 Drive screws with power screw-gun and set with countersunk heads slightly below surface of board.
.13 Do not secure gypsum board by installing screws into aluminum or steel window and door frames.
.14 At partitions except shaft walls, apply 1 continuous 6 mm bead of acoustical sealant to each side of partition where gypsum board meets dissimilar materials.
.15 Where 2 layers of gypsum board per face are required, apply bead of sealant at perimeter of base layer only.
.16 Apply sealant beads at perimeter of all other services and like objects which penetrate wallboard in accordance with manufacturer's directions.
.17 Install access panels in locations to be determined by coordination with Trades installing mechanical, electrical and other building services.
.18 Consultant reserves right to relocate access panels up to 3600 mm from locations shown on Drawings due to site conditions, providing ample warning is given prior to installation.
.19 Install in accordance with manufacturer's instructions.
.20 Provide access panels in locations and sizes required by other Sections.

.21 Coordinate with other Sections for locations and sizes. Install in accordance with manufacturer's instructions.

.22 At impact resistant gypsum board Provide 0.914 mm (designation thickness 33mils/minimum base steel thickness 0.836 mm (colour - White/20 ga) metal studs. Provide control joints 9000 mm on centre maximum and at both sides of door jambs.

.23 Access Doors and Panels:

- .1 Install access doors and panels where required as part of work of this Section in walls, bulkheads, ceilings and soffits.
- .2 Cooperate and coordinate delivery of access doors and panels supplied as part of work of Divisions 21, 22. 23. 24 and 26.
- .3 Install access doors and panels supplied as part of work of Divisions 21, 22. 23. 24 and 26 in walls, bulkheads, ceilings and soffits.

.24 Shaft Wall:

- .1 Construct shaft wall assemblies to provide fire resistance ratings indicated, from both sides, and to maintain airtight seal.
- .2 Install shaft wall studs at centres to meet design requirements in accordance with manufacturer's instructions or fire rated test design.
- .3 Provide framing to enclose sides, tops and bottoms of shafts terminating at floor or in ceiling space, to maintain fire rating of shaft assembly.
- .4 Install shaft wall liner in accordance with manufacturer's instructions at areas where specially designed studs require shaft wall liner panel application as required.
- .5 Apply continuous sealant around partitions to ensure airtight shaft enclosures. Firestopping and smoke seals at penetrations specified under Section 07 84 00 - Firestopping.
- .6 Where shaft wall height exceeds maximum available panel height, liner panel joints shall be positioned within upper and lower third points of wall and shall be staggered to prevent continuous horizontal joint.
- .7 Frame around duct openings through shaft walls with 'J' runners.

.25 Gypsum Board Application:

- .1 Provide gypsum board in accordance with manufacturer's written installation instructions and finish to requirements of ASTM C840. Ensure moisture resistant gypsum board is installed on any wall/partition containing a plumbing fixture (i.e. water closets, sinks, tubs, etc.).
- .2 Provide metal trim casing bead at junctions with dissimilar materials.
- .3 Provide reveals at junctions with dissimilar materials and where indicated.
- .4 Provide curved uniform surfaces by wetting or dampening board or scoring back gypsum board and form to profiles indicated Provide additional screws and framing members to maintain design curve.
- .5 Apply joint compound and trowel smooth to provide continuous, smooth radius free from flat spots, facets and trowel marks.
- .6 Allow gypsum boards to dry thoroughly before handling.
- .7 Provide finished work plumb, level and true, free from perceptible waves or ridges and square with adjoining work.
- .8 Cut and fit gypsum board to accommodate or fit around other parts of Work.
- .9 Provide work of this Section accurately and neatly.
- .10 Butt gypsum board sheets together in moderate contact.
- .11 Do not force into place.
- .12 Place tapered or wrapped edges next to 1 another.
- .13 Provide gypsum board perpendicular to framing and in lengths that will span ceilings and walls without creating end (butt) joints.
- .14 If butt joints do occur stagger and locate them as far from centre of walls and ceilings as possible.
- .15 Accurately fit exposed butt joints together and make edges smooth.
- .16 Support ends and edges on framing.

.17 Fasten gypsum board to furring and studs with screws. Space screws at 200 mm oc at board edges and 300 mm oc on board field. Ensure perimeter screws are not less than 9 mm nor more than 13 mm from edges and ends are opposite screws on adjacent boards.

.18 Gypsum Board - Single Layer:

.1 Ceilings:

.1 Apply gypsum board to metal furring with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members.

.2 Space screws at 200 mm oc.

.2 Partitions:

.1 Apply gypsum board to metal studs with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members. Locate vertical joints at least 300 mm from jamb lines of openings. Space screws at 200 mm oc at board edges and 300 mm oc on board field.

.3 Ceiling and Partition Fasteners:

.1 Ensure perimeter screws are not less than 9 mm nor more than 13 mm from edges and ends are opposite screws on adjacent boards. Drive screws with power screw gun and set with countersunk head slightly below surface of board.

.4 Joints: Finish all joints unless specified otherwise.

.19 Gypsum Board - Double Layer:

.1 Lay out work to minimize end joints on face layer; to offset parallel joints between face and base layers by at least 250 mm and to apply face layer at right angles to base layer.

.2 Base Layer: Base layer shall be same as face layer, or backing board, and applied at right angles to framing members. Secure base layer with screws spaced 300 mm oc to each member. Ensure perimeter screws are not more than 13 mm from edges and ends are opposite screws on adjacent boards. Ensure surface of erected base layer is straight, plumb or level and without protrusions before face layer is applied.

.3 Face Layer: Apply face layer at right angles to base layer with adhesive. Apply adhesive with notched spreader to leave 9 mm x 13 mm ribbons, 38 mm apart over entire back side of face layer. Erect board immediately after spreading adhesive. Supplement adhesive with screw fasteners. Provide temporary support for board until adhesive bond has fully developed. As alternative to adhesive specified, joint cement mixed with water in accordance with manufacturer's directions may be used. Allow joint cement and water mixture to stand 30 minutes before using.

.4 Joints: Finish joints in face layers only, unless otherwise required to achieve fire resistant ratings indicated, as hereinafter specified. Setting compound for fire rated construction shall conform to requirements of authorities having jurisdiction to obtain fire rating shown on Drawings.

.26 Gypsum Board Laminated to Concrete and/or Concrete Block Masonry:

.1 Gypsum Board Laminated to Concrete and/or Concrete Block Masonry:

.2 Mix laminating adhesive in accordance with manufacturer's directions.

.3 Allow to stand 30 minutes before using.

.4 Apply adhesive with notched trowel to leave 9 mm x 13 mm ribbons, 32 mm apart over entire back side of face layer.

.5 Erect gypsum board immediately after spreading adhesive.

.6 Use moderate pressure to develop full adhesive contact with substrate.

.7 Temporarily secure gypsum board in place with concrete nails or bracing.

.8 Ensure joints are accurately aligned.

.9 Avoid impact or movement of boards until adhesive sets firmly.
.10 Remove temporary support when adhesive has set.
.11 Do not treat joints of laminated gypsum board for at least 24 hrs after lamination.

.27 Exterior Sheathing:
.1 Provide exterior sheathing in accordance with manufacturer's instructions.
.2 Minimum Fastening Requirements:
.1 Perimeter Edge of Each Board: 200 mm oc max.
.2 Intermediate Supports: 300 mm oc max.
.3 Provide exterior sheathing neatly with tight butt joints and without gaps and holes.
.4 Bear edges of exterior sheathing fully onto structural framing.
.5 Do not crush exterior sheathing edges.
.6 Secure exterior sheathing to exposed leg of inner track of telescopic 2-piece top track.
.7 Provide ready to receive air/vapour barrier membrane.

.28 Interior Ceilings:
.1 Comply with recommendations of CGC Drywall Steel-Framed Systems Folder 09250-SA 923.
.2 Provide hanger wires spaced at maximum 1200 mm oc along carrying channels and within 150 mm of ends of carrying channel runs.
.3 Secure hanger wires to inserts in structure above.
.4 Provide carrying channels maximum 1200 mm oc and within 150 mm of walls.
.5 Secure with hanger wire saddle-tied along channels.
.6 Provide 25 mm clearance between runners and walls.
.7 Provide splicers behind joints. Level channels to a maximum tolerance of 3 mm over 3600 mm.
.8 Provide metal furring channels at right angles to carrying channels at maximum 600 mm oc and within 150 mm of walls.
.9 Provide 25 mm clearance between furring ends and abutting walls.
.10 Attach furring channels to carrying channels with saddle-tie of double strand tie wire.
.11 Provide additional cross-reinforcing at bulkheads and at other openings.
.12 Provide additional reinforcement for ceiling mounted miscellaneous accessories and signage.
.13 Provide ceiling gypsum board, smooth and level.

.29 Metal Trim and Accessories:
.1 Provide metal trim casing beads at reveals; at ceiling-wall intersections and partition perimeters; and at intersection of dissimilar constructions such as gypsum board to concrete.
.2 Provide metal trim casing beads where gypsum board abuts against a surface having no trim concealing junction.
.3 Provide ceiling fascia suspension trims at perimeter of "floating" suspended gypsum board ceilings as indicated on the Drawings.
.4 Provide a 13 mm separation gasket between metal trim casing beads and window frames or other cold surfaces, where such framing abuts exterior door or window frame.
.5 Tape shall be either full width or 1 strip 9 mm wide on each side of framing member.
.6 Provide casing bead where gypsum board abuts materials other than itself and acoustic tile ceilings including at exterior door and window frames, where juncture is not concealed with trim; or elsewhere where indicated on Drawings.
.7 Unless indicated otherwise, use tape 3 mm narrower than casing bead to provide recess at exposed side. Compress tape by 25%.
.8 Unless indicated otherwise, use tape 3 mm narrower than casing bead to provide recess at exposed side. Compress tape by 25%.
.9 Provide prefinished metal angle trim supports and Provide light pockets and eggcrate grilles and/or louvres in accordance with manufacturer's instructions.

.10 Install light pockets and eggcrate grilles and/or louvre units square, straight and in 1 piece where possible or with inconspicuous joints at long runs.

.30 Control Joints:

.1 Provide pre-fabricated, pre-manufactured control joints and/or prepared to suit site conditions control joints and in accordance with manufacturer's instructions and in accordance with ASTM C840.

.2 Set in gypsum facing board, supporting control joints with studs or furring channels on both sides of joint.

.3 Ensure double studs with discontinuous tracks and double suspended ceiling furring channels have been installed prior to commencing board and bead application at control joints.

.4 Provide control joints at following locations:

.1 Support construction changes.

.2 Partition, ceiling or furring runs exceed 9000 mm.

.5 Provide control joints full height floor to ceiling or door header to ceiling in partitions and furring runs.

.6 Provide control joints from wall to wall in ceiling areas.

.7 Provide continuous polyethylene dust barrier behind and across control joints.

.8 Obtain Consultant's acceptance of exact location of control joints.

.31 Sound Control:

.1 Where indicated on Drawings, provide sound rated partitions and ceiling in locations indicated to meet required minimum Sound Transmission Class STC rating.

.2 Gypsum board shall be applied on both sides of sound-proofed partitions.

.3 Follow manufacturer's details and recommendations.

.4 Provide sound attenuation insulation to completely fill height of stud cavities.

.5 Tightly butt ends and sides of blankets within cavities.

.6 Cut blankets to fit small spaces.

.7 Carefully fit blankets behind electrical outlets, bracing, fixture attachments and mechanical and electrical services.

.8 Staple blankets to back of gypsum board as recommended by gypsum board manufacturer.

.9 At sound attenuating suspended ceiling and enclosures having spring isolator hangers, terminate ceiling or enclosure at adjacent construction by providing continuous isolator strip and sealed joint.

.32 Sealant:

.1 Conform to ASTM C919 for use of sealants in sound attenuation partitions.

.2 Apply acoustical sealant around partition cutouts including, but not limited to, electrical outlets and boxes, plumbing and duct outlets, and other miscellaneous wall and floor penetrations or gaps.

.3 Apply acoustical sealant to every air gap, such as gaps around perimeter of wall, between wall panels and around any penetrations made for plumbing or electrical wiring. Seal off any piping, electrical output boxes, and duct work with acoustical treatments. Treat junction boxes with acoustic putty, treat piping and duct work either with fiberglass duct liner or damping material or both.

.4 Treat frame with gasket material (weather-strip) and install security flap on bottom of door to seal it off.

.5 Apply minimum 13 mm diameter bead of acoustic sealant continuously around periphery of each face of partition to seal gypsum board/structure junction where partitions abut fixed building components in accordance with recommendations of "CGC Drywall/Steel Framed Systems, Folder SA923 09250".

.33 Joint Treatment - Gypsum Board:

.1 Verify board is firm against framing members and screw heads are properly depressed.

.2 Mix joint compound or ready-to-use compounds according to manufacturer's directions. Use pure, unadulterated, clean water for mixing.
.3 Permit mixed material to stand 30 minutes before using.
.4 Do not mix more material than can be used within 1 hour.
.5 Do not use set or hardened compound.
.6 Clean tools and equipment after mixing each batch.
.7 Tape and fill joints and corners in accordance with gypsum board manufacturer's printed instructions.
.8 Fill either manually, using hand tools of trade, or by a mechanical taping and filling machine of proven efficiency.
.9 Remove plastic tape from control joints after finishing with joint compound.
.10 After final coats of filler have dried at least 24 hours, sand surface lightly with No. 00 sandpaper to leave it smooth, ready for decoration.
.11 Provide finished work smooth, seamless, plumb and true, flush and with square plumb neat corners.
.12 Levels of Finish: Provide following levels of finish in accordance with ASTM C840:
  .1 Level 0: No taping, finishing or accessories required for temporary construction or areas where final decoration is not required.
  .2 Level 1: Use this level in plenum areas above ceilings, attics, areas where assembly would generally be concealed or in building service corridors and other areas.
  .3 Level 2: Use this level where water resistant gypsum backing board (ASTM C630M) is used as substrate for tile; may be used in garages, warehouse storage, or other similar areas where surface appearance is not of primary concern.
  .4 Level 3: Use this level in appearance areas which are to receive heavy or medium texture spray or hand applied finishes before final painting or where heavy grade wall coverings are to be applied as final decoration.
  .5 Level 4: Use this level where light textures or wall coverings including paint are to be applied.
  .6 Level 5: Use this level to provide a uniform surface and minimize possibility of joint telegraphing and of fasteners showing through final decoration. Use this Level of finish when using gloss, semi-gloss or enamel paint finish or when working in a critical (severe) lighting areas including but not limited to walls and ceiling areas near windows, skylights, long hallways and atriums with large surface areas exposed to artificial and natural light. Refer to ASTM C840 for additional locations for Level 5 applications.
  .7 Exposed Moisture Resistant Gypsum Board Joint Finish: All joints and interior angles shall have fiberglass tape embedded in setting 90 joint compound and 2 separate coats of joint compound applied over all flat joints and 1 separate coat of joint compound applied over interior angles. Cover fasteners heads and accessories with three (3) separate coats of joint compound. Ensure surface is smooth and free of tool marks and ridges.

3.4 FIRE RATED PARTITIONS

.1 Ensure materials for fire rated construction conform to requirements of Authorities Having Jurisdiction to obtain fire rating shown on Drawings.
.2 Where dissimilar components are built into fire rated assemblies ensure continuity of fire separation by boxing in elements with gypsum board and framing to suit Authorities Having Jurisdiction.
.3 Work in cooperation with Section providing firestopping work.
.4 Provide fire rated enclosures, separations and assemblies as indicated on Drawings conforming to requirements of Authorities Having Jurisdiction.

.5 Where required, secure sound attenuation blanket insulation between studs as specified in Article on Sound Control Partitions.

3.5 CUTTING AND PATCHING

.1 Cooperate and coordinate with other Sections to obtain satisfactory gypsum board finish work. Do all cutting, patching and make good as required by installation of work of other Sections.

3.6 CLEANING

.1 Clean off beads, casings, joint cement droppings and similar items and remove surplus materials and rubbish on completion and as directed.

3.7 FIRE WALL IDENTIFICATION

.1 Following installation of gypsum board and painting.
.2 Provide identification on fire walls.
.3 Using three (3) stencils cut out to read "Smoke Sealed", "1-Hour Fire Rated" and "2-Hour Fire Rated" in 75mm high letters.
.4 Using stencil and spray can of paint to transfer the information to the appropriate walls above the ceiling level at 3000 mm o/c on both sides of wall.

END OF SECTION

This page intentionally left blank

1 General

1.1 WORK INCLUDED

.1 Supply and install non-load bearing steel stud systems, and furring systems for walls and drywall work included in Section 09 21 16 - Gypsum Board Assemblies, all as indicated in the contract documents.
.2 Supply and install suspension systems for drywall ceilings, coves and bulkheads.
.3 Supply and install metal blocking.
.4 Supply and install wind load bearing steel stud systems for exterior walls and drywall work included in Section 09 21 16 - Gypsum Board Assemblies, all as indicated in the contract documents.
.5 This Contractor is responsible for the following:
  .1 Supply and installation of all steel stud partitions, ceilings and bulkheads, as indicated on the drawings including exterior walls.
  .2 Supply and installation of metal strapping.
  .3 Allow openings for equipment installed in drywall construction by others.
  .4 Installation of access panels in gypsum wallboard partitions and ceilings as supplied by Mechanical and Electrical trades.
  .5 Supplementary steel supports for ceilings.
  .6 Reinforcement for suspension systems for lighting fixtures, access hatches, etc.
  .7 Steel studs and furring channels.
  .8 Concealed reinforcements in partitions and ceilings to support washroom accessories and miscellaneous specialties.
  .9 Ceiling, bulkhead and soffit suspension system.

1.2 RELATED REQUIREMENTS

.1 Section 06 10 00 - Rough Carpentry
.2 Section 07 21 16 - Blanket Insulation
.3 Section 07 26 00 - Vapor Retarders
.4 Section 08 11 13 - Hollow Metal Doors and Frames.
.5 Section 09 21 16 - Gypsum Board Assemblies
.6 Division 10 - Specialties
.7 Division 23 - Heating, Ventilation and Air Conditioning (HVAC)
.8 Division 26 - Electrical

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
  .1 ASTM C645-00, Specification for Nonstructural Steel Framing Members.
  .2 ASTM C754-00, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

1.4 SUBMITTALS

.1 Shop Drawings:
  .1 Submit shop drawings including fabrication and erection documents and materials list inaccordance with Section 01 33 00 - Submittal Procedures.
  .2 Include on Shop Drawings, all connection details, stud and track gauges.
  .3 Each shop drawing submitted shall bear stamp and signature of qualified professional engineer registered or licensed to practice in the Province of Prince Edward Island, Canada.

1.5 QUALITY ASSURANCE

.1 Execute Work of this section by a Contractor who has adequate plant, equipment and skilled tradesman to perform it expeditiously, and who has been responsible for satisfactory installations similar to that specified, during a period of at least the immediate past three (3) years.

.2 Attend pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 NON-LOAD BEARING WALL FRAMING

.1 Non-load bearing channel stud framing: to ASTM C645, stud sizes as noted on drawings, roll formed from 0.84 mm (20 gauge) thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centers.

.2 Deflection for interior stud walls to be L/240 maximum.

.3 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

.4 Metal channel stiffener: 13 x 38 mm size, 1.4 mm (18 gauge) thick cold rolled steel, coated with rust inhibitive coating.

.5 Acoustical sealant: to CAN/CGSB-19.21 to perimeter of walls with acoustic insulation. Provide tamper-resistant sealants in patient-accessible locations.

.6 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

.7 Wall Reinforcement metal blocking: 14 ga. X 610 mm wide galvanized metal sheet reinforcement to ASTM A924 at locations including, but not limited to the following:

- .1 All washroom accessories.
- .2 Millwork.
- .3 Zone valve boxes, fire hose cabinets and fire extinguisher cabinets.
- .4 Lockers.
- .5 Wall-mounted door stops.
- .6 All other wall-mounted specialties, including Owner-supplied items.

2.2 STEEL STUDS

.1 Steel Studs:

- .1 ASTM C645, Galvanized sheet steel, minimum 0.531 mm (designation thickness 18mils/minimum base steel thickness 0.836 mm/colour-White/20 ga) thickness, zinc coating Z275, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths practicable.
- .2 Provide heavier gauges where required due to height.

.2 Heavy Duty Studs at Openings and Unrestrained Height and where impact-resistant gypsum board is scheduled to be installed.:

- .1 ASTM C645, Galvanized sheet steel, minimum 1.087mm, 18ga thickness, zinc coating Z275, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths practicable.
- .2 Provide heavier gauges where unrestrained height exceeds 3600 mm.

.3 Concealed Reinforcement in Partitions:

.1 Sheet Steel Reinforcing in Partitions:
  .1 Commercial quality cold rolled galvanized sheet steel to ASTM A653M with zinc coating designation of ASTM A653M, Z275 in minimum thickness of 1.087 mm /colour-yellow/18 ga).
  .2 Must be specially treated by phosphate conversion process if steel is to be exposed and finish painted.
  .3 Concealed Structural Shapes, Plates, Reinforcements: 3 mm new material conforming to CSA G40.20 and CSA G40.21, Grade 300W. Hot dipped galvanizing with minimum zinc coating of 600 g/m2 to CAN/CSA-G164-M.
.2 Concealed Knee Brace for Low Wall Partitions:
  .1 Concealed welded steel assembly made up of 50 mm x 50 mm tube and 3 mm wall and 88 mm x 127 mm x 9 mm base plate with 4 holes 10 mm diameter.
  .2 Assembly shall be provided with flat black primer to yield corrosive resistant surface compatible with joint compounds and interior finishes.
  .3 Height to suit low wall partitions.
  .4 SKB Knee Brace Kit by Pittcon Softforms Corp.
  .5 Provide hollow structural steel, stud, angle and steel plate sections, galvanized sheet steel minimum 1.214 mm (designation thickness 43mils/minimum base steel thickness 1.087 mm /colour-yellow/18 ga) where required to support manufactured components.
  .6 Weld connections.

.4 Provide knockout openings in web at 460 mm oc to accommodate (if required) horizontal mechanical and electrical service lines and bracing.

.5 Floor and Ceiling Partition Track for Gypsum Board:
  .1 ASTM C645, Galvanized sheet steel, 0.836 mm /colour-White/20 ga) overall thickness zinc coating Z275, with minimum 30 mm legs, top track having longer legs where required to compensate for deflection of structure above.
  .2 Width to suit metal studs.

.6 Furring Channels:
  .1 Galvanized sheet steel, minimum 0.914 mm (designation thickness 33mils/minimum base steel thickness 0.836 mm /colour-White/20 ga) overall thickness zinc coating Z275 screw channels, 67 mm wide x 22 mm deep.

.7 Carrying Channels for Gypsum Board:
  .1 ASTM C645, galvanized sheet steel, minimum 1.214 mm (designation thickness 43mils/minimum base steel thickness 1.087 mm /colour-yellow/18 ga) overall thickness zinc coating Z275, 38 mm high with 19 mm flanges, for primary carrying member in suspended ceilings and as horizontal stiffeners or bracing in metal stud systems.

3 Execution

3.1 ERECTION NON-LOAD BEARING WALL FRAMING

.1 Align partition tracks at floor and ceiling and secure at 600 mm o.c. maximum.

.2 Install dampproof course under stud shoe tracks of partitions on slabs on grade.

.3 Place studs vertically at 400 mm o.c. and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Attach studs to bottom track using screws. Do not fix top of studs to ceiling track.

.6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centers specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.9 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs. For door widths greater than 1219 mm, incorporate diagonal braced stud at head of opening.

.10 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.11 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.12 Extend all partitions to underside of deck above except where noted otherwise on drawings. Where partitions occur under and parallel to ductwork, provide steel stud frames around ductwork to secure partition head. Maintain 12 mm clearance between ductwork, piping or equipment which might transmit vibration to metal framing.

.13 Maintain 19 mm clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 88 mm leg ceiling tracks.

.14 Install continuous insulating strips to isolate studs from uninsulated surfaces.

.15 Install two lines of stiffeners in partitions up to 2440 mm high and three lines in partitions over 3660 mm high. Install stiffeners snugly in knock out service holes, extended horizontally across entire length of each braced partition and across two full stud spaces at each side of door and screen openings. Wire stiffeners at splices.

.16 Install metal blocking for the attachment of accessories and equipment as required by individual sections and drawings. Blocking to be sized to suit vertically a minimum of 150 mm higher, 150 mm lower than the attachment points and horizontally a minimum of one stud beyond attachment point each way.

.17 Provide and install 18ga wall reinforcement metal sheet on all washroom walls secured to 'flanges' of steel studs with sheet metal screws. Locate bottom of metal sheet at 600 mm AFF.

.18 Install 75mm X 75mm metal angle blocking vertically to all non-90° corners for full height to 150 mm above ceiling and to all corners designated to receive corner guards for height of guard.

.19 Conform to manufacturer recommendations for installation of fire dampers.

.20 Provide diagonal bracing at maximum 1220mm o.c. at large door and screen openings 1200mm and wider in interior partitions between top of frame and floor structure above.

3.2 INSTALLATION

.1 Metal Framing for Partitions and Bulkheads:

- .1 Comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation and recommendations of CGC Drywall Steel-Framed Systems for metal stud partition, ceiling, column fireproofing and bulkhead detailing.
- .2 Install members true to lines and levels and to maintain surface flatness with maximum variation of 3 mm in 300 mm in any direction.
- .3 Provide partition tracks at floor and underside of ceiling or structure above.
- .4 Align accurately. Lay out to partition layout.
- .5 Curved partitions: Erect partial height and curved partitions as indicated.
- .6 Cut top and bottom runners through leg and web at 50 mm intervals for arc length.
- .7 Bend runners to uniform curve of radius indicated and locate straight lengths tangent to arcs. Support outside (cut) leg of runners by clinching a 25 mm high x 0.914 mm (designation thickness 33mils/minimum base steel thickness 0.836 mm /colour-White/20 ga)thick sheet steel strip to inside of cut legs using metal lock fasteners.
- .8 Attach studs to runners with 9.5mm long pan head framing screws.
- .9 On straight lengths at ends of arcs, place studs 150 mm on center with last stud left free standing.

.10 Place studs vertically at 400 mm oc unless otherwise specified, not more than 50 mm from abutting walls, and at each side of openings and corners.
.11 Position studs in tracks.
.12 Cross brace studs as required to provide rigid installation.
.13 Provide heavy duty double boxed studs at each side of openings to extend in 1 piece from floor to underside of structure above.
.14 Co-ordinate erection of studs and installation of service lines.
.15 Provide continuous gasket to separate metal framing from masonry and concrete.
.16 Do not secure studs to exterior window framing, or to ceiling grid members.
.17 Provide continuous gasket between ceiling and floor tracks, and structure.

.2 Concealed Reinforcements in Partitions:
.1 Provide concealed steel reinforcing in gypsum board partitions where scheduled on Drawings or required to meet design requirements which may include without limitations, concealed hot dipped galvanized structural shapes, plates reinforcements and concealed knee brace for low wall partitions.
.2 Ensure rigid and secure installation capable of offering resistance to minimum 227 kg pull force.
.3 Provide continuous horizontal furring channels as backing to wall cabinets.
.4 Galvanize stud reinforcements in moist areas.
.5 Do not use wood blocking for this purpose.
.6 Provide additional reinforcing framing studs, backer plates or furring channels secured between studs for attachment and support without limitations following:
.1 Washroom accessories.
.2 Fire hose cabinets.
.3 Access panels.
.4 Architectural woodwork.
.5 Miscellaneous specialties including but not limited to:
.1 Plastic corner guards.
.2 Stainless steel corner guards.
.3 Continuous handrailing.
.4 Stainless steel handrailing.
.5 Chair railing.
.6 Bumper railing.
.7 Baby change station.
.8 Coat rack.
.9 Wall mounted lights.
.10 Signage zones - architectural dimension lettering.
.11 Fitments and fixtures.
.12 System furniture
.13 Equipment.
.14 Wall mounted equipment.
.15 Owner provided wall mounted bin system or bins.

.3 Access Doors and Panels:
.1 Install access doors and panels where required as part of work of this Section in walls, bulkheads, ceilings and soffits.
.2 Cooperate and coordinate delivery of access doors and panels supplied as part of work of Divisions 21, 22. 23. 24 and 26.
.3 Install access doors and panels supplied as part of work of Divisions 21, 22. 23. 24 and 26 in walls, bulkheads, ceilings and soffits.

.4 Metal Furring:
.1 Erect furring in accordance with manufacturer's directions and as specified herein.
.2 Provide furring rigid, secure, square, level or plumb, framed and erected to maintain finish dimensions and contours indicated.
.3 Allow for thermal movement.

.4 Furr around ducts, pipes and dropped beams occurring in finished areas and for vertical gypsum board breaks within or at termination of ceilings.

.5 Provide metal furring channels fastened to masonry or concrete surfaces in parallel rows at 400 mm oc unless gypsum board is indicated to be adhered directly to masonry or concrete surfaces. Shim metal furring channels to provide a level surface.

3.3 CLEANING

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

END OF SECTION

1 General

1.1 SUMMARY

.1 Provide acoustic tile ceilings including but not limited to following:
  .1 Ceiling Suspension Systems.

1.2 RELATED REQUIREMENTS

.1 Section 09 21 16 - Gypsum Board Assemblies: Suspension systems for gypsum board ceilings.
.2 Section 09 51 00 - Acoustical Ceilings.
.3 Division 23 - HVAC, trim for recessed mechanical fixtures.
.4 Section 26 50 00 - Lighting.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
  .1 ASTM C423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  .2 ASTM E1264-98, Standard Classification for Acoustical Ceiling Products.
  .3 ASTM E1477-98a(2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
  .4 ASTM C635M-07 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  .5 ASTM C636M-06, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
  .6 ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  .7 ASTM E1264 Standard Classification for Acoustical Ceiling Products.
.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 1988.
  .2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
  .3 CAN/ULC-S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
  .4 CAN/ULC-S102-07, Surface Burning Characteristics of Building Materials and Assemblies.
  .5 CAN/ULC S114-05, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
  .6 CAN/ULC-S702-97, Standard for Mineral Fibre Thermal Insulation for Buildings
.3 Underwriter's Laboratories of Canada (ULC)
  .1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.
.4 Ceilings and Interior Systems Construction Association (CISCA):
  .1 CISCA Code of Practices.

1.4 DESIGN REQUIREMENTS

.1 Design all systems for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority. Systems are not designed to carry the weight of electrical equipment.
.2 Suspension Systems:
  .1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.
  .2 Design ceilings to resist safely and effectively all loads and effects of loads in accordance with part 4.0 of the National Building Code.

.3 Design ceiling suspension systems in accordance with ASTM C636, ASTM C754 and manufacturer's printed directions.
.4 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.
.5 Design suspension system to support weight of mechanical and electrical items such as air handling boots and lighting fixtures, and with adequate support to allow rotation/relocation of light fixtures.
.6 Acoustic panel system is not designed to carry the weight of mechanical and electrical equipment.
.7 Design sub framing as necessary to accommodate, to circumvent, and to avoid conflicts and interferences where ducts or equipment prevent regular spacing of hangers.

.3 Coordinate installation and cooperate with Mechanical and Electrical Subcontractors, to accommodate mechanical and electrical items, or any other work required to be incorporated in or coordinated with the ceiling system.

1.5 SUBMITTALS

.1 Make all submittals in accordance with Section 01 33 00 - Submittal Procedures.
.2 Shop Drawings:
.1 Submit suspension and acoustic panel systems layouts - include bulkheads, hangers, supports, carriers, and panel sizes, locations patterns and termination at walls.
.2 Indicate insert and hanger spacing and fastening details, location of mechanical and electrical components, splicing method, and details of changes in level and junctions with dissimilar materials.
.3 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.
.4 Submit conditions at abutting, intersecting, and penetrating construction.
.5 Submit dimensioned locations of lighting fixtures, diffusers, sprinkler heads, P.A. system speakers, and other items that pierce the ceiling plane.
.3 Product Data:
.1 Submit manufacturer's technical literature and installation instructions describing components, materials and finishes.
.4 Material Safety Data Sheets:
.1 Submit MSDS for inclusion in Operation and Maintenance Manual.
.5 Samples:
.1 Submit one representative model of each type ceiling suspension system.
.6 Certificates:
.1 Submit written certification stating that suspended ceiling systems are designed for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.
.2 Submit certificate attesting installed acoustical ceiling systems meet fire resistance ratings required for this project.
.3 Submit independent test data and certificate confirming system meets or exceeds specified STC rating.
.4 Submit independent test data and design tables for each type of insert to be employed on this project for hanger supports.

1.6 REGULATORY REQUIREMENTS

.1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.7 EXTRA MATERIALS

.1 Provide extra materials of acoustic units in accordance with Section 01 33 00 - Closeout Submittals.

.2 Provide extra suspension system materials in unopened clearly marked cartons of 12 pieces each of 1220mm long tees and 610mm long tees.
.3 Extra materials to be from same production run as installed materials.
.4 Deliver to site, upon completion of the Work of this Section.
.5 Store where directed by Consultant

1.8 WARRANTY

.1 Submit a written warranty executed by the manufacturer, agreeing to repair or replace grid system components that fails within the warranty period. Failure includes but not limited to:
  .1 Rusting and manufacturer defects.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Intermediate Grid System. Unless otherwise indicated, ceiling suspension products shall be manufactured to minimum requirements of ASTM C635, for Heavy Duty, modified as required to suit grid design shown.
.2 Exposed Grid System:
  .1 Factory finished satin white on hot dipped galvanized cold rolled steel.
  .2 Acceptable Material: Refer to Material / Finish Schedule.
.3 Basic Steel Material and Finish:
  .1 Commercial quality cold rolled steel 0.179" (26 ga) minimum thickness, and heavier gauge for Heavy Duty as necessary, galvanized to zinc coating designation Z275.
  .2 Exposed surfaces of metal Products shall be factory finished in non-yellowing, low sheen satin white enamel to Consultant's acceptance to match whiteness in panels.
  .3 Provide paint formulation of grid system to lighting fixture, speaker grille, sprinkler and diffuser manufacturers to ensure consistency of colour, sheen and texture of all exposed metal components in the ceiling assemblies.
  .4 Provide slip-on trim mouldings or metal mouldings with baked enamel finish, as standard with grid manufacturer, to trim around light fixtures.
.4 Accessories for Suspension System:
  .1 Complete with splices, clips, and perimeter moulding, of manufacturer's standard and aluminum types to suit the applicable conditions unless special conditions and access areas are shown or specified.
  .2 In high humidity areas provide galvanized suspension system.
.5 Hangers:
  .1 Minimum 0.104" (12 ga) overall thickness galvanized steel wire to zinc coating designation Z275, meeting "Heavy-duty" classification of ASTM C635.
.6 Main Tees:
  .1 3.66 m long, 23.8 mm face width double web design, rectangular bulb at top of web, 38 mm web height.
  .2 Expansion cut-outs in main tees controlling buckling caused by heat expansion.
.7 Main Tee Splices:
  .1 Designed to lock lengths of main tees together so that joined lengths of tee function structurally as single unit with tee faces at joint perfectly aligned and presenting tight seam.
.8 Cross Tees:

.1 1220 mm long, 25 mm web height structural cross-section, design same as main tees, designed to connect at main tees forming positive lock without play, loss or gain in grid dimensions with offset over-ride of face flange over main tee flange to provide flush joint.
.2 Provide 38 mm web height of cross-tee for fire rated assemblies.

.9 Edge Moulding Around Ceiling Perimeters:
.1 Materials and finish to match tees.

.10 Panel Hold-Down Clips:
.1 As recommended by lay-in panel manufacturer.

.11 Radiant Panel Perimeter Mouldings:
.1 38 mm X 25 mm edge moulding, 22 ga. thick steel with slotted holes at 203 mm centres to allow for expansion at building perimeter.
.2 Radiant panel edges adjacent to metal acoustic tile suspension system are fit into suspension system tees.
.3 Note: Radiant panels are structurally supported by Division 23 and not by perimeter mouldings.
.4 Provide 3 mm gap between edge moulding lengths to allow for expansion.
.5 At curved building perimeter sections, provide 5 mm gap between edge moulding lengths to allow for increased geometric expansion.

.12 Metal Closures and Trim:
.1 Bonderized and with factory-applied white baked enamel finish.
.2 Provide anchors as standard with manufacturer.

.13 Sound Attenuation Batts (Acoustical Ceiling Insulation): Conform to requirements of Section 07 21 16 - Blanket Insulation to meet design requirements.

.14 Suspended GWB Ceiling System:
.1 Where "GWB" is indicated under ceiling material on finish schedule.
.2 Acceptable Material:
.1 CGC - Drywall suspension system.
.2 Armstrong - Drywall suspension system.

.15 Metal Ceiling Transition Piece:
.1 Aluminum perimeter trim channel. Color as selected by Consultant from manufacturer STD Color Range.
.2 Acceptable Material:
.1 Armstrong - Axiom Perimeter Trim.
.2 CGC - Compasso

3 Execution

3.1 INSTALLATION

.1 Installation: in accordance with ASTM C636 except where specified otherwise.
.2 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.
.3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.
.4 Secure hangers to overhead structure using attachment methods as indicated.
.5 Install hangers spaced at maximum 1200 mm centers and within 150 mm from ends of main tees.
.6 Lay out center line of ceiling both ways, to provide balanced borders at room perimeter.
.7 Ensure suspension system is coordinated with location of related components.
.8 Install wall molding to provide correct ceiling height.
.9 Completed suspension system to support super-imposed loads, such as lighting fixtures and speakers.
.10 Support at light fixtures with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.11 Interlock cross member to main runner to provide rigid assembly.
.12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
.13 Install access splines to provide 10 percent ceiling access.
.14 Finished ceiling system to be square with adjoining walls and level within 1:1000.
.15 Expansion joints.
  .1 Erect two main runners parallel, 25 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, painted black, 25% narrower than space between 2 T bars.
  .2 Supply and install "Z" shaped metal trim pieces at each side of expansion joint.
  .3 Design to accommodate plus or minus 25 mm movement and maintain visual closure.
  .4 Finish metal components to match adjacent exposed metal trim.
  .5 Provide backing plates behind butt joints.

3.2 CLEANING

.1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

END OF SECTION

This page intentionally left blank

1 General

1.1 SUMMARY

.1 Provide acoustic tile ceilings including but not limited to following:
- .1 Lay-In Acoustic Ceiling Panels.

1.2 RELATED REQUIREMENTS

.1 Section 07 21 16 - Blanket Insulation.
.2 Section 09 22 26 - Suspension Systems.
.3 Mechanical Divisions
.4 Electrical Divisions

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- .2 ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .3 ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- .4 ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- .5 ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- .6 ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- .7 ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- .8 ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- .9 ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.
  - .1 Armstrong Fire Guard Products.
- .10 ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint.
- .11 ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
- .12 ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
- .13 ASTM E 1264 Classification for Acoustical Ceiling Products.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 1988.
- .2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .3 CAN/ULC-S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .4 CAN/ULC-S102-07, Surface Burning Characteristics of Building Materials and Assemblies.
- .5 CAN/ULC S114-05, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
- .6 CAN/ULC-S702-97, Standard for Mineral Fibre Thermal Insulation for Buildings

.3 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

.4 Ceilings and Interior Systems Construction Association (CISCA):

.1 CISCA Code of Practices.

1.4 SUBMITTALS

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

.2 Shop Drawings:

.1 Submit acoustic panel systems layouts - include bulkheads and panel sizes, locations patterns and termination at walls.

.2 Indicate insert and hanger spacing and fastening details, location of mechanical and electrical components, splicing method, and details of changes in level and junctions with dissimilar materials.

.3 Submit conditions at abutting, intersecting, and penetrating construction.

.4 Submit dimensioned locations of lighting fixtures, diffusers, sprinkler heads, sound system speakers, patient lifts, microscope, operating lights and other items that pierce the ceiling plane.

.3 Product Data:

.1 Submit manufacturer's technical literature and installation instructions describing components, materials and finishes.

.4 Material Safety Data Sheets:

.1 Submit MSDS for inclusion in Operation and Maintenance Manual.

.5 Samples:

.1 Minimum 300mm x 300mm samples of specified acoustical panel. Submit duplicate full size samples of each type acoustical units.

.2 Submit one full-size sample of each type of tile panel to be used.

.6 Certificates:

.1 Submit written certification stating that suspended ceiling systems are designed for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.

.2 Submit certificate attesting installed acoustical ceiling systems meet fire resistance ratings required for this project.

.3 Submit independent test data and certificate confirming system meets or exceeds specified STC rating.

.4 Submit independent test data and design tables for each type of insert to be employed on this project for hanger supports.

1.5 DESIGN REQUIREMENTS

.1 Performance Requirements:

.1 Provide acoustical ceiling assembly designed and tested to provide surface burning characteristics (ASTM E84) as follows:

.1 Flame Spread: 0.

.2 Smoke Development: 0.

.2 Provide acoustical ceiling system which has been manufactured, fabricated and installed to provide Noise Reduction Coefficient (NRC) rating.

.2 Design all systems for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority. Systems are not designed to carry the weight of electrical equipment.

1.6 QUALITY ASSURANCE

.1 Applicator Qualifications: Provide work of this Section executed by competent installers with minimum of 5 years' experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.7 COORDINATION OF WORK

.1 Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.8 REGULATORY REQUIREMENTS

.1 Fire resistance: NFPA Class A fire retardant treated wood required by code, to conform to ASTM E84.

1.9 MOCK-UP

.1 Construct mock ups in accordance with Section 01 33 00 - Submittal Procedures.
.2 Construct mock-up 10 square meters minimum of each type acoustical tile ceiling including one inside corner and one outside corner.
.3 Construct mock-up where directed.
.4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with ceiling work.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 The building shall be enclosed, the air conditioning system shall be operating with proper filters in place, and the proper temperature and humidity conditions shall be established before, during, and following installation.
.2 Building areas to receive ceilings shall be free of construction dust and debris.
.3 Do not install the Work of this Section until:
  .1 Mechanical and Electrical Work above the ceiling is complete.
  .2 Maintain uniform humidity of 20-40% before and during installation.
  .3 Ventilation is adequate to remove excess moisture.
  .4 Uniform Temperature 13-21 degrees C.
.4 Permit wet work to dry before commencement of installation.
.5 Store materials in work area 48 hours prior to installation.
.6 Areas are closed and protected against weather and maintained at no less than 10 degrees C.

1.11 DELIVERY, STORAGE, AND HANDLING

.1 Transport, handle and store material in manner to prevent warp, twist, and damage to panel edges and surfaces in accordance with Manufacturer's recommendations.
.2 Any bent, twisted, warped, or otherwise damaged tee grid suspension components, panels, and or trim shall not be used under any circumstances. Replace such damaged items with new straight, undamaged and acceptable material at no cost to Owner.
.3 Store material in warm, dry place away from water and the elements. Protect against undue loading stresses and shock.
.4 All packaged material shall be delivered in original manufacturer's wrappers and containers with labels and seals intact. Cartons for all fire rated materials shall bear U.L label.

1.12 EXTRA MATERIALS

.1 Provide extra materials of acoustic units in accordance with Section 01 33 00 - Closeout Submittals.
.2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type specified to nearest full carton, minimum two cartons.
.3 Extra materials to be from same production run as installed materials.
.4 Clearly identify each type of acoustic unit, including color and texture.
.5 Deliver to site, upon completion of the Work of this Section.
.6 Store where directed by Consultant

1.13 WARRANTY

.1 Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replacement of acoustical panels that falls within the Warranty period. Failure include, but are not limited to:
  .1 Acoustical Panels: Sagging or warping
  .2 Grid System: Rusting and manufacturers defects
.2 Warranty period for acoustical panels is ten (10) years from date of Substantial Completion.
.3 The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.14 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 ACOUSTICAL CEILING PANELS

.1 Acceptable material: Refer to Material / Finish Schedule.
.2 Adhesive: low VOC type recommended by acoustic unit manufacturer.
.3 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.
.4 Polyethylene: to CAN/CGSB-51.34, 0.15 mm thick.
.5 Hold down clips: purpose made clips to secure tile to suspension system, approved for use in fire-rated systems.

3 Execution

3.1 INTERFACE WITH OTHER WORK

.1 Co-ordinate with Section 07 21 16 - Blanket Insulation and 09 22 26 - Suspension Systems.
.2 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

3.2 EXAMINATION

.1 Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities and dampness that would affect quality and execution of work.
.2 Do not proceed with installation of ceiling system until unacceptable conditions are corrected.

3.3 MANUFACTURER'S INSTRUCTIONS

.1 Comply with the instructions and recommendations of the ceiling system manufacturer.
.2 Install materials in accordance with governing regulations, fire resistance rating requirements and industry standards applicable to work.
  .1 Comply with CISCA Code of Practices.

3.4 INSTALLATION

.1 General: Do not begin installation until materials sufficient to complete an entire room are received and prepared for installation.

.2 Ensure wet work is completed and dried out to a degree acceptable to panel manufacturer before installation is commenced. Maintain uniform temperatures of at least 21°C for 72 hours prior to commencement of work and maintain temperature until 72 hours after completion.

.3 Install ceiling panels and metal suspension system in accordance with applicable requirements of ASTM C636 and manufacturer's directions.

.4 Where manufacturer's directions are at variance with Contract Documents, notify Consultant before proceeding with work.

.5 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders.

.6 Recessed items shall replace or be centred on acoustical panels, except where shown otherwise.

.7 Consult with Mechanical and Electrical Divisions to co-ordinate work.

.8 Provide additional supports where required.

.9 Space hangers for suspended ceilings to support grillage independent of walls, columns, pipes and ducts at maximum 1220mm centres along support grillage and not more than 150mm from ends.

.10 Provide additional hangers at light fixtures and diffusers.

.11 Attach hangers to inserts in overhead concrete slab. Bend top of hangers at right angles, turn down and securely fasten. Turn bottom of hangers upwards and securely wrap 3 times.

.12 Suspension to Metal Deck:

.1 Punch lower part of metal deck with special puncher at required distances.

.2 Put hanger wire through holes, turn down, make a loop and securely wrap 3 times

.13 Provide written confirmations to Mechanical and Electrical Divisions that suspended ceiling is capable of supporting additional weight of mechanical and electrical fixtures specified in Mechanical and Electrical Divisions.

.14 Run main tees at right angles to length of light fixtures.

.15 Space main tees 1220mm oc in 1 direction and securely tie to hangers.

.16 Space cross tees 610mm oc at right angles to main tees and properly lock at intersections.

.17 Level suspended systems with a maximum tolerance of 3mm over 3m.

.18 Use longest practical lengths of tees, furring and running channels to minimize joints.

.19 Make joints square, tight, flush and reinforced with concealed splines.

.20 Assemble framework to form a rigid and interlocking system.

.21 Design suspension system to accommodate movement caused by thermal expansion or contraction.

.22 Design and space hangers and carrying members to support entire ceiling system, including lighting fixtures, diffusers and equipment openings in locations indicated on reflected ceiling drawings and related Mechanical and Electrical Division drawings.

.23 Use edge moulding where ceiling abuts vertical surface.

.24 Use corner moulding along external edges at ceiling steps.

.25 Install direct-hung exposed grid lay-in acoustic panel ceilings where shown.

.26 Install main tees, cross tees, and wall mouldings so bottom flanges are in flat, level plane at finish ceiling elevations.

.27 Arrange grid so opposite wall edge panels are of equal width but not less than 1/2 panel width and lay out and erect grid system to provide following panel pattern as shown:

.1 Pattern of 2'-0" x 4'-0" with main beam tees spaced 4'-0" oc and cross tees 2'-0" oc unless reviewed otherwise (imperial measure).

.2 Pattern of 2'-0" x 2'-0" with main beam tees spaced 2'-0" oc, primary cross tees at 2'-0" oc and secondary cross tees at 610 mm oc (imperial measure).

.28 Erect main beams parallel to main wall and to each other; space uniformly at centres specified. Stop ends of main beams 13 mm from walls allowing for expansion.

.29 In ceilings having recessed lighting fixtures, modify grid framing to provide main beams along and parallel to both long sides of lighting fixtures; at each 300 mm wide fixture.

.30 Provide an additional main beam along the long side of fixture. At other items recessed in ceiling and designed to be framed by main beams, provide additional main beams necessary.

.31 Rest ends of main beams on horizontal leg of wall mouldings.
.32 Support main beams with hangers along each run, spaced at not more than 1220mm centres; except in areas of steel framing, provide hangers at each intersection of main beam and framing.
.33 If ductwork or equipment located in ceiling plenum area interferes with hanger spacing, provide a trapeze or other arrangement reviewed by Consultant to support main beams at proper spacing.
.34 Do not secure hangers to metal roof deck, ductwork, conduit, piping, equipment or support system for any of these.
.35 Provide an additional hanger at each corner of each opening to receive a recessed lighting fixture and each opening that has been framed by main beam members.
.36 Provide additional hangers at each diffuser, grille and other points of extra loading.
.37 Secure hangers to main beams to develop full strength of hangers and per manufacturer's published directions.
.38 Install primary cross tees at right angles to main beam tees and space uniformly at centres specified. Join ends of cross tees to web of main beams with a positive interlock; except at light fixtures, secure members together with concealed steel clips and bolts.
.39 Field paint cut edges to match surface color and sheen.
.40 Arrange acoustical units and orient directionally patterned units, if any, in manner shown on reflected ceiling plans.
.41 Clip down acoustic panels at fire rated rooms or at locations shown on Room Finish Schedule against wind uplift.

3.5 CLEANING

.1 Clean exposed surfaces of acoustical ceilings, trim, edge moldings and suspension members to comply with manufacturer's instructions for cleaning.
.2 Touch up any minor finish damage.
.3 Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.6 PROTECTION

.1 Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* resilient rubber sheet flooring including but not limited to following:

.1 preparation of substrate.

.2 moisture reducing barrier coating.

.3 resilient rubber sheet flooring.

.4 integral resilient bases with tamper-resistant sealants.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 Coordination:

.1 In particular ensure requirements for concrete subfloor preparation are compatible with requirements of this Section. Ensure following meet acceptable criteria to ensure proper performance floor covering work:

.1 floor flatness and floor levelness requirements for rubber flooring installation and their acceptability by flooring manufacturer;
.2 surface texture of finished floor required for rubber sheet flooring installation;
.3 acceptable approaches to remediation of high moisture and high pH floors;
.4 adhesive application and floor covering installation.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 *Shop Drawings*:

.1 Submit *Shop Drawings* for work of this Section in accordance with Division 01. Submit *Shop Drawings* for all areas showing the following:

.1 seam layout;
.2 coving details, treatment at walls and floor drains;
.3 treatment where flooring meets dissimilar materials and all other special conditions.

.2 Obtain reviewed *Shop Drawings* from *Consultant* prior to commencement of resilient flooring application.

.4 Site Quality Control Submittals: Submit a diagram of area showing locations and results of each of the following tests as required by pre-installation testing:

.1 Calcium chloride test

.2 Relative humidity test

.5 Samples: Submit samples in accordance with Division 01. Submit following samples in sizes indicated prior to ordering:

.1 Submit 2 - 300 mm x 300 mm (12" x 12") samples of each rolled rubber sheet flooring,

.2 Submit 1 - 300 mm (12") sample of base condition,

.3 Submit 1 - 300 mm (12") sample depicting weld rod, feature strips and edge strips.

.6 Maintenance Data: For each type of floor covering to include in maintenance manuals.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.3 *Mock-Up*: *Provide* complete room *Mock-up*, minimum 10 m^2 (100 sq ft) complete with integral base showing corner conditions (4 inside corners and 2 outside corners) in locations designated by *Consultant* and as required to demonstrate quality of workmanship. Maintain *Mock-ups* during construction in an undisturbed condition as a standard for judging the completed work.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact. Store materials in warm and dry area. Store rubber sheet flooring rolls upright.

.2 Deliver materials in original packaging clearly labelled with Project information, flooring materials, location and other pertinent information.

.3 Prevent damage to materials during handling and storage. Do not stack flooring materials over 2 cartons in height or in excess of allowable floor loading. Store materials on smooth surfaces only, in area designated by *Consultant*.

.4 Protect this work and work of other trades from damage at all times.

1.7 PROJECT CONDITIONS

.1 Environmental Requirements:

.1 Ensure ambient temperature of room and surface temperature of materials is not less than 18 deg C (65 deg F) for 48 hours before, during and after installation. Maintain minimum temperature as recommended *Product* manufacturer.

.2 Store adhesive on site 48 hours prior to installation. Remove rolled rubber sheeting from plastic wrap to facilitate equalization of temperature on site.

.3 Ensure adequate ventilation is provided during installation and curing of materials.

.4 Ensure humidity levels of spaces to receive rubber sheet flooring are maintained at design levels for minimum 24 hours before installation.

.5 Avoid high humidity, cold drafts and abrupt temperature changes.

1.8 WARRANTY

.1 Warrant work of this Section against defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant. Include in warranty costs of complete system replacement of affected areas involved and at no expense to Owner.

.1 Flooring material: for period of 10 years from Substantial Performance of the Work. Defects include but are not limited to: shrinkage, cracking, buckling, splitting, opening of seams, and extensive colour fading.

.2 Adhesive material and workmanship: for period of 10 years from Substantial Performance of the Work. Defects include but are not limited to: bond failure or delamination, blistering, re-emulsification and other symptoms of adhesive failure.

1.9 MAINTENANCE

.1 Extra Materials: Deliver full-width rolls equal to 5% of each colour, pattern and type of flooring installed for maintenance use. Store where directed. Identify each roll and bundle of pieces. Ensure maintenance materials are of same production run as installed materials.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 American Biltrite Canada ; https://www.american-biltrite.com/

.2 Mondo America Inc.; www.mondo.com

.3 Nora Rubber Flooring; www.norarubber.com

.2 Substitution Limitations: This Specification is based on “Marathon Sheet - Oasis - Marathon®” by American Biltrite. Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant’s opinion, and subject to Consultant’s review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements

.1 *Provide Product* with following flame spread rating and smoke developed rating when tested in accordance with following standards:

.1 Critical Radiant Flux (ASTM E648): > 0.45 watts/cm^2 – Class I
.2 Smoke Developed (ASTM E662): ≤ 450
.3 CAN/ULC-S102.2-M: Maximum Flame Spread: 100;

.2 Design and Performance Requirements:

.1 *Provide Products* free from blisters, cracks, chipped edges and corners, embedded foreign matter or other defects as required to complete flooring installation and to meet design requirements.

.3 Colour Uniformity: Use sheet flooring from consecutive manufacturing process to maintain consistent colour match between adjacent sheets. Replace installed products in areas showing undue colour variation, in the opinion of the Owner or Consultant.

2.3 MATERIALS

.1 Rubber Sheet Flooring (RUB-1): conforming to ASTM F1859 (without backing) or ASTM F1860 (with backing), Type I (entirely homogeneous) or Type II (vulcanized layered) with minimum 1.5 mm (0.04") homogenous wear layer thickness. Laminated layered Products are not acceptable.

.1 Static load limit (ASTM F970): ≥ 250 psi

.2 Chemical resistance (ASTM F925): Pass

.3 Wearing Surface (as applicable): Smooth. Ensure appearance of rubber sheet floor covering can remain consistent and comparable to original appearance after removal of 0.5 mm (0.02") of floor thickness.

.4 Slip Resistance (James Test): ≥ 0.5 when tested in accordance with ASTM D2047

.5 Thickness: Minimum 3.0 mm (0.118")

.6 Basis-of-Design Products: "Oasis Rubber Sheet - Color# RRO-508 – Taupe Tease" or approved equivalent from one of the following:

.1 Mondo America Inc.,
.2 Nora Rubber Flooring

.2 Integral Cove Base: Fabricated from same sheet flooring with base height as indicated on *Drawings* using adhesive, cove corner fillet radius reinforcing strips, welding rod and accessories recommended by manufacturer complete with inside and outside corners.

2.4 ACCESSORIES

.1 Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated. Do not use gypsum based materials. Refer to Section 03 54 16.

.2 Primers and Adhesives: Low VOC, Waterproof, of types recommended by rubber flooring manufacturer and compatible with applied curing material for specific material on applicable substrate, above, on or below grade.

.1 Regular traffic: Manufacturer's standard acrylic type

.1 Basis-of-Design: "AD-777" by American Biltrite or approved equivalent.

.2 Locations subject to heavy rolling loads and under patients' beds: Manufacturer's standard 2-part polyurethane type.

.1 Basis-of-Design: "AD-590" by American Biltrite or approved equivalent.

.3 Moisture Reduction Barrier: Application of systems for reduction of moisture vapour transmission and alkalinity control for concrete slab required to receive floor covering specified under this Section to be as follows:

.1 Moisture Vapour Emission Rate (MVER) Range: Ensure items provided are capable of treating high moisture vapour transmitting concrete surfaces up to 11.34 kg/93 m2 (25 lbs/1000 sq ft) in 24 hours; Maximum Relative humidity: 100%; as determined by ASTM F1869 test.

.2 Final Product selection to suit condition encountered at time of installation. Where applicable, Provide manufacturer's floor leveling systems for use with specified Products.

.4 Molding Accessories:

.1 As a minimum Provide following items: Cap for coves, reducer strips and transition strips for resilient flooring.

.2 Profile and Dimensions: As required.

.3 Colors and Patterns: As selected by Consultant from manufacturer's full range.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Ensure Substrates are dry and clean and free of depressions, raised areas or other defects which would telegraph through installed flooring

.3 Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work implies acceptance of previously completed work.

3.2 PREPARATION

.1 Prepare concrete floors to receive resilient flooring in accordance with requirements of ASTM F710. Consult manufacturer for specific recommendations and prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.

.2 Ensure compatibility of adhesives, waterproofing, reinforcing and fillers with adjacent substrate and component coming in contact with these Products.

.3 Ensure waterproofing and adhesive manufacturers; examine substrate conditions, verify conditions are suitable for installation prior to commencement, and review application procedures. If requested submit written report.

.4 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

.5 Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, paint, dirt, silicone, or any other foreign matter detrimental to sheet flooring application using mechanical methods recommended by manufacturer. Do not use solvents.

.6 Pre-Installation Testing:

.1 Acidity/Alkalinity and Adhesion Testing:

.1 Conduct pH test to ensure alkali salt residue is within limitations acceptable to manufacturer and to avoid adhesive failure, discoloration, shrinkage and softening of floor covering.
.2 If pH results are higher than acceptable to manufacturer, neutralize floor prior to beginning of installation. Neutralize floor by sanding, vacuuming and by application of water and mild muriatic acid as recommended by manufacturer. Retest to ensure pH levels have been neutralized.
.3 Proceed with installation only after substrates pass testing.

.2 Moisture Testing:

.1 Relative Humidity Test: Perform relative humidity test in accordance with requirements of ASTM F2170 using in situ probes and measure internal relative humidity of slab.

.1 Ensure concrete slab and air space above floor slab are at service temperature and that relative humidity of area is similar to Project's final conditions for 48 hours prior to measuring concrete relative humidity.
.2 Conduct minimum of 3 tests for first 1,000 sq.ft and one additional test for each 1,000 sq.ft. Conduct one test near center and others around perimeter of area.
.3 Proceed with installation only after substrates have a maximum 75% relative humidity measurement.
.4 Provide results to Consultant in writing prior to commencement of installation.
.5 Do not proceed with installation until moisture problems have been corrected.

.7 Moisture Barrier Application:

.1 Apply moisture reduction barrier at following locations:

.1 Slabs-on-grades and Basement slabs (regardless of pre-installation moisture testing results)
.2 Suspended slabs where slab moisture contents are above those recommended by floor covering manufacturers at time of installation after performing pre-installation testing.

.2 Prior to applying moisture barrier, mechanically prepare concrete substrate using dustless approved method to ICRI requirements to CSP (Concrete Surface Profile) #2 (Diamond Cup Ground) or #3 (Shotblasted).

.3 Apply moisture barrier in accordance with manufacturer's recommendations across entire surface being treated including up to and around perimeter of restrained surfaces such as walls and columns.

.4 Do not proceed with work until unsatisfactory conditions have been resolved.

.8 Remove sub-floor ridges and bumps. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate. Prohibit traffic until filler has cured.

.9 Vacuum, prime and seal substrate to resilient rubber sheet flooring manufacturer's recommendations.

3.3 APPLICATION

.1 Installation of Resilient Rubber Sheet Flooring:

.1 *Install* resilient rubber sheet flooring in accordance with manufacturer's installation procedures and as specified herein.

.2 Mix and apply adhesives to manufacturer's recommendations. Apply adhesive uniformly using recommended trowel. Do no spread more adhesive than can be covered by flooring before initial set takes place.

.1 If adhesive over-dries, completely remove it. Use solvents compatible with new adhesive. Re-apply adhesive.
.2 Do not soil walls, bases, fitments, casework and adjacent areas with adhesive. Promptly remove spillage.

.3 Install flooring wall to wall before installation of floor set cabinets, casework, furniture, equipment and fixed partitions.

.4 Lay out floor coverings as follows:

.1 Maintain uniformity of floor covering direction.
.2 Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 150 mm (6 ") away from parallel joints in substrates.
.3 Match edges of floor coverings for color shading at seams.
.4 Run sheets parallel to length or width of room as indicated on reviewed Shop Drawings.
.5 Ensure border widths are minimum 1/3 of width of full material
.6 Avoid cross seams.

.5 Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, fixed objects and built-in furniture including cabinets, pipes, outlets, and door frames. Provide borders around permanent fixtures. Continue flooring over areas which will be under built-in furniture.

.6 Extend floor coverings into toe spaces, door reveals, closets, and similar openings.

.7 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.8 Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.

.9 Install floor coverings on access covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of floor coverings installed on covers and adjoining floor covering. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.

.10 Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

.11 Roll flooring with 45 kg (100 lb) roller to ensure full adhesion. Keep edges of sheet flooring at seams free of extra adhesive.

.12 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

.13 Install reducer strips as specified herein at unprotected or exposed edges where flooring terminates.

.14 Seams: Comply with ASTM F1516. Use heat-welded seam method and sequence of work in conformance with approved Shop Drawings and in conformance with manufacturer's recommendations.

.1 Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Finish seams flush and free from voids, recesses and raised areas.
.2 Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
.3 Lay flooring (with seams parallel to building lines) to produce a minimum number of seams.

.2 Installation of Integral Cove Base:

.1 Install integral cove wall base where shown on Drawings, including cove fillet support strip and top rubber round cove cap edge trim. Use special heat welding rod and process at seams. Heat weld to Provide neat well fitted coved skirting as specified herein.

.2 Provide tamper-resistant sealant at junction of base and walls.

3.4 CLEANING

.1 Remove excess adhesive from floor, base and wall surfaces without damage. 48 hours after installation, clean surfaces with neutral pH cleaning detergent approved by rubber sheet flooring manufacturer. Avoid flooding rubber sheet flooring with water. Pick up excess water with vacuum or squeegee. Rinse rubber sheet flooring with clean water and allow to dry.

3.5 PROTECTION

.1 Comply with manufacturer's written instructions for cleaning and protection of floor coverings.

.2 Perform the following operations immediately after completing floor covering installation:

.1 Remove adhesive and other blemishes from floor covering surfaces.

.2 Sweep and vacuum floor coverings thoroughly.

.3 Damp-mop floor coverings to remove marks and soil.

.3 Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

.4 Provide and maintain necessary protection of bases. Replace damaged resilient bases with new materials at no additional cost.

.5 Cover floor coverings until Substantial Performance of the Work. Prohibit traffic on floor for 48 hours after installation.

3.6 DEMONSTRATION AND TRAINING

.1 Engage manufacturer to demonstrate cleaning and maintenance procedures to Owner in accordance with requirements of Division 01.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* resilient base including but not limited to following:

.1 surface fillers, primer and adhesive.

.2 resilient toe bases at resilient floor areas.

.3 Resilient molding accessories

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Samples: Submit samples in accordance with Division 01.

.1 Submit duplicate 610 mm (2'- 0") long sample of each type of resilient bases.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.3 Mock-Up:

.1 Build mockups to verify selections made to demonstrate aesthetic effects and set quality standards for materials and execution.

.2 Install minimum 12'-0" (3600 mm) long sections of each type of resilient base (2 inside and 2 outside corners) as directed at the site by Consultant. Do not proceed with resilient base work until quality control Mock-Up has been reviewed and accepted by Consultant.

.3 Reviewed and accepted quality control Mock-Up to be retained and serve as minimum acceptable standard for the resilient base work. Incorporate quality control Mock-Up into finished resilient base work if accepted by Consultant.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in good condition to site in manufacturer’s original unopened containers that bears name and brand of manufacturer, *Project* identification, shipping and handling instructions.

.2 Store on site in designated space at minimum temperature of 20 deg C (68 deg F) for period of 48 hours immediately prior to, during and after installation. Store goods in rolls only.

1.7 PROJECT CONDITIONS

.1 *Provide* each flooring *Product* in accordance with manufacturer's recommended tolerances for:

.1 Substrate moisture content.

.2 Temperature and ventilation.

.3 Maintain Relative Humidity at application to % recommended by manufacturer when tested in accordance with ASTM F2170.

.2 Environmental Requirements: Air temperature and structural base temperature at base installation are shall be above 20 deg C (68 deg F) for 72 hours before, during and 48 hours after installation. Allow base materials and application adhesives to acclimatize to these temperatures for 48 hours.

1.8 WARRANTY

.1 Warranty resilient bases for a period of 3 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the *Contract*.

.2 Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of *Consultant* and at no expense to *Owner*. Defects include but are not limited to: failure in adhesive bond and extensive colour fading.

1.9 MAINTENANCE

.1 Extra Materials: *Supply* to *Owner* at completion of job 6000 mm (20'-0") of coil stock of each type of resilient base in colours specified for future repairs, boxed in original containers and clearly labeled. Extra stock shall be same production run as installed *Products*. Store extra stock in location as directed later by *Consultant*.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Flexco; www.flexcoFloor.com

.2 Johnsonite Division of Duramax Inc.; www.johnsonite.com

.3 Roppe.; www.roppe.com

.2 Substitution Limitations: This Specification is based on *Products* from manufacturers listed herein.

.3 Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Flooring materials shall be low VOC emitting materials when tested by a qualified testing agency.

.2 Surface burning characteristics: *Provide Product* with following flame spread rating and smoke developed rating when tested in accordance with following standards:

.1 Critical Radiant Flux (ASTM E648 or NFPA 253): > 0.45 watts/cm^2 – Class I
.2 Smoke Developed (ASTM E662): ≤ 450
.3 CAN/ULC-S102.2-M: Maximum Flame Spread: 100.

.2 Design and Performance Requirements:

.1 Provide rubber stair treads as specified herein complete with preparation of substrate, and other accessories to complete installation to meet design requirements.

.2 Provide materials free from blisters, cracks, chipped edges and embedded foreign matter or other defects.

.3 Comply with applicable regulations regarding VOC (volatile organic compound) content of adhesives.

.4 Colour Uniformity: Use treads from consecutive manufacturing process to maintain consistent colour match between adjacent installation. Replace installed products in areas showing undue colour variation, in the opinion of the Owner or Consultant.

2.3 MATERIALS

.1 Rubber Toe Base (RB-1): ASTM F1861, PVC free, Type TS (rubber, vulcanized thermoset) or TP (thermoplastic rubber), Group 1 (solid, homogeneous); smooth surface with following characteristics:

.1 Styles: Cove (base with toe)

.2 Thickness: Minimum 3.2 mm (0.125") thick

.3 Height: 150 mm (6") unless otherwise indicated on Drawings.

.4 Lengths: Coils in manufacturer's standard length.

.5 Corners: Job-formed using adhesive, cove former fillet radius reinforcing strips, welding rod and accessories as recommended by resilient base manufacturer.

.6 Acceptable *Products*: “Rubber Wall Base; 32 – Pebble” by Johnsonite, or approved equivalent by one of the following:

.1 “Marathon Rubber Cove Base” by American Biltrite (Canada) Ltd.,
.2 “Pinnacle Rubber Wall Base” by Roppe
.3 “Wallflowers Rubber Wall Base” by Flexco.

.2 Molding Accessories

.1 Description: Provide resilient caps for cove resilient flooring, reducer strips for resilient flooring, joiners for tile and carpet and transition strips as noted on Drawings and Schedules.

.2 Profile and Dimensions: As recommended by manufacturer.

.3 Locations: Provide rubber molding accessories unless indicated otherwise.

.4 Colours and Patterns: As selected by Consultant from full range of industry colours.

2.4 ACCESSORIES

.1 Surface fillers and primers: Types and brands approved, acceptable to resilient base manufacturers for applicable conditions. Use non-shrinking latex compound.

.2 Resilient base adhesives: Best quality, waterproof, clear setting type and brands as recommended by resilient base manufacturer and meeting VOC limits stipulated herein.

.3 Joint Sealant: Tamper-resistant type as specified in Section 07 92 00.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Ensure concrete floors are fully cured. Verify concrete floor dryness by using test methods recommended by flooring manufacturer.

.3 Verify curing, hardening or other admixtures have been used and if used ensure these compounds have been removed.

.4 Installation of flooring shall be considered an acceptance of surfaces to be covered. If repair of surfaces is required after commencement of flooring work it shall be included as part of the work specified herein.

3.2 PREPARATION

.1 Substrates shall be:

.1 dry and clean;

.2 free of cracks, ridges, depressions, raised areas or other defects which would telegraph through and interfere with adhesion and installation of flooring;

.3 temperature of resilient flooring and substrate shall be within specified tolerances;

.4 perform moisture and adhesive bond test.

.5 Perform adhesive bond test in each major area, minimum 1 per 93 m^2 (1000 sq ft), prior to installation. Examine after 72 hours to determine whether bond is solid and no moisture is present. Do not proceed with work until results of bond test are acceptable.

.2 Concrete shall have dampness no greater than recommended by flooring and adhesive manufacturers when tested with moisture meter. Where floors exhibit negative alkalinity, carbonization or dusting conform to manufacturers' recommendations for removal of these elements detrimental to work.

.3 Be responsible to report conditions contrary to requirements that would prevent proper installation. Do not commence with *Work* until unsatisfactory conditions have been corrected.

.4 Failure to report unsatisfactory conditions will be construed acceptance and approval of substrate conditions. Commencement of *Work* shall imply acceptance of substrate with regard to conditions of substrate at time of installation.

3.3 INSTALLATION

.1 Resilient Bases:

.1 Resilient base work shall be performed by experienced and competent workers in strict accordance with manufacturers written instructions for material concerned.

.2 Fill cracks or irregularities with crack filler approved by resilient base manufacturer. *Provide* a solid backing over entire area behind resilient base.

.3 Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products

.4 Apply primer in strict accordance with manufacturer's written instructions. Permit primer to dry.

.5 Apply adhesive evenly and continuously with an approved notchtooth spreader at the recommended rate for full base adhesion and contact. Mechanical spreader not approved. Do not apply adhesive in a manner which promotes induced waviness in resilient base. Do not spread more adhesive than can be covered before initial set takes place. Use waterproof adhesive throughout.

.6 Mix and spread adhesive evenly, in quantities which can be covered by resilient base within the adhesive's working time. If the adhesive over-dries, completely remove it using solvents compatible with adhesive and re-apply adhesive. Do not soil walls, bases, fitments, finish carpentry work or adjacent surfaces with adhesive. Promptly remove all excess and spillage of adhesive.

.7 Unroll coils of resilient base. Place resilient base flat to loosen coil set.

.8 Set wall base in adhesive tightly against wall and floor surfaces. Use lengths as long as practicable and not less than 500 mm (20") long.

.9 *Install* resilient bases to walls, columns and fitments as indicated on the *Drawings* and Room Finish Schedule, during final stages of completion of work, when ceilings and permanent partitions are finished, when prime paint coats are applied and when surface conditions are suitable for installation.

.10 Set resilient base in adhesive to produce a positive, permanent bond without gaps, tight against vertical and floor surfaces for a uniform fit.

.11 *Install* resilient base straight and level with maximum height variation of 1:1000, having vertical, tight and flush "hairline" butt joints with no two joints closer than 2' - 0" (610mm) apart.

.12 Roll resilient base with clean, polished 5 lbs.(2.27 kg) roller, against vertical and floor surfaces to ensure full bonding to surfaces.

.13 Ensure that installation of resilient base is tight, firm, and free of bubbling and separation of any kind from surfaces. Remove defective installation as directed by *Consultant* and *Install* new resilient base as specified herein.

.14 Resilient base work shall be handed over to *Owner* free of blemishes and in perfect condition.

.15 Job-Formed Corners:

.1 Accurately scribe and fit resilient base to metal frames and other obstructions.

.2 Outside Corners: Use straight pieces of maximum lengths possible. External corners shall be wrapped around corners as sharp as possible by scoring the back. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.

.3 Inside Corners: Provide mitred internal corners. Use straight pieces of maximum lengths possible. Shave back of base where necessary to produce a snug fit to substrate.

.2 Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING

.1 Remove excess adhesive from floor, base and wall surfaces without damage.

.2 Clean, seal and wax floor and base surface to flooring manufacturer's instructions.

.3 Sweep and vacuum horizontal surfaces thoroughly.

.4 Damp-mop horizontal surfaces to remove marks and soil.

3.5 PROTECTION

.1 Protect installed flooring as recommended by flooring manufacturer against damage from rolling loads, other trades or placement of fixtures and equipment.

.2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: Provide seamless resin flooring including but not limited to following:

- .1 preparation of substrates and existing conditions.
- .2 underlayment.
- .3 moisture reduction barrier (where required to suit site conditions).
- .4 seamless resin flooring.
- .5 divider strips.
- .6 integral cove base.
- .7 cleaning and sealing.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

- .1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.
- .2 In particular address the following items:
  - .1 Prior to commencing work of this Section arrange for manufacturer's technical representative to review with Contractor and Consultant, procedures to be adopted and conditions under which work shall be performed.
  - .2 Inspect surfaces to determine adequacy of existing and proposed conditions.
  - .3 Ensure Division 3 requirements for concrete are compatible with requirements of this Section. Ensure following meet acceptable criteria to ensure proper performance seamless resin flooring work:
    - .1 floor flatness and floor levelness requirements for seamless resin flooring installation and their acceptability by flooring manufacturer;
    - .2 surface texture of finished floor required for seamless resin flooring installation;
    - .3 acceptable approaches to remediation of high moisture and high pH floors;
    - .4 seamless resin flooring application.
  - .4 Co-operate fully with other Subcontractors on the Work and promptly proceed with work of this Section as rapidly as job conditions permit.
  - .5 Co-operate with other Sections for application of all miscellaneous specialties.

.6 Supply items to be built-in in ample time to be incorporated into work of other Subcontractors, together with measurements and other information required for location of it.

.7 Ensure work which may create dust does not proceed during work related to painting and final finish

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for Project in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Samples: Submit 300 mm x 300 mm (12" x 12") sample of flooring for approval. Submit additional samples until approval is obtained. Make changes in aggregate mix as required to secure correct colour and texture. Label sample(s) with Project name and number, applicator, names of material and manufacturer, area where material will be applied, date of sample, colour, gloss, texture and aggregate mix proportion.

.4 Site Quality Control Submittals: Submit a diagram of area showing locations and results of each of the following tests as required by pre-installation testing:

.1 Calcium chloride test

.2 Acidity and alkalinity test

.3 Relative humidity test

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.3 Inspection and Testing Company: Retain services of independent inspection and testing company acceptable to Consultant to perform testing on concrete substrates to identify moisture levels in slabs. Independent inspection and testing company will be required to submit results of tests performed to Consultant for verification.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.1 Mock-ups:

.1 At site, in area designated by Consultant, erect sample floor area 1 m2 (10 sq ft) by required thickness as per Specifications for each type of flooring, including moisture barrier and waterproofing membrane where applicable, primer and necessary

number of coats to obtain specified finish, showing colour range, bond and quality of work.

.2 Indicate range of slip resistance for various conditions encountered in the Project. Final slip resistant finish will be selected for specific areas from approved Mock-up.

.3 Show colour range, sheen level, bond and final quality of work. Ensure Mock-up erected illustrates minimum 2 outside corners and 2 inside corner of integral cove base and complete floor drain detailing

.4 Erect additional sample, if required, to obtain approval. Do no work until Mock-ups have been reviewed. Approved Mock-ups shall become standard of comparison for flooring work on site and shall not be destroyed or moved until authorized by Consultant.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site in original, unopened containers with manufacturer's labels and seals intact. Labels shall identify manufacturer's name, brand name of Product, grade and type, application directions and shelf life and/or expiry date of Product.

.2 Handle and store materials in accordance with manufacturer's printed directions.

.3 Store flammable materials in safe, approved containers to eliminate fire hazards and remove from site at end of each work shift.

.4 Do not use materials that have been stored for period of time exceeding maximum recommended shelf life of materials.

1.7 PROJECT CONDITIONS

.1 Environmental Requirements:

.1 Verify concrete slab is smooth, sound, clean, free of any compounds or curing agents detrimental to topping and any materials used to correct contour of concrete slab shall be compatible with epoxy topping system.

.2 Do not apply flooring over substrate materials that contain over 3% moisture. Obtain approval of flooring manufacturer of moisture content of subfloors before proceeding with application.

.3 Maintain minimum air and surface temperatures at 16 deg C (60 deg F) for 24 hours before, during and for 48 hours following application, or until cured.

.4 Maintain well-lit and well-ventilated area.

.5 Comply with flooring manufacturer's directions for maintenance of substrate temperatures, ventilation and other conditions required to execute and protect work.

1.8 WARRANTY

.1 Warrant work of this Section for period of 2 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the Contract.

.1 Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to;

.2 discolouration, fading, pinholes, cracking, peeling and leaking. Damage due to structural failure of base, water seepage or abnormal abuse is excepted.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 BASF Canada Inc. ; www.basf.com

.2 NEOGARD®; www.neogard.com

.3 Sherwin Williams High Performance Flooring; www.industrial.sherwin-williams.com

.4 Sika Canada Inc.; www.sika.com

.5 Stonhard, Inc.; www.stonhard.ca

2.2 DESCRIPTION

.1 Design and Performance Requirements:

.1 Seamless epoxy flooring shall be CGSB 81-GP-4M, 100% solids, zero VOC, solvent-free system comprised of a two-component epoxy primer, a two-component resin and curing agent, aggregate added into both primer and undercoat, and a high performance, two-component, clear sealer.

.2 Critical Radiant Flux: 0.22 W/sq. cm or greater per NFPA 253.

.3 Bases will be integral cove bases

.4 Slip Resistance (Coefficient of Friction):

.1 Provide materials having a minimum values as determined by ASTM D2047 unless otherwise indicated:

.1 Level Surfaces: Minimum 0.6. Provide additional grit to achieve higher slip resistance (≥ 0.7) in wet areas.
.2 Ramp Surfaces: Minimum 0.8.

.2 Provide materials having a minimum Dynamic Coefficient of Friction (DCOF) of 0.42 in accordance with ANSI A137.1 when tested using the BOT 3000 Digital Tribometer.

.5 Antibacterial and Antifungal Treatment: Provide flooring complete with antibacterial and antifungal treatment with no growth of bacteria, mould, mildew and fungi for lifetime of floor when tested in accordance with following standards:

.1 Fungi Growth (ASTM G21): Minimum Class 1 Rating.
.2 Mould Growth (ASTM D3273): Minimum Class 10 Rating.

2.3 MATERIALS

.1 Seamless Resin Flooring (Decorative) - Multi Colour (SR-1): 100% solids, decorative abrasion-, impact- and chemical-resistant, aggregate-filled, resin-based, monolithic floor surfacing designed to produce a seamless floor with following characteristics:

.1 System Description:

.1 Overall System Thickness: 6 mm (1/4”)
.2 Primer: 2-component epoxy as recommended by manufacturer.

.3 Mortar: 100% solids troweled system with silica sand aggregate.
.4 Cove base: integral type
.5 Body/Grout Coats: Troweled or screeded epoxy resin complete with manufacturer's standard aggregates. Provide minimum 2 coats.
.6 Finish Coat (Semi-Gloss): Epoxy- or aliphatic polyurethane based sealing or finish coat. Provide minimum 2 coats.

.2 System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

.1 Compressive Strength: 47.8 MPa (6,931 psi) at 28 days in accordance with ASTM C579.
.2 Flexural Strength: 11.1 MPa (1,610 psi) at 28 days in accordance with ASTM C580.
.3 Pull-off Strength: > 2 MPa (>290 psi) with substrate failure in accordance with ASTM D4541.
.4 Flammability: Self-extinguishing in accordance with ASTM D635.

.3 Color and Pattern: “Stone” by Stonhard Inc.

.4 Wearing Surface: Manufacturer’s standard wearing surface meeting slip-resistance performance specified herein.

.5 Basis-of-Design System: “Stonblend GSI” by Stonhard Inc. or approved equivalent as follows:

.1 “Neo-Quartz 250” by NEOGARD®;
.2 “Sika Floor Quartzite Trowel System” by Sika Canada Inc.;
.3 “MasterTop 1245 CLAD” by BASF Canada Inc.
.4 “Resulfor Deco Quartz TG46” by Sherwin Williams High Performance Flooring

2.4 ACCESSORIES

.1 Primer: 100% solids, type recommended by manufacturer for substrate and body coats indicated.

.2 Waterproofing Membrane: Type recommended by manufacturer for substrate and primer and body coats indicated.

.3 Reinforcing Membrane: Flexible resin formulation type recommended by manufacturer for substrate and primer and body coats indicated to prevent substrate cracks from reflecting through flooring. Provide fiberglass scrim embedded in reinforcing membrane.

.4 Patching and Fill Material: Seamless resin product or other product recommended by manufacturer for application indicated.

.5 Divider Strips: white alloy zinc, 'L' shape; thickness as required to suit floor thickness,

.6 Cove Strips: As recommended by flooring manufacturer.

.7 Slip Resistant Additive (SRA): Manufacturer’s standard material for use with or as a component part of coating on horizontal surfaces to provide slip resistance.

.8 Joint Sealant and backers: CAN/CGSB-19.24-M, Type 1, Class B, multi-component modified urethane base chemical curing material compatible with floor finish and as recommended by flooring manufacturer.

.9 Provide preformed, closed cell, compressible joint backer strips Compatible with sealant, primer, flooring and substrate. Minimum 20 shore 'A' hardness; tensile strength: between 140

kPa and 200 kPa. Sizes and shapes to suit various conditions, diameter 25% greater than joint width.

.10 Moisture Reduction Barrier: ASTM F3010, moisture vapour transmission and alkalinity control system for concrete slab required to receive floor covering specified under this Section to be as follows:

.1 Moisture Vapour Emission Rate (MVER) Range: Ensure items provided are capable of treating high moisture vapour transmitting concrete surfaces up to 11.34 kg/93 m2 (25 lbs/1000 sq ft) in 24 hours; Maximum Relative humidity: 100%; as determined by ASTM F1869 test.

.2 Final Product selection to suit condition encountered at time of installation. Where applicable, Provide manufacturer's floor leveling systems for use with specified Products.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with seamless resin flooring.

.1 Ensure concrete slab has been properly cured and dry for minimum of 28 Days.

.2 Ensure slab on grade has been adequately waterproofed beneath and at perimeter of slab and on earth side of below grade walls.

.3 Ensure no curing and sealing compounds, hardeners or other chemical additives have been used on concrete.

.4 Verify specified environmental conditions are maintained before commencing work. Be familiar with manufacturer's Product literature and Material Safety Data Sheets and comply with precautions, handling procedures and equipment requirements.

.5 Repair damaged and deteriorated concrete according to flooring manufacturer's written instructions.

.3 Pre-installation Testing: Inspect and test concrete surfaces and immediately advise to Consultant in writing of unsatisfactory conditions which may affect performance or appearance of finished surfaces.

.1 Tensile Bond Strength Test: Ensure concrete surface have minimum 1.5 MPa (210 psi) tensile bond strength when tested in accordance with ASTM C1583 prior to flooring application.

.2 Acidity/Alkalinity and Adhesion Testing:

.1 Conduct pH test to ensure alkali salt residue is within limitations acceptable to manufacturer and to avoid adhesive failure, discoloration, shrinkage and softening of floor covering.

.2 If pH results are higher than acceptable to manufacturer, neutralize floor prior to beginning of installation. Neutralize floor by sanding, vacuuming and by application

of water and mild muriatic acid as recommended by manufacturer. Retest to ensure pH levels have been neutralized.

.3 Proceed with installation only after substrates pass testing.

.3 Moisture Testing:

.1 Relative Humidity Test: Perform relative humidity test in accordance with requirements of ASTM F2170 using in situ probes and measure internal relative humidity of slab.

.1 Ensure concrete slab and air space above floor slab are at service temperature and that relative humidity of area is similar to Project's final conditions for 48 hours prior to measuring concrete relative humidity.

.2 Conduct minimum of 3 tests for first 1,000 sq.ft and one additional test for each 1,000 sq.ft. Conduct one test near center and others around perimeter of area.

.3 Proceed with installation only after substrates have a maximum 75% relative humidity measurement.

.4 Provide results to Consultant in writing prior to commencement of installation.

.5 Do not proceed with installation until moisture problems have been corrected.

.4 Moisture Barrier Application:

.1 Apply moisture reduction barrier at following locations:

.1 Basement slabs and Slabs-on-grades (regardless of pre-installation moisture testing results)

.2 Suspended slabs where slab moisture contents are above those recommended by floor covering manufacturers at time of installation after performing pre-installation testing.

.2 Prior to applying moisture barrier, mechanically prepare concrete substrate using dustless approved method to ICRI requirements to CSP (Concrete Surface Profile) #2 (Diamond Cup Ground) or #3 (Shotblasted).

.3 Apply moisture barrier in accordance with manufacturer's recommendations across entire surface being treated including up to and around perimeter of restrained surfaces such as walls and columns.

.4 Do not proceed with work until unsatisfactory conditions have been resolved.

.5 Remove sub-floor ridges and bumps. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate. Prohibit traffic until filler has cured.

.6 Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through seamless resin flooring according to manufacturer's written instructions.

.7 Vacuum, prime and seal substrate to flooring manufacturer's recommendations.

3.2 PREPARATION

.1 Comply with ASTM C811 requirements unless manufacturer's written instructions are more stringent.

.2 Clean subfloor free of laitance, oil, grease and other foreign matter detrimental to flooring application. Ensure concrete substrate surface is sound, with deteriorated concrete removed, cleaned, and replaced to suit design requirements. Ensure cleaned surfaces are dust free, sound and unbruised. Blow clean control joints, sawcuts and cracks with compressed air and grout with material compatible with floor coating materials.

.3 Repair, joint spalling, surface spalling, and cracks prior to placement seamless flooring. Seal joints and when required repair cracks with epoxy injection method.

.4 Use surface preparation equipment or mechanical methods recommended by system manufacturer. Prepare concrete floors over entire area with steel shot blasting or other method recommended by manufacturer.

.5 Remove uneven joints, rough areas and projections off surfaces. Ensure surface is hard, sound and roughened to irregular surface with weak concrete removed and surface holes and voids exposed. Equip dry blasting machine with vacuum to minimize dust.

.6 Ensure shot blasting exposes cracks in concrete surface. For cracks less than 1.5 mm (1/16") employ crack reinforcing tape in accordance manufacturer’s recommendations. Repair cracks, holes or other deficiencies in accordance with manufacturer's recommendations.

.7 Ensure masonry backing surfaces for cove bases are free of voids and irregularities. Fill recessed joints with recommended epoxy plaster.

.8 Obtain Consultant's approval of prepared substrate prior to installation of flooring.

.9 Mix components and prepare materials according to flooring manufacturer's written instructions.

3.3 INSTALLATION

.1 Apply components of seamless resin flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated with integral cove bases, uninterrupted except at divider strips, sawn joints or other types of joints required.

.2 Apply flooring with care to ensure no laps, pin holes, voids, crawls, skips or other marks or irregularities are visible, and to provide uniform appearance.

.3 Coordinate application of components to provide optimum adhesion of seamless resin flooring system to substrate, and optimum intercoat adhesion.

.4 Work coating into corners and other restricted areas, up and over equipment bases, and into recesses in floors to ensure full coverage.

.5 Make clean true junctions with no visible overlap between adjoining applications of coatings.

.6 For large areas, stop each Day's production at metal dividing strip at lines approved by Consultant.

.7 Cure seamless resin flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes. Match approved sample for colour, sheen, texture and slip resistance.

.8 At substrate expansion and isolation joints, comply with seamless resin flooring manufacturer's written instructions.

.9 Apply primer over prepared substrate at manufacturer's recommended spreading rate.

.10 Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness.

.11 Apply waterproofing membrane to integral cove base substrates.

.12 Primer: Apply primer over prepared substrate, at manufacturer's recommended spreading rate with timing of application coordinated with subsequent application of topping mix to ensure optimum adhesion between flooring materials and substrate.

.13 Troweled Method:

.1 Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, remove trowel marks and roughness using method recommended by manufacturer.

.2 Combine aggregate to blended epoxy resin to form trowellable mortar. Trowel apply mix over tacky primer in number of coats and at spreading rates required to produce minimum thickness specified.

.3 Allow topping to harden minimum time recommended by manufacturer before applying finish coats.

.14 Grout Coats:

.1 When trowelled epoxy matrix has hardened, remove imperfections by lightly abrading surface and vacuum clean.

.2 Apply grout coat, of type recommended by seamless resin flooring manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.

.3 Apply minimum of 2 finish coats at spreading rate and following method recommended by manufacturer minimum thickness per coat and to obtain specified finish to match approved samples.

.4 Allow minimum recommended drying time between coats.

.15 Top Coats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

.16 Cove Bases:

.1 Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

.2 Provide cove base struck straight to provide line for wall finish. Cap with manufacturer's recommended cove strip. Install at heights indicated on Drawings.

.17 Thresholds:

.1 Where flooring terminates at doorways and difference in height occurs between seamless flooring and other floor finishes, cut back slab for 32 mm (1-1/4") width to allow full thickness of seamless flooring to be flush with adjacent floor finish (chasing).

.2 Where flooring terminates at doorways and floor finishes are of same thickness, Provide metal divider strips flush with surfaces.

.18 Floor Drains:

.1 Slope flooring to drains minimum of 3 mm in 300 mm (1/8" in 12") from furthest surface point.

.2 Grind concrete around perimeter to provide 6 mm (1/4") thickness of flooring material which is flush with top of drain and slopes as indicated on Drawings.

.19 Ramps, Stairs and Landings: Provide textured slip resistant finish to surfaces of ramps stairs and landings. Finish stair nosing in accordance with manufacturer's recommendations. Match approved sample.

.20 Chasing: Provide chase where flooring does not abut against vertical surface by chiselling out 38 mm (1-1/2") wide chase to straight saw-cut 12 mm (1/2") depth.

.21 Control Joints: Where substrate is interrupted by isolation, control or expansion joints, Provide saw-cut joint in flooring after floor installation, Install backer rod and fill with manufacturer's recommended epoxy or urethane sealant.

.22 Site Tolerances: Finish seamless flooring surfaces to produce plumb and level floor, or straight where sloped to drains, within tolerance of 3 mm in 3 m (1/8" in 10').

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services: Ensure flooring manufacturer representative's presence at pre-construction site meeting and on site Day flooring application is commenced and periodically thereafter, to ensure work is properly performed.

3.5 CLEANING

.1 Touch up and refinish minor defects in work. Refinish entire coated surface areas where finish is damaged or otherwise unacceptable.

.2 Remove promptly as work progresses spilled or splattered coating materials from adjacent surfaces. Clean floors on completion of work. Do not mar surfaces while removing splatters.

3.6 PROTECTION

.1 Protect completed work from traffic for at least 1 week to allow proper curing of floor finish. Protect work from any trades using area after completion of installation.

.2 Protect adjacent surfaces from damage resulting from work of this Section. If necessary, cover or mask adjacent surfaces to those receiving flooring including fixtures and equipment.

.3 Replace materials soiled by coatings during application and storage, and from which stains cannot be completely removed at no extra cost.

.4 Erect barriers to prevent entry and presence of workers not performing work of this Section during application of flooring and for 48 hours following completion of application.

.5 Post "No Smoking" signs while work is in progress and curing. Ensure spark-proof electrical equipment is used in areas where flammable materials are being applied. Prevent use of open flames or equipment that may cause sparks during this phase of work.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Provide labour, materials, products, equipment and services to complete the elastomeric liquid flooring work specified herein. This includes, but is not necessarily limited, to:

.1 Fluid-applied elastomeric liquid flooring

.2 Auxiliary materials required for a complete installation.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 Coordination:

.1 In particular ensure requirements for concrete subfloor preparation are compatible with requirements of this Section. Ensure following meet acceptable criteria to ensure proper performance floor covering work:

.1 floor flatness and floor levelness requirements for flooring installation and their acceptability by flooring manufacturer;

.2 surface texture of finished floor required for flooring installation;

.3 acceptable approaches to remediation of high moisture and high pH floors;

.4 adhesive application and floor covering installation.

1.4 SUBMITTALS

.1 Product Data: Submit product data in accordance with Division 01 for each type of product indicated.

.1 Submit manufacturer's instructions, printed product literature and data sheets for the elastomeric liquid flooring work and include product characteristics, performance criteria, physical size, finish and limitations

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Shop Drawings: Show installation details for flooring including layout, colours, widths, and dimensions of game lines and markers and locations of athletic equipment floor inserts.

.4 Samples :

.1 Submit manufacturer's colour charts showing colours and glosses available for flooring.

.2 Samples for Verification: Submit sample of verification in accordance with Division 01 for each colour, gloss, and texture of flooring required, 305 mm (12 inches) square, applied to a rigid backing.

.5 Maintenance Data: Submit maintenance data in accordance with Division 01 for fluid-applied elastomeric liquid flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

.1 Installer Qualifications: An installer (applicator) who is approved, trained, or certified by fluid-applied elastomeric liquid flooring manufacturer.

.2 Manufacturers Qualifications: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.3 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.4 Mock-Up: Provide complete room Mock-up, minimum 10 m2 (100 sq ft) complete with integral base showing corner conditions (4 inside corners and 2 outside corners) in locations designated by Consultant and as required to demonstrate quality of workmanship.

.1 Maintain Mock-ups during construction in an undisturbed condition as a standard for judging the completed work.

.2 Arrange for Consultant's review and acceptance, obtain written acceptance before proceeding with Work.

.3 Upon acceptance, mock-up serves as a minimum standard of quality for the balance of the work of this Section. Mock-up shall be left in place for the duration of the work

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, batch or lot number, and date of manufacture.

.1 Material must be delivered to job site and checked for completeness and shipping damage prior to job start.

.2 Storage:

.1 Store materials in accordance with manufacturer's written instructions.

.2 Keep containers sealed until ready for use. Material should be stored in a dry, enclosed, protected area from the elements.

.3 Do not subject material to excessive heat or freezing.

.4 Shelf life: Established based on manufacturer's written recommendation for each material being used.

.3 Handling: Protect materials during handling and application to prevent damage or contamination.

.4 Condition materials for use accordingly to manufacturer's written instructions prior to application.

.5 Record material lot number and quantity delivered to jobsite/storage.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations: Comply with flooring manufacturer's written instructions for substrate temperature, ambient temperature, humidity, ventilation, and other conditions affecting flooring application.

.1 Do not apply flooring until spaces are enclosed and weatherproof; wet work in spaces is complete and dry; and overhead work, including installing mechanical systems, lighting, and athletic equipment, is complete.

.2 Maintain constant ambient room temperature for 48 hours before, during and after installation, or until cured. Do not apply while ambient and temperatures are rising.

.1 During conditioning period, maintain an ambient temperature between 18 and 24 deg C (65 and 75 deg F) and not more than 50 percent relative humidity in spaces to receive flooring.

.2 After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.

.3 Erect suitable barriers and post legible signs at points of entry to prevent traffic and trades from entering the work area during application and cure period of the floor.

.4 Ensure adequate ventilation and air flow.

1.8 WARRANTY

.1 Warrant work of this Section against defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant. Include in warranty costs of complete system replacement of affected areas involved and at no expense to Owner.

.1 Flooring material: for period of 5 years from Substantial Performance of the Work.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 BASF Canada Inc. ; www.basf.com

.2 NEOGARD®; www.neogard.com

.3 Sherwin Williams High Performance Flooring; www.industrial.sherwin-williams.com

.4 Sika Canada Inc.; www.sika.com

.5 Stonhard, Inc.; www.stonhard.ca

2.2 MATERIALS

.1 Adhesive: two component solvent free polyurethane adhesive.

.1 Basis-of-Design: “Sikafloor Comfort Adhesive”.

.2 Shock Pad: prefabricated rubber shockpad produced by bonding rubber crumb with a polyurethane compound.

.1 Basis-of-Design: “Sikafloor Comfort Regupol 6015H”

.3 Pore Sealer: two part, total solid, low VOC, polyurethane; flexible, durable high quality urethane compound used for sealing and levelling of the permeable surface of prefabricated granular rubber and foam pads.

.1 Basis-of-Design: “Sikafloor Comfort Pore filler”

.4 Color Sealer: two part waterbased, low VOC, polyurethane, pigmented matte topcoat for use with flexible membrane systems.

.1 Basis-of-Design: “Sikafloor 305 W”

.5 Color Flakes: Random Decorative Flakes.

.6 Top Coat / Clear Sealer / 2nd Sealer Coat: low VOC, clear, two part waterbased polyurethane matte topcoat for use with flexible membrane systems.

.1 Basis-of-Design: “Sikafloor 304 W”

.7 Cove base: Epoxy mortar cove based.

2.3 FLUID-APPLIED ELASTOMERIC LIQUID FLOORING (SR-2)

.1 Resinous flooring system: ergonomic, sound-absorbing, UV-resistant, low VOC floor. System includes following components:

.1 Adhesive: “Sikafloor Comfort Adhesive” by Sika Canada Inc.applied with a 10 mm (3/8”) notched trowel.

.2 Shockpad: “Sika Comfort Regupol 6015H” by Sika Canada Inc.

.3 Pore Sealer: “Sikafloor Comfort Porefiller” by Sika Canada Inc. applied at 6 mils.

.4 Body Coat: “Sikafloor 330” by Sika Canada Inc. applied at 80 mils.

.5 Color Sealer: “Sikafloor 305W” by Sika Canada Inc. applied at 8 mils.

.6 Color Flakes: Random Decorative Flakes.

.7 Top Coat / Clear Sealer: “Sikafloor 304W NA” by Sika Canada Inc. applied at 5 mils

.8 Optional 2nd Sealer Coat: “Sikafloor 304W NA” by Sika Canada Inc. applied at 5 mils

.9 Basis-of-Design: “Sika ComfortFloor PS - 67 “ applied at 240 to 320 mils thick or approved equivalent.

3 - EXECUTION

3.1 EXAMINATION

.1 Examine substrates, with Installer (Applicator) present, for conditions affecting performance of flooring including substrate moisture content. Begin flooring application only after unsatisfactory conditions have been corrected.

.2 Surface must be clean, sound and dry. Remove dust, laitance, grease, curing compounds bond inhibiting impregnations, waxes and any other contaminants. All projections, rough spots, etc. should be dressed off to achieve a level surface prior to the application.

.3 Concrete substrate to have a minimum compressive strength of 3,500 psi (24 MPa) at 28 days and a minimum of 215 psi (1.5 MPa) in tension at time of application.

.4 Flooring system must not be applied to sand-cement setting beds. Sand-cement beds shall be removed to structural concrete substrate and re-leveled/sloped as necessary to achieve grade and/or adequate drainage.

.5 Flooring system must not be applied to asphaltic or bitumen membranes, soft wood, aluminum, copper or fiberglass reinforced polyester/vinyl ester composites.

.6 Application to glazed or vitrified brick and tile, structural wood, steel shall only be permitted with Manufacturer's written recommendation.

.7 Moisture Testing: Verify that concrete slabs are flat, level, and dry.

.1 Flatness Tolerance: Maximum 3 mm in 3 m (1/8 inch in 10 feet) when measured with a straight edge.

.2 Moisture Testing:

.1 Moisture content of concrete substrate must be ≤ 4% by mass as measured with a concrete moisture meter (Tramex® CME/CMExpert type or equivalent)

.2 Additionally, determine relative humidity of concrete slabs using in situ probes per ASTM F 2170.

.1 Proceed with application only after substrates have maximum relative humidity recommended in writing by manufacturer, but not more than 70 percent.

.3 Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

.1 Prepare and clean substrates according to manufacturer's written instructions.

.2 Remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair flooring bond. Remove contaminants using mechanical means.

.3 Treat nonmoving substrate cracks and control joints to prevent cracks from telegraphing (reflecting) through flooring according to manufacturer's written recommendations.

.4 Protect substrate voids and joints to prevent flooring resins from flowing into or leaking through them.

.5 Protect walls, floor openings, electrical openings, door frames, and other obstructions during installation. Cover floor and wall areas at mixing stations.

3.3 APPLICATION

.1 Mix and apply flooring components according to manufacturer's written instructions.

.2 At substrate expansion, isolation, and other moving joints, install continuous joint of same width through flooring.

.3 Apply flooring with care to ensure that no laps, voids, or other marks or irregularities are visible, and with an appearance of uniform color, sheen and texture, all within limitations of materials and areas concerned.

.4 Match colors and textures of approved samples

3.4 PROTECTION

.1 Protect fluid-applied elastomeric liquid flooring during remainder of construction period to allow it to cure and to ensure that flooring and finish are without damage or deterioration at the time of Substantial Performance of the Work.

.2 Freshly applied material should be protected from dampness, condensation and water for at least 72 hours.

.3 Follow manufacturer's written recommendation with respect to cure, wait time and return to service.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* hygienic wall panels including but not limited to following:

.1 hygienic vinyl wall panels.

.2 Auxiliary materials required for a complete installation.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at *Project* site to review *Project* requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01.

.1 Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 *Shop Drawings:*

.1 Submit *Shop Drawings* in accordance with Division 01.

.2 Ensure *Shop Drawings* indicate material characteristics, design, construction, layout diagrams, details of construction, location of each panel and joining method, connections, elevations, finishes, relevant details and relationship with adjacent construction.

.4 Submit a layout diagram indicating the location of each panel and joining method. Samples: Submit samples in accordance with Division 01. Submit following samples in sizes indicated:

.1 hygienic vinyl wall panel material 300 mm (12") square.

.5 Test Reports:

.1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Manufacturer's Instructions: Current published manufacturer's installation and maintenance instructions.

1.5 CLOSEOUT SUBMITTALS

.1 Maintenance Data: Submit maintenance instructions to Owner in accordance with requirements of Division 01 for recommended cleaning materials and methods for panels and trims. Include list of cleaning materials detrimental to hygienic wall panel materials and precautions for use of finished installations

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials: Deliver 5% surplus of material required for maintenance use in accordance with Division 01. Store where directed by Owner. Identify each roll and bundle of pieces. Ensure maintenance materials are of same production run as installed materials.

1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 *Provide* work of this Section executed by competent installers with minimum of 10 years' experience in application of Products, systems and assemblies specified and with approval and training of the *Product* manufacturers.

.2 Manufacturer's Qualifications: Manufacturer shall have a minimum ten (10) years continuous experience in successful manufacture and fabrication of hygienic wall panels of type and quality shown and specified herein. Show and demonstrate that employed skilled workers who custom-fabricate systems similar to that required for this project and whose products have a record of successful in-service performance. Submit proof of experience upon request.

.2 *Mock-up*s: *Provide Mock-ups* in locations designated by *Consultant* and as required to demonstrate quality of workmanship. Maintain *Mock-ups* during construction in an undisturbed condition as a standard for judging the completed work.

.3 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.2 Stack panels on a solid flat surface and precondition for 8 hours in temperatures and humidity conditions approximating the operating environment of the finished room.

.3 Store all adhesives, sealants and accessories in an area with minimum temperatures of 18 deg C (60 deg F) and maximum 26 deg C (80 deg F) for a minimum 48 hours prior to installation.

1.9 PROJECT CONDITIONS

.1 Ambient Conditions:

.1 Maintain temperature between 21 deg C to 27 deg C (70 deg F to 80 deg F) and humidity below 80% 24 hours before, during and 48 hours after installation.

.2 Ensure electrical items (power outlets, etc.) are roughed in where possible.

.3 Remove existing electrical equipment fixed to or in close proximity to walls and replace upon completion of installation.

1.10 WARRANTY

.1 Warrant work of this Section for period of 10 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the *Contract.* Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of *Consultant* and at no expense to *Owner*. Defects include but are not limited to: opening of seams, bond failure delamination and extensive colour fading.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 *Products* of following manufacturers may be acceptable subject to conformance to requirements of *Drawings*, Schedules and *Specifications*:

.1 Altro Limited; www.altro.co.uk

.2 Advanced Hygienic Contracting c/o CDS Distribution Inc.; www.bioclad.com

.2 Substitution Limitations: This Specification is based on Altro Llimited Products. Comparable *Products* from manufacturers listed herein will be considered provided they meet the requirements of this Specification

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Fire Performance Characteristics: Provide wall panels having ULC or UL label indicating that they are identical to those tested in accordance with CAN/ULC S102.2 or ASTM E84 for Class A characteristics with flame spread of 25 or less; and smoke development of 450 or less.

.2 Design and Performance Requirements:

.1 Provide hygienic vinyl wall panels complete with edge trims as adhesives as recommended by manufacturer to suit appropriate substrate with recommended fixing methods at locations indicated. Ensure hygienic wall coverings are capable of maintaining manufacturer stated performance criteria without defects, damage or failure.

.2 *Provide* high-performance hygienic wall systems to meet institution’s infection prevention control standards.

.3 Wall panel systems to be durable, stain resistant, water-tight, seamless, smooth to prevent bacteria or mould growth.

.4 Systems provided shall accommodate site heat formable and welded seams capabilities to fit around corners, pipes, integration with compatible flooring system and other similar locations.

.5 Material Properties:

.1 Impact Resistance (ASTM D5420): > 160 in-lbs.
.2 Shore Hardness: Durometer D - 79

.3 Water Vapor Resistivity (ASTM E96): 3.82 x 10^6 GN.S/kg.m
.4 Flammability: Ensure materials as rated as Class A when tested in accordance with ASTM E84 and CAN/ULC S102.2.

.1 Flame Spread Index: < 15
.2 Smoke Developed: < 100

2.3 MATERIALS

.1 Hygienic Vinyl Wall Panels (HWP): *Provide* 2.5 mm (0.10") thick impact and chemical resistant, extruded vinyl sheet having a maximum working temperature of 60 deg C (140 deg F).

.1 Sheet Sizes: 1220 mm x 3048 mm or as indicated on *Drawings*.

.2 Heights: as indicated on Drawings.

.3 Panel Fixing: Install panels using adhesive method

.4 Accessories: *Provide* moulding profiles, welding rods, joint strips, start and edge trims, transitions and other thermoformed sections to suit *Project* requirements.

.1 Jointing: *Provide* heat welding as necessary to suit installation conditions.
.2 Adhesive and sealants: Manufacturer's recommended polyurethane adhesives and sealants suitable for hygienic applications indicated. Ensure suitability and compatibility with substrate finish application.
.3 Flooring transitions:

.1 Vinyl Flooring: overlapping with sealant applied to joint or high impact transition trim as recommended by manufacturer
.2 Other Flooring: Manufacturer's recommended "J" trims

.4 Corners: premanufactured or thermoformed
.5 Edges: Heavy Duty Edge Trims and finished with recommended sealant bead.

.5 Colours and Finish: to be selected from Whites, Satins and Bright colours at a later date from manufacturer full range.

.6 Acceptable *Products*:

.1 "Whiterock Wall Panels" by Altro
.2 "BioClad Antimicrobial Panels" by Bioclad

3 - EXECUTION

3.1 INSTALLERS

.1 Only installers recommended by Manufacturers are acceptable for the work of this Section subject to conformance to requirements of Drawings, Schedules and Specifications:

3.2 EXAMINATION

.1 Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog, installation instructions and product label instructions for installation.

.2 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify *Consultant* in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Verify room using a 2 m (6') level to ensure all walls are flat, paying particular attention to corners, window reveals, and door entrances. Inspect these to ensure they are free of any debris or irregularities, which could prevent the panels laying flat to the substrate after the adhesive has been applied and the panel installed.

3.3 PREPARATION

.1 Surface Preparation: Ensure substrate is dry, well sealed and free of dirt, loose paint, wax and grease. Glossy surfaces may require sanding or priming before installation to help promote adhesion.

.2 Walls should be smooth and level. High points must be removed and low points filled with filler intended for the substrate and environmental conditions.

.3 Wall panels must be fixed firmly to the wall. Surfaces must be permanently dry and free from all substances that may contribute to adhesive bond failure.

.4 Very absorbent / porous substrates (particularly plaster finishes and unprimed sheetrock) must have a proprietary sealer e.g. PVA primer or similar, applied to the surface a minimum of 12 hours prior to the installation.

.5 Electrical switches, power points etc., should be in a first fix / installation state. Eectrical equipment should only be moved or altered by a qualified electrician as specified in Division 26.

.6 All plumbing should have pipe-work removed to a first fix or installation state and "tails" left protruding from the substrate. Panels can then be drilled and slid over the pipe tails. All holes should be drilled 1/8" (3mm) oversize to allow for expansion, then sealed with manufacturer's recommended caulking.

.7 Hot pipes and steam pipes should be insulated and a 1/8" to 1/4" (3-6mm) expansion gap should be created when installing panels around these pipes, then sealed with manufacturer's recommended caulking.

.8 All pipes, fixing bolts, etc. extending through the Wall panels should have a minimum 1/8" (3mm) expansion gap and be sealed using manufacturer's recommended caulking.

.9 If fitting to door frames, these must be in place prior to installation of wall panels.

.10 Prior to installation, complete any painting which comes in contact with wall panels.

3.4 INSTALLATION

.1 Hygienic Wall Panel Installation:

.1 Install wall panels in accordance with the manufacturer's current published installation guide. All joints should be joined by approved methods as detailed in the installation guide.

.2 Panel Fitting:

.1 Mark a datum line around wall perimeters using a water level, laser or other suitable leveling device. Take measurements from this line to determine top and bottom lines for cutting purposes.

.2 When measuring, allow for minimum 3 mm (1/8") gap at ceiling, door and window frames, pipes and any projections to accommodate for possible panel expansion. After fixing panel, seal gaps using specified sealant.

.3 When fitting to the top of flash-coved sheet vinyl, allow for a 19 mm (3/4") gap to accommodate transition strips.
.4 Thermoform inside corners, outside corners and specific shapes to suit contours of the building.
.5 Cut panels using power saws equipped with laminate cutting blades or by scoring with laminate scoring knife, folding then breaking.
.6 Bevel all leading edges to receive following manufacturer's proprietary strips:

.1 joint strips.
.2 transition strips.
.3 start and edge strips.
.4 extruded preformed inside corners.
.5 extruded preformed outside corners.

.7 Strip burrs from panel edges in preparation for heat welding joints.
.8 When fitting for heat welded joints, ensure 1.6 mm (1/16") gap is maintained sheet to sheet.

.3 Panel Fixing:

.1 Adhesive Method:

.1 Cut and fit sheet as required.
.2 Clean back of panel using safe solvent cleaner. Avoid use of ketones, acetones or any solvents that may cause damage to panel.
.3 Apply double-sided adhesive tape to top and bottom of sheet.
.4 Apply adhesive tape to window and door openings where sheet has a tendency to pull away from substrate prior to adhesive cure.
.5 It may be necessary to prime wall on area directly corresponding to tape position using a non-flammable contact adhesive.
.6 Apply adhesive to back of sheet using recommended trowel, as indicated herein. In some cases it may be more convenient to apply adhesive to substrate.
.7 Apply sheet to wall and line up any reference marks before pressing into place. Use a white rubber mallet for initial contact with adhesive tape.
.8 Ensure adequate adhesive transfer by thoroughly rolling entire panel surface using a wall roller.
.9 Follow above only as guideline. Ensure adequate transfer of adhesive takes place (minimum 80% coverage). Consult adhesive label.
Surfaces must be reasonable in plane, structurally sound and tested to standard moisture requirements.

.2 Panel Jointing:

.1 Heat Welding:

.1 Apply double-sided adhesive tape flush to panel edges.
.2 Remove burrs from panel edges.
.3 Place each successive panel allowing for a 1.6 mm (1/16") gap between each panel.
.4 Clean both seam area and weld rod with safe solvent cleaner; 1 that will not attack the vinyl or leave a film (e.g isopropyl alcohol).
.5 Test weld on a scrap piece of material before proceeding. Proceed only when temperature and speed have been satisfied.

.6 The weld may be trimmed flush when semi-cooled using the round part of the trimming spatula.

.3 Jointing Sheet to Coved Vinyl Flooring:

.1 Overlapping:

.1 Extend panel down a minimum of 25 mm (1") past top of flooring material.
.2 Use extra adhesive to fill gap.
.3 Apply a bead of recommended sealant along bottom edge of panel.

.4 Finishing Edges: Finish panel edges using manufacturer's proprietary "Start and Edge Trim" specified herein.

3.5 FIELD QUALITY CONTROL

.1 Manufacturer’s Field Services: Provide manufacturer’s field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer’s instructions.

3.6 CLEANING

.1 Clean wall panels with manufacturer’s recommended diluted soap/detergent solution or anti-static solution to reduce buildup of static. Do not use materials containing abrasives or solvents.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* painting including but not limited to following:

.1 Painting of all interior exposed elements noted on Room Finish Schedule and exterior exposed elements noted on *Drawings*. Do not paint excluded components indicated herein. Where an item or surface is not specifically mentioned on Room Finish Schedules or on *Drawings*, Provide same finish as similar adjacent materials or surfaces.

.2 Work Excluded:

.1 Do not paint pre-finished metal siding, fascia and soffit, coping cap flashing and similar components. Refer to dedicated trade Sections for special finishes specified therein and their effects on your trade.

.2 Do not paint chrome, stainless steel, vinyl, plastic laminate and aluminum surfaces throughout unless specified otherwise.

.3 Do not paint internal surfaces of steel tanks and stacks.

.4 Do not paint sprayed fire-resistant materials.

.5 Do not paint equipment furnished completely prime and finish painted by manufacturer unless required to have field painting over factory finish to have one common corporate colour as identified in finish schedule.

.6 Do not paint over ULC, FM or other code required labels or equipment identification plates.

.3 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Exposed: This refers to items visible in completed Work. In case of closets, cabinets and drawers, it includes their interiors.

.3 Surface Preparation: This refers to means of cleaning or treating of surface to be painted to ensure best possible bond between surface and painting applied. Surface preparation methods include but are not limited to:

.1 Ensure preparation and workmanship conforms to MPI Painting Manual requirements
.2 Removal of surface contaminants that will affect performance of painting including but not limited to: oil, grease, salts, dust, dirt, rust, rust scale, mill scale, and old coatings where applicable.
.3 Removal of surface imperfections including without limitations: weld spatter, sharp edges, burrs, silvers, laminations, pits, porosities and crevices.
.4 Preparation of surfaces to Provide anchor profile or surface profile to improve mechanical bonding of coating to prepared surface by increasing surface area.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.1 Submit copy of Master Painter's Institute "Architectural Painting Specification Manual", (MPI) latest edition on site during the performance of painting work.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Proposed Materials: Submit in writing list of proposed materials prepared by paint manufacturer for approval, at least 60 Days before materials are required. Ensure list bears manufacturer's official certification that materials listed meet or exceed requirements specified herein.

.4 Qualification Data: Submit qualification data for independent paint inspection and testing agency retained for this *Project* illustrating agency’s personnel credentials and experience on *Projects* of similar size and scope.

.5 Progress Reports:

.1 Arrange for independent inspection and testing company’s representative to visit site at intervals during surface preparation and paint coating application to ensure proper specified surface preparation is being performed, specified Product are being used, appropriate number of coats are being applied and specified finishing procedures are being carried out. Painting inspector shall prepare job progress reports at regular intervals. Submit copy of reports to Consultant.

.2 Upon completion of work, submit written reports and Inspection Company’s confirmation that materials and application methods conform to manufacturers’ requirements.

.6 Samples: Submit following samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate in sizes indicated.

.1 Brushouts: minimum 200 mm x 250 mm (8" x 10") of each colour required at least 30 Days prior to commencement of painting.

Substrate	**Sample, Base Material**
Concrete Masonry	Face of typical unit
Gypsum Board	Face of typical unit
Metal	Steel Plate

Woodwork	Wood (Submit sample panels of stain and varnish finish on each species of wood specified, minimum 300 mm (12") square and of specified thickness.)

.7 Product List: Conform to requirements of Division 01 and submit a Schedule of Finishes listing manufacturer's Product name and colour for each paint system. Upon completion, submit records of products used. List products in relation to finish systems and include the following:

.1 Product Name, Type and Use

.2 Manufacturer’s Product Number

.3 Colour Numbers

.4 MPI Environmentally Friendly Classification System Rating

.5 VOC Level (g/L)

.6 Manufacturer’s Material Safety Data Sheets (MSDS)

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years’ experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years’ experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 *Provide* work of this Section executed by competent installers with membership in good standing in OPCA and/or PDCA having a minimum of 5 years’ experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

.3 MPI Inspection and Testing: Work of this section shall be inspected by a local MPI Accredited Quality Assurance Paint Inspection Agency or other inspection agency acceptable to *Consultant* during the course of application and at completion.

.4 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.5 Single Source Responsibility:

.1 Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.2 Provide paint and finishing materials for each procedure listed in Finish Schedule from Products of single manufacturer.

.3 Use single brand of paint chosen throughout work of this Section, except where specified otherwise.

.6 Mock-Up: At site, with Painting Inspector present, Consultant will locate testing area to establish standard of workmanship, texture, gloss and coverage.

.1 Prepare surfaces and apply treatment to galvanized components for Consultant's review. Do no painting until samples have been approved. Approved panels become standard of comparison for painting work on site.

.2 Apply 300 mm x 300 mm (12" x 12") samples of each finish on each type of surface to be coated with correct material, number of coats, colour, texture and degree of gloss required or apply full size test samples in areas designated by Consultant. Provide additional samples, if required, to obtain approval.

.3 Correct and refinish work which does not meet quality levels established by reviewed finishes at no expense to Owner. Reviewed full size sample panels may become integral part of finished work if undisturbed at time of Substantial Performance of the Work

1.6 DELIVERY, STORAGE AND HANDLING

.1 Review Product literature, Material Safety Data Sheets, related safety data, proper disposal requirements and inform trades involved in work of this Section.

.2 Deliver and store materials on site in manufacturer's sealed and labeled containers. Imprint containers with batch numbers and colour identification.

.3 Store containers of paint, thinner and other volatile materials in well ventilated places where they will not be exposed to excessive heat or direct rays of the sun. Keep tightly closed when not in use. Remove used cloths from building at the end of every working shift and when not in use. Take precautions against spontaneous combustion by drenching with water or placing in air-tight covered metal containers.

.4 Prevent fire or explosion caused by improper storage of paints, solvents, rags, and similar items. Store hazardous materials in location and in manner approved by local fire authority.

.5 Post "No Smoking" signs in areas of storage and mixing. Strictly enforce this requirement. Provide and maintain CO_2 fire extinguishers of minimum 9 kg (20 lb) capacity. Repair damage to storage area or surrounding area at no cost to Owner.

.6 Protect finished areas subject to contact during drying by posting "Wet Paint" signs and barring from traffic where necessary.

.7 Leave storage areas clean and free from evidence of occupancy.

.8 Collect waste paint by type and provide for delivery to recycling or collection facility. Recycle empty paint cans.

1.7 PROJECT CONDITIONS

.1 Paint and finish work items in clean, dust-free, properly ventilated and adequately lit areas (minimum 100 lx (9.3 ft candles).

.2 Maintain minimum interior temperature of 18 deg C (65 deg F) during application and drying of paint and maintain until building occupancy occurs.

.3 Do not undertake interior painting on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation. Do not undertake painting unless substrate is a minimum of 3 deg C (5 deg F) above the dew point and rising.

.4 Substrate Moisture Content: Perform tests with electronic moisture meter to ensure compliance with manufacturer's recommendations. Unless otherwise recommended by substrate manufacturer, maximum moisture content for following materials is as follows:

.1 Concrete and Concrete Unit Masonry: Maximum 12 - 14% for solvent coatings and as recommended by manufacturer for each water based system.

.2 Gypsum Based Board and Plaster: Maximum 12 - 14%.

.3 Wood: Maximum 15%.

.5 Temperature and Ventilation:

.1 Do not Provide paint under ambient and surface temperatures less than 15 deg C (59 deg F) in any instance for 24 hours before and during installation; and 7 Days after installation.

.2 Provide ventilation to remove odours, evaporating solvents and moisture. Maintain adequate ventilation at all times to control excessive humidity.

.3 Ensure adequate temporary ventilation is provided under Division 01 for protection of workers from toxic fumes.

1.8 WARRANTY

.1 Warrant Work of this Section for period of 2 years from Substantial Performance of the Work against defects and deficiencies in accordance with General Conditions of the Contract.

.2 Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to: material shrinkage, cracking, splitting, bubbling, blistering and delamination resulting from defective materials or poor workmanship.

1.9 MAINTENANCE

.1 *Supply* of Touch-up Paint: *Supply* to *Owner* 1-4 litre can (1-1 gal) of each different type and colour of paint used on this *Project.*

.2 Paint shall be boxed and in sealed, unopened cans in undamaged condition, with name of manufacturer, contents, type and colour clearly indicated on a label securely adhered to can. Submit cans to Owner in accordance with requirements of Division 01.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Benjamin-Moore; www.benjaminmoore.com

.2 PPG – PPG Paints - www.ppgpaints.com and Dulux Paints – www.dulux.ca

.3 Sherwin Williams; www.sherwin.com

.2 Substitution Limitations:

.1 Limit material selection to Products selected from manufacturers listed herein that comply with MPI systems indicated below and listed in "MPI Approved Products List" and indicated by code numbers referred to in the Master Painter Institute Architectural Specification Manual, latest edition. Provide listed prime and finish coat materials unless otherwise recommended in writing by the paint manufacturer for each specific substrate.

.2 Only comparable *Products* from manufacturers listed herein will be considered provided they meet the requirements of this Specification, offering functionally, aesthetically equivalent products in Consultant’s opinion and subject to Consultant’s review.

.3 Colour matching is not acceptable. Paint materials without manufacturer's label will not be allowed.

.3 Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Conform to *the Occupational Health and Safety Act, Regulation 851* and other requirements of local authorities having jurisdiction for storage, mixing, application and disposal of paint and related waste materials.

.2 For temporary scaffolding, ladders and other construction accessories, conform to *the Occupational Health and Safety Act,, Regulation 851*, and other requirements of authorities having jurisdiction, as amended.

.3 Fire Hazard Classification: As determined by ULC testing in accordance with ASTM E84 shall not exceed following:

.1 Flame Spread: 0.
.2 Fuel Contributed: 15.
.3 Smoke Developed: 10.

.4 *Provide* coatings from specified MPI designations which are in accordance with Canadian Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations.

.5 Comply with toxic trace limitations stipulated by authorities having jurisdiction in accordance with requirements of CAN/CGSB-1.500.

.2 Design and Performance Requirements:

.1 Acceptable materials, workmanship and all items affecting the Work of this Section are to be in accordance with the Master Painter's Institute "Architectural Painting Specification Manual", (MPI) latest edition, and "Maintenance and Repainting Specification Manual", latest edition. Painting work to be in accordance with MPI Premium Grade finish requirements.

.2 Scrubbability (Abrasion Resistance). Using a shim, the product shall demonstrate 400 scrub cycles before failure per ASTM D2486 Standard Test Method for Scrub Resistance of Interior Latex Flat Wall Paints.

.3 Washability (Stain Removal). The product shall demonstrate the following minimum requirements for stain removal as determined by ASTM 4828 Mechanical Method, Standard Test Method for Practical Washability of Organic Coatings.

.1 Flat Topcoat - 5 minimum rating
.2 Non-Flat Topcoat - 7 minimum rating.

.4 Deep or Bright Colours: Apply a minimum of four coats of paint where deep or bright colors are used to achieve satisfactory results.

.5 Infection prevention and control shall be a priority in selection of finishes for all and user areas Provide paint and finishing materials of highest grade, top of line quality of manufacturer. Ensure finishes in areas where water is anticipated as part of cleaning procedures are not affected and damaged.

.6 Painting materials shall be selected in accordance with CSA Z317.13-12 Section 5 Construction Materials. Appearance of finishes and colours shall create and promote a natural healing environment, prevent glare, and minimize artificial lighting requirements

.7 Provide primers in recommended dry film thicknesses per coat (DFT/coat).

.8 Only materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, etc.) listed in the MPI Approved Product List are acceptable for use on this Project.

.9 Provide other materials such as linseed oil, shellac, thinners, solvents, etc. of the highest quality Product of an MPI listed manufacturer and compatible with paint materials being used as required.

.10 Provide paint materials with good flowing and brushing properties and dry or cure free of blemishes, sags, air entrapment, and other similar effects.

.11 Where required, ensure paints and coatings meet flame spread and smoke developed ratings designated by local Code requirements and authorities having jurisdiction.

.12 Paint applied on materials which from time to time will become hot, such as convector covers and similar items, to be approved by paint manufacturer for particular condition.

.13 Paint materials will be rated under Environmental Notation System (ENS) with acceptable VOC ranges as listed in the MPI Approved Product List under “E” ranges. Use only materials having a minimum MPI "Environmentally Friendly “E2” or "E3" rating based on VOC (EPA Method 24) content levels

.14 As far as practical, factory mix paint for immediate application without thinning or alteration at site. Do not alter or thin any paint without manufacturer’s written approval.

.3 Consultant reserves right to refuse paint or finishing material if in Consultant’s opinion materials are not suitable or adequate for proposed use.

2.3 MATERIALS

.1 Topcoat and Intermediate Coat Thickness:

.1 Latex & Acrylics (Interior): 0.03 mm (1.2 mils) DFT/coat.

.2 Epoxies (Interior): 0.076 mm (3 mils) DFT/coat.

.3 Urethanes (Interior and Exterior): 0.076 mm (3 mils) DFT/coat.

.2 Gloss and Sheen Ratings: Gloss terms to have following values in accordance with ASTM D523 based on MPI recommended gloss reflectance guidelines:

Gloss Term	Gloss Level	Gloss Value
Flat or Matte	G1	0 to 5 units at 60 degrees and max 10 units at 85 degrees
Velvet	G2	0 to 10 units at 60 degrees and max 10 to 35 units at 85 degrees
Eggshell	G3	5 to 25 units at 60 degrees and 10 to 35 units

		at 85 degrees
Satin	G4	20 to 35 units at 60 degrees and min 35 units at 85 degrees
Semi-Gloss	G5	35 to 70 units at 60 degrees
Gloss	G6	70 to 85 units at 60 degrees

.3 Gloss Values:

.1 As later selected by Consultant:

.1 Walls: Satin or Eggshell
.2 Floors: Semi-gloss
.3 Trim and doors: Semi-gloss
.4 Ceilings: Flat

.4 Colours: Consultant will select colours at a later date. Refer to Interior Design Finish Schedule.

.1 Colours of Latex Paint (PT):

.1 Maximum of 15 colours, of which no more than 6 colours will be dark accent colours. No more than 4 colours will be used per room for walls and ceilings, with a different colour for painted doors and frames. Deep tint accent colours may be used on doors and similar panels scheduled for painting.
.2 Reveals, coves and bulkheads and valances may have colour different than main colour in room.
.3 Final colours selected will not necessarily be colours found on standard colour charts of manufacturer whose Products have been accepted for use.

.2 Colour of Epoxy Paint (PT-E): Consultant will select maximum 10 colours for epoxy paint from manufacturer's standard colour range.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Verification of Surface Conditions:

.1 Do work only when surfaces and conditions are satisfactory for production of quality work. Report to *Consultant* in writing any surfaces which are found to be unsatisfactory. Commencement of work implies acceptance of substrate surfaces.

.2 Ensure temperature of surfaces to be finished is between 10 deg C and 20 deg C (50 deg F and 68 deg F) and surfaces are dry and free of dirt, grease or other contaminants that may affect applied finish.

.3 Verify moisture content of surfaces with electronic moisture metre. Do not proceed without written directions if moisture reading is higher than 12 - 15%.

.4 Conform to manufacturer's requirements and those listed below for following substrates:

.1 Steel substrates: Do not apply coatings over moisture or when surface temperature is not at least 3 deg C (5 deg F) above dew point and rising.
.2 Wood substrates: Do not stain or paint if moisture reading is higher than 12%. Inspect work to ensure surfaces are smooth, free from machine marks and that nailheads have been countersunk.
.3 Cast-in-place concrete substrates: Allow to cure for 60 to 90 Days before proceeding with priming.
.4 Concrete: Inspect and accept or reject filled-in surface blow holes.
.5 New masonry substrates: Allow to cure for 30 to 90 Days. Ensure moisture content is below 12% and test for alkalinity and neutralize (pH 6.5 - 7.5) before proceeding with priming.
.6 Gypsum board substrates: Inspect to ensure joints are completely filled and sanded smooth. Inspect surfaces for following defects and ensure corrective measures have been taken prior to commencing painting work:

.1 "nail popping".
.2 screw heads not recessed and taped.
.3 breaks in surface or other imperfections.

3.2 PREPARATION

.1 Verify each substrate is dry and not frozen and free from tool and sandpaper marks, dust, rust, insects, grease and other foreign matter liable to impair finished work.

.2 Prepare defective surfaces to obtain a satisfactory substrate and in accordance with paint manufacturer's instructions.

.3 Prior to painting, sweep areas dust-free.

.4 Clean soiled surfaces to be painted.

.5 Protection:

.1 *Provide* scaffolding, staging, platforms and ladders, as required for execution of work. Erect scaffolding to avoid interference with work of other trades. Comply with Occupational Health and Safety Act and other authorities having jurisdication.

.2 *Provide* drop cloths or adequate plastic sheets to protect floors in areas assigned for storage and mixing of paints.

.3 Protect work of other trades against paint splattering and *Make Good* at own expense any such damage.

.4 Remove finish hardware, electrical switch and outlet covers, receptacle plates, fittings and fastenings, to protect from paint splatter. Mask items not removable. Use sufficient drop cloths and protective coverings for full protection of floors, furnishings, mechanical, electrical and special equipment, all other components of building which do not require painting or to be removed, from paint spotting and other soiling. Re-Install items when paint is dry. Clean any components that are paint spotted or soiled.

.5 Keep waste rags in covered metal drums containing water and remove from building at end of each *Day*.

.6 Prohibit traffic, where possible, from areas where painting is being carried out and until paint is cured. Post "wet paint" or other warning signage during and on completion of work. *Provide* also warning signs at all points of entry to areas where painting is applied.

.7 When handling solvent coating materials, wear approved vapour/particulate respirator as protection from vapours. Dust respirators do not *Provide* protection from vapours.

.6 Surface Preparation:

.1 Conform to requirements of as per MPI RSP 1 Hand Tool Cleaning or MPI RSP 4 Power Tool Cleaning or SSPC SP1, 2 or 3 as applicable.

.2 Remove dust, grease, rust and extraneous matter from surfaces (except rust occurring on items specified to be primed under other Sections shall be removed and work reprimed under those Sections). Vacuum (fibre acoustic tile and) insulation covering surfaces. Vacuum clean floors before painting; wipe clean adjacent surfaces and surfaces to be painted before work is commenced to prevent dust and debris damage to wet paint.

.3 Existing Ceramic Tiles: Remove dust, grease, rust and extraneous matter from surfaces. Repair all cracks, chips and broken areas with epoxy filler. Take extra care to clean surfaces around drain. Sand to roughen and dull any gloss on surface with sandpaper or sanding pads or XIM-Etch. Conform to paint manufacturer's recommendations for surface preparation of existing tile surfaces. Refer to detailed procedures on data sheet.

.4 Remove mild mildew growth by scrubbing affected area with solution of tri-sodium-phosphate (TSP) (150 g) and/or household bleach (125 g) in 3.5 L water. Rinse well with clean water and allow to dry. If condition is serious then notify Consultant and installed work shall be considered defective and shall be removed at Contractor's expense. Contractor shall be responsible to retain a qualified and experienced bio-contamination investigator acceptable to Consultant to conduct at its expense sampling and laboratory analysis and other required assessment steps to determine whether or not materials are impacted by mould amplification and follow up recommended contamination management method.

.5 As a minimum requirement conform to New York City Department of Health Bureau of Environmental & Occupational Disease Epidemiology, " Guidelines on Assessment and Remediation of Fungi in Indoor Environments" and appropriate Levels of requirements for mould removal" as amended.

.6 Be responsible for surface preparation to suit surface condition and conform to level of cleaning based on SSPC or MPI recommended metal cleaning procedures most commonly used to suit site conditions. Take measure to change rags frequently to prevent spread of contaminants. Do final water cleaning prior to water based paint applications.

.7 Ferrous Metal: Clean to SSPC-SP1/2/3 described herein, to suit site conditions. Remove loose rust and prime bare metal with rust inhibitive steel primer. Touch-up damaged shop applied primer using compatible *Product*. *Provide* full coat primer only if damage is extensive.

.8 Structural Steel/Miscellaneous Steel (previously painted and exposed by alterations work): Remove oil, grease, dirt, rust scale, loose mill scale, loose paint or coating by brush-off blast cleaning to SSPC-SP7 or to SSPC-WJ4 LPWC (Low Pressure Water Cleaning with pressure < 5000PSI)

.9 Metal Stacks, Breeching, Piping: Blast clean to 0.037 mm to 0.050 mm (1.5 - 2 mil) profile using grit abrasive to SSPC-SP6.

.10 Decorative Metals: Blast clean removing minimum 0.037 mm to 0.050 mm (1.5 - 2 mil)scale, rust and other foreign matter from metal surface using grit abrasive to SSPC-SP6.

.11 Hot Dipped Galvanized Steel (Unweathered): Allow to weather minimum of 26 weeks and clean to SSPC-SP16. Remove silicates or similar surface treatments or any deposits of white rust by sanding or similar abrasive methods (bronze wool). Use of acetic acid to prepare galvanized surfaces is not acceptable. Clean chromate passivated galvanized

metal surface contamination by washing with appropriate chemical solution compatible with finish specified such as MPI #25.

.12 Galvanized Steel (Weathered): Remove dust, dirt, grease, oxides and other foreign material and clean to SSPC-SP16 specified herein prior to coating.

.13 Galvanized Steel (Pre-Treated)(Non-Crystal Appearance): Follow manufacturer's recommendations for preparation, priming and coating of pre-treated galvanized steel.

.14 Woodwork:

.1 Verify and determine wood species, grain direction and structure, properties of finish, application method and exposure to elements. Check moisture content to avoid movement of wood caused by expansion and contraction due to changes in moisture content. Verify grain cut as it may interfere with adhesion of paint.

.2 Obtain inspection of glue laminated beams by assigned painting inspector to ensure shop sealer has been applied. Where non specified shop sealer has been applied to beams or columns, remove and refinish in accordance with manufacturer's specification.

.3 Apply wood finishing Product in following order and as needed for specific appearance and application specified herein.

.1 Sanding sealer: to control penetration of subsequent coats to create more uniform finish.

.2 Stain: to colour wood and highlight grain for final finish.

.3 Filler: to fill pores of wood and control penetration of subsequent coats.Apply filler across grain forcing it into pores followed with rubbing and sanding when dried. For staining requirements mix stain with filler before applying for uniform finish. Finish coats to Provide protection to wood.

.4 Woodwork for Opaque Coating:

.1 Seal knots and sapwood in surfaces to receive paint with alcohol-based primer-sealer. Seal plastic laminate wood door edges and architectural woodwork door edges as indicated on Drawings.

.2 Sand smooth rough surfaces of woodwork to be finished using 150 grit paper. Sand in direction of grain.

.3 Clean surfaces free of dust before applying first coat using brush, compressed air or tack rags. Fill nail holes, splits and scratches with non-shrinking filler after first coat is dry.

.4 Remove salt deposits appearing on wood surfaces treated with fire retarder.

.5 Plywood surfaces: Remove dirt and debris. Fill screw and nail holes or minor imperfections with recommended filler and sand properly to receive finish coating. Prime plywood requiring stained or painted finish with top quality alkyd primer. Use only penetrating quality stain over plywood.

.5 Woodwork for Clear Finish or Stain:

.1 Sand smooth woodwork to be finished using 150 grit paper followed by second sanding using 220 grit paper and clean surfaces free of dust using brush, compressed air or tack rags before applying first coat.

.2 Abrade surfaces with stiff brush to remove loose fibers and splinters. Fill nail holes, splits and scratches with non-shrinking filler tinted to match local grain condition after first coat is dry. Sand lightly between coats with No. 220 sandpaper and remove dust.

.3 Remove salt deposits appearing on wood surfaces treated with fire retarder.

.4 Obtain inspection of glue laminated beams by assigned painting inspector to ensure shop sealer has been applied. Where non- specified shop sealer has been applied to beams or columns, remove and refinish in accordance with manufacturer's specification.

.15 Plastic (PVC): Solvent clean to SSPC-SP1. Sand lightly with No. 120 sandpaper and remove dust.

.16 Previously Finished Surfaces:

.1 Clean existing interior and exterior surfaces to be repainted or varnished to provide bond. Remove rust, scale, oil, grease, mildew, chemicals and other foreign matter. Remove loose paint and fill flush with suitable patching material.
.2 Clean off bubbled, cracked, peeling or otherwise defective paint by stripping with suitable environmental strippers or by burning. Do not burn off paints suspected of having lead content.
.3 Treat residue from stripping as Hazardous Waste. Flatten gloss paint and varnish with sandpaper and wipe off dust.
.4 If previous coatings have failed so as to affect proper performance or appearance of coatings to be applied, remove previous coatings completely and prepare substrates properly and refinish as specified for new work.
.5 Leave entire surface suitable to receive designated finishes and in accordance with finish manufacturer's instructions.

.17 Concrete Surfaces:

.1 Verify moisture content is less than 12% before proceeding with painting. If concrete is less than 26 weeks old or has been previously painted, clean surface and etch with muriatic acid with extenders.
.2 Conform to printed instructions for handling of acidic Products and hazardous substances use following without limitations: approved gloves, aprons, boots and eye protection in accordance with the Occupational Health and Safety Act.
.3 Do not allow muriatic acid to come in contact with steel or electronic equipment. Rinse out etching compound with clean water and tri-sodium-phosphate (TSP) to neutralize acidity of surface (pH 6.5 - 7.5). Rinse out with clean water 2 to 3 times and allow to dry. Ensure Product residue is removed prior to painting.
.4 Concrete Floors: Prepare in accordance with paint manufacturer’s recommendations. Thoroughly rinse floor with clean water. Where hardeners or other chemical curing chemicals have been used, ensure floors are dry prior to finishing.
.5 Concrete Vertical Surfaces:

.1 Use sand blasting, high pressure water blasting, high pressure water blasting with abrasives, vacuum blasting with abrasives, needle guns or power grinders equipped with suitable grinding stone to remove concrete, loose mortar, fins, projections and surface contaminants.
.2 Vacuum or blow down and remove dust and loose particles from surface. Fill large cracks in consultation with design engineer using either polyester, epoxy or acrylic resin, block filler or cement sand mixture in accordance with design engineer’s written instructions. Fill only flush to surface and allow to set.
.3 Concrete Block Masonry: Fill voids and cracks in masonry block wall to Provide uniform surface for subsequent coats.

.18 Gypsum Board:

.1 Examine and ensure gypsum board surfaces are without defects or deficiencies and suitable to receive painting applications. Commencement implies acceptance of

gypsum board work. Examine surfaces for imperfections showing through and fill small nicks or holes with patching compound and sand smooth.

.2 Clean surfaces dry, free of dust, dirt, powdery residue, grease, oil, wax or any other contaminants. Sand and dust as necessary prior to painting. Examine surfaces after priming for imperfections showing through.

.3 Ensure glass mat reinforced gypsum is prepared to receive high solid primer with minimum 40% volume solids. Ensure primer is applied with recommended roller to achieve film thickness in one coat or two coats.

.19 Plaster Work:

.1 Existing Plaster: Clean dry, free from dust, dirt, powdery residue, grease, oil, wax or any other contaminant accumulated since application. Do not sand plaster before painting.

.2 New Plaster: Examine and ensure plastered surfaces are without defects or deficiencies and suit able to receive painting applications. Commencement implies acceptance of plastered work. Allow new plaster work to cure for a minimum of 1 month prior to painting. Check moisture content of plaster work with electronic moisture meter, (less than 12%.) Ensure pH value is within 7 to 13. Patch cracks and crevices on plastered surfaces. After priming inspect surface again and repair any defects and spot prime before proceeding.

.3 Textured Spray: Examine and ensure textured surfaces are without defects or deficiencies and suit able to receive painting applications. Commencement implies acceptance of textured work. Remove dirt or other contaminant using a soft brush, broom or by vacuuming without damaging textured finish effect. Take extreme care when repairing textured finish taking into consideration its sensitivity to moisture and to maintain its finish integrity. Repair and patch damaged structure and allow to cure completely before proceeding paint work. Prime watermark after texture finish is repaired.

3.3 MIXING

.1 Mix and prepare paint materials in accordance with manufacturer’s directions for particular material and coat to be applied. If reducing is required, do so in accordance with recommendations of manufacturer for particular material and coat.

.2 Mix primer-sealer with a certain amount of colour coat in proportions recommended by manufacturer of material actually used. Tint undercoats and each finish coat with correct type colours, for identification of each succeeding coat.

.3 Clean containers used for storage, mixing and application of materials free of foreign materials and residue.

3.4 APPLICATION

.1 Paint interior and exterior exposed elements as noted on Room Finish Schedule and as required to complete design requirements. Do not paint excluded components indicated herein. Where an item or surface is not specifically mentioned in Schedules, Provide same finish as similar adjacent materials or surfaces. If color or finish is not designated, Consultant will select from standard colors or finishes available.

.2 *Provide* finish uniform in sheen, colour and texture, free from streaks, shiners and brush or roller marks or other defects.

.3 Apply materials in accordance with manufacturer's directions and *Specifications* paying particular attention to appropriate time frame after cleaning when environmental conditions

encourage flash-rusting, rusting, contamination or manufacturer's paint *Specifications* require earlier applications. Apply subsequent coatings in accordance with manufacturer's recommended recoat "windows". Do not use adulterants. Do any reduction of coating's viscosity in accordance with manufacturer's directions.

.4 Use up paints within the period of shelf life recommended by paint manufacturer.

.5 Successive coatings to be harmonious chemical compositions and materials of same manufacturer.

.6 Thoroughly mix materials before application. Apply materials evenly, under adequate illumination, free from sags, runs and other defects. Do cutting-in neatly and ensure paint is applied wet edge to wet edge.

.7 Sand and dust between each coat to *Provide* an anchor for next coat and to remove defects visible from a distance up to 1000 mm (39").

.8 Ensure each coat is dry and hard as per manufacturers' recommendations for recoats before a following coat is applied.

.9 Continue through paint finish behind wall-mounted items (e.g. markerboards and tack boards).

.10 Finishes and number of coats specified hereinafter in Finish Schedule are intended as minimum requirements guide only. Refer to manufacturer's recommendations for exact instructions for thickness of coating to obtain optimum coverage and appearance. Some materials and colours may require additional coats and deeper colours may require use of manufacturers' special tinted primers.

.11 Apply additional paint coats, beyond number of coats specified for any surface, to completely cover and hide substrate and to produce a solid, uniform appearance.

.12 Allow each coat of paint to cure and become dry and hard before application of succeeding coats (unless manufacturer's directions require otherwise).

.13 Before finishing paint coats are applied, inspect and touch-up shop coats of primers previously applied by other trades or fabricators.

.14 *Provide* paint coating thicknesses indicated, measured as minimum dry film thicknesses.

.15 Obtain colour chart giving colour schemes and gloss value for various areas from *Consultant*. Colour chart shall give final selection of colours and surface textures of finishes and whether finishes are transparent (natural) or opaque (paint).

.16 Spraying is not allowed without written permission.

.17 Paint entire plane of areas exhibiting incomplete or unsatisfactory coverage and of areas which have been cut and patched. Patched appearance is not acceptable.

.18 Finish paint factory primed surfaces. Do not paint baked paint surface, chrome plated, stainless steel, aluminum or other surfaces finished with final finish in factory.

.19 Advise *Consultant* when each applied paint coat can be inspected. Do not recoat without inspection. Tint each coat slightly to differentiate between applied coats.

.20 Apply final coats on smooth surfaces by roller or brush. Hand brush wood trim surfaces.

.21 Sand smooth paint and varnish undercoats prior to recoating.

.22 Apply primer coat soon after surface preparation is completed to prevent contamination of substrate.

.23 Woodwork:

.1 Prime woodwork designated for painting as soon as possible after delivery to site and before installation. Prime cut surfaces, whether exposed or not (i.e. all 6 edges of wood

doors) before installation. Prime cut surfaces of woodwork to receive transparent finish with 1 coat of transparent finish reduced 25%.

.2 Fill open grain woods with filler tinted to match wood and work well into grain. Wipe excess from surface before filler sets.

.3 Apply primer-sealer coats by brush or roller. Permit to dry in accordance with manufacturer's recommendations before applying succeeding coats. Touch up suction spots and sand between coats with No. 120 sandpaper.

.4 Apply final coats on smooth surfaces by roller or brush. Hand brush wood trim surfaces.

.24 Ferrous Metal Surfaces: Apply primer coat to unprimed ferrous metal surfaces. Where sandblast preparation is specified, apply specified primer immediately after blast cleaning.

3.5 EXISTING SPACES

.1 Refinish existing surfaces of rooms or areas which have been damaged, altered or otherwise affected by work. Also finish "new" work occurring thereon unless otherwise specified. Use same procedure as for new work but primer (or filler, stain and sealer in case of varnish finish) may be omitted. Prepare existing surfaces as specified herein. Ensure finish matches previous finish.

.2 Paint or repaint rooms or areas where noted on Room Finish Schedule and/or as indicated on *Drawings*.

.3 Repaint surfaces entirely between changes of plane.

.4 Extend painting to a suitable boundary to avoid a "patched" effect. Sand, wire-brush, or scrape such existing finished surfaces to remove loose paint and to reduce gloss. Also clean existing films of dirt, grease or wax. If metallic surfaces are rusted, remove loose scale to *Provide* a firm surface. Patch and sand cracks and other imperfections.

.5 *Provide* paint to interior existing spaces effected by alterations [and shelled-in spaces] in accordance with following:

.1 Paint walls to the nearest inside and outside corners for the full wall height.

.2 Paint columns floor to ceiling.

.3 Paint full ceilings to the nearest wall or bulkhead.

.4 Unless indicated otherwise match the existing colour.

.5 Where Room Finish Schedule indicates existing and/or new wall finishes to be painted, existing surfaces such as, existing door and frames, mechanical *Supply* and return air grilles (both on walls and ceilings), access doors and electrical panels which has been previously painted shall be painted for a complete finish room. If the Room Finish Schedule indicates "-" it denotes the entire room need not be painted, only the patched area to be painted.

.6 Example Locations:

.1 pressed steel frames.
.2 hollow metal doors.
.3 access doors and frames.
.4 hose cabinets.
.5 miscellaneous exposed interior metal work.

3.6 MECHANICAL AND ELECTRICAL SERVICES

.1 Read Division 21, 22, 23 and Division 26 for their requirements and further instruction on painting Mechanical and Electrical work and perform such work under supervision of respective Mechanical and Electrical Divisions.

.2 Finish paint primed mechanical equipment: heaters, convectors, radiators, wall fin perimeter induction units, fan coil units and similar items.

.3 Prime and paint exposed, unfinished electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items.

.4 Keep sprinkler heads free of paint.

.5 Take steps to protect gauges, identification plates and similar items from being painted over or paint splattered.

.6 Remove grilles, covers, access panels for mechanical and electrical systems from installed location and paint separately, if these items are not factory finished

.7 Paint work to match surfaces they are seen against unless directed otherwise.

.8 Paint interior surfaces of air ducts visible through grilles and louvres, with 1 coat of flat black metal paint to limit of sight line.

3.7 SITE QUALITY CONTROL

.1 Field Tests and Inspections:

.1 *Owner* may engage an independent paint testing and inspection agency acceptable to the Consultant and to the local MPI Accredited Quality Assurance Association to inspect all aspects of the work from start to completion.

.2 Provide and coordinate site inspection service by in advance of work commencing and during progress of work to ensure correct use and application of each specified material. Give at least 2 weeks' notice of starting work and allow inspector free access.

.3 Notify *Consultant* 48 hours in advance of date and time of inspection. Painting will be considered defective if it does not pass tests and inspections.

.4 Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.8 CLEANING

.1 Clean adjacent surfaces which have been painted, soiled or otherwise marred.

.2 Remove masking and other protection provided under this Section.

.3 During work of this Section cover finished floors, walls, ceilings and other work in vicinity and protect from paint and damage.

.4 Painting work will not be considered complete until spatters, drippings, smears and overspray have been cleaned and removed to satisfaction of *Consultant*.

.5 *Make Good* any damage to structure building surfaces or furnishings resulting from painting operations at no cost to *Owner*.

.6 Disposal of Paint Waste:

.1 Be responsible for removal and disposal of material and waste generated by this Section.

.2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous *Products* and are subject to regulations for disposal. Obtain

information on these controls from applicable Provincial government departments having jurisdiction.

.3 Separate and recycle waste materials. Where paint recycling is available, collect waste paint by type and *Provide* for delivery to recycling or collection facility. Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.5 To reduce amount of contaminants entering waterways, sanitary/storm drain systems or into the ground adhere to following procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case clean equipment using free draining water.
.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
.5 Dry empty paint cans prior to disposal or recycling (where available).
.6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

.6 Set aside and protect surplus and uncontaminated finish materials not required by *Owner* and deliver or arrange collection for verifiable re-use or re-manufacturing.

3.9 EXTERIOR FINISH SCHEDULE

.1 Substrate: Exterior Asphalt Pavement Marking – Latex Traffic Marking Paint (EXT 2.1A):

.1 Primer: As recommended by manufacturer.

.2 Finish Coats: Apply water-based traffic paint (MPI #97) coats in strict accordance with manufacturer's instructions:

.1 Fast Drying Type:

.1 "Hotline® Fast Dry Traffic Paint" by Sherwin Williams
.2 "Insl-X Traffic Paint TP-XXX" by Benjamin Moore
.3 Traffic Solutions EF Series Fast Dry Waterborne Traffic Paint – PPG Paints and Dulux Paint by PPG.

OR

.2 Normal Drying Type:

.1 "Setfast® Traffic Marking Paint" by Sherwin Williams
.2 "Traffic Solutions EF Series Standard Waterborne Traffic Paint – PPG Paint and Dulux Paint by PPG.
.3 "Waterborne Marking Paints" by Benjamin Moore

.2 Substrate: Concrete Vertical Surfaces (including undersides of balconies, soffits, etc.) - Latex Finish (EXT 3.1A as amended):

.1 Regular Type:

.1 Primer: 1 coat alkali resistant, WB primer (MPI #3):

.1 "Loxon Concrete & Masonry Primer, <100 g/L" by Sherwin Williams
.2 " Seal Grip Universal Acrylic Prime (17-921XIC) " or “Weatherguard Exterior Acrylic Primer (1535)” by by PPG/ Dulux Paint
.3 Approved equivalent by Benjamin Moore

.2 Finish Coats: 2 coats exterior latex coating (MPI #10)

.1 "A-100 Exterior Latex, <50 g/L" by Sherwin Williams
.2 “Sun Proof Exterior Latex (72-110XIC)” or “Weatherguard Exteior Acrylic (1530)” by PPG/ Dulux Paint
.3 "K447 Ultra Spec Exterior Flat Finish - Zero VOC" by Benjamin Moore

OR

.2 High Build Type:

.1 Primer: 1 coat alkali resistant, WB primer (MPI #3):

.1 "Loxon Concrete & Masonry Primer, <100 g/L" by Sherwin Williams
.2 Approved equivalent by Benjamin Moore
.3 “Seal Grip Universal Acrylic Prime (17-921XIC) or Weatherguard Exterior Acrylic Primer (1535)” by PPG/ Dulux Paint.

.2 Finish Coats: 2 coats exterior latex coating (MPI #10)

.1 "Loxon XP High Build Coating" by Sherwin Williams
.2 " Regal Select High Build Flat K400" by Benjamin Moore
.3 “Perma-Create High-Build Acrylic (4-22XIC) by PPG/ Dulux Paint.

.3 Substrate: Concrete Vertical Surfaces (including undersides of balconies, soffits, etc.) – Textured Latex Aggregate Finish (EXT 3.1N as amended):

.1 Primer: As recommended by manufacturer.

.2 Finish Coats: Apply textured latex aggregate paint (MPI #41 and #42) coats in strict accordance with manufacturer’s instructions:

.1 "UltraCrete Textured Masonry Topcoat, <50 g/L" by Sherwin Williams.
.2 "Perma-Crete Acrylic Texture Coating (4-50C or 4-60C) by PPG/ Dulux Paint.

.4 Substrate: Concrete Block Masonry - Latex Finish (EXT 4.2A as amended):

.1 Regular Type:

.1 Primer: 1 coat exterior block filler (MPI #4):

.1 "Loxon Block Surfacer, <100 g/L" by Sherwin Williams
.2 "Speedhide Hi Fill Acrylic Block Filler (6-15XIC)" or Glidden PRO Latex Blockfiller (20056A) by PPG/ Dulux Paint
.3 “Ultra Spec Masonry Block Filler K571” by Benjamin Moore

.2 Finish Coats: 2 coats exterior latex coating (MPI #10, #15)

.1 "A-100 Exterior Latex, <50 g/L" by Sherwin Williams
.2 “Sun Proof Exterior Latex (72-110XIC or 76-110XIC) or Weatherguard Exteior Acrylic (1530 or 1540)” By PPG/ Dulux Paint
.1 “Ultra Spec Exterior Flat Finish K447” by Benjamin Moore

OR

.2 High Build Type:

.1 Primer: 1 coat exterior block filler (MPI #4):

.1 "Loxon Block Surfacer, <100 g/L" by Sherwin Williams
.2 ""Ultra Spec Hi-Build Block Filler K571 " by Benjamin Moore
.3 Speedhide Hi Fill Acrylic Block Filler (6-15XIC)" or Glidden PRO Latex Blockfiller (20056A) by PPG/ Dulux Paint

.2 Finish Coats: 2 coats exterior latex coating (MPI #10)

.1 "Loxon XP High Build Coating" by Sherwin Williams
.2 "" Regal Select High Build Flat K400" by Benjamin Moore
.3 “Perma-Create High-Build Acrylic (4-22XIC) by PPG/ Dulux Paint

.5 Substrate: Structural Steel and Miscellaneous Ferrous Metals – WB Light Industrial Coating (EXT 5.1M as amended):

.1 Primer: 1 coat rust inhibitive primer (MPI #107):

.1 "Pro Industrial Pro-Cryl Universal Metal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Primer 90-19XX Series" PPG Paint and Dulux Paint by PPG.
.3 "KP04 Super Spec High Performance Acrylic Metal Primer" by Benjamin Moore

.2 Finish Coats: 2 coats WB light industrial coating (MPI #163)

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Enamel 90-16XX Series" – PPG Paint and Dulux by PPG.
.3 “Ultra Spec HP D.T.M. Acrylic Semi-Gloss FP29”by Benjamin Moore

.6 Substrate: Galvanized Metals

.1 Repair of Galvanized Metals: Touch-up damaged surfaces with zinc-rich coating.

.1 Primer: 1 coat organic zinc-rich epoxy primer:

.1 "Zinc Clad 5" by Sherwin Williams
.2 "Metalhide One Pac Zinc Rich Primer – PPG Paints and Dulux Paint by PPG.
.3 “Corotech Organic Zinc Rich Primer V170” by Benjamin Moore

.2 Galvanized Steel: WB Light Industrial Coating (EXT 5.3J as amended):

.1 Primer: 1 coat rust inhibitive primer (MPI #134):

.1 "Pro Industrial Pro-Cryl Universal Metal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Enamel 90-16XX Series" – PPG Paint and Dulux by PPG.
.3 “Ultra Spec HP D.T.M. Primer FP04”by Benjamin Moore

.2 Finish Coats: 2 coats WB light industrial coating (MPI #163)

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 “Pitt-Tech Plus EP DTM Acrylic Enamel 90-16XX Series" – PPG Paint and Dulux by PPG.
.3 “Ultra Spec HP D.T.M. Acrylic Semi-Gloss FP29” by Benjamin Moore

.7 Substrate: Steel (High Heat) including heat exchangers, breeching, pipes, flues, stacks etc. – Heat Resistant Enamel – Maximum 205 deg C (400 deg F) (EXT 5.2A as amended):

.1 Primer: As recommended by manufacturer.

.2 Finish Coats: Apply heat resistant enamel (MPI #21) coats in strict accordance with manufacturer’s instructions:

.1 "Heat Flex Hi Temp 500" by Sherwin Williams
.2 PPG Hi-Temp 500- PPG Paint and Dulux Paint - by PPG
.3 Approved equivalent by Benjamin Moore

.8 Substrate: Aluminum – WB Light Industrial Coating (EXT 5.4G as amended):

.1 Primer: 1 coat rust inhibitive primer (MPI #134):

.1 "Pro Industrial Pro-Cryl Universal Metal Primer, <100 g/L" by Sherwin Williams
.2 " Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series)" PPG Paint and Dulux Paint by PPG
.3 "Ultra Spec HP D.T.M. Primer FP04" by Benjamin Moore

.2 Finish Coats: 2 coats WB light industrial coating (MPI #163)

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 " Pitt-Tech Plus EP DTM Acrylic Enamel (90-16XX Series) – PPG Paint and Dulux by PPG.
.3 "Ultra Spec HP D.T.M. Acrylic Semi-Gloss FP29 (MPI 153)"by Benjamin Moore

.9 Substrate: Structural Steel and Miscellaneous Metals (Ferrous Metals, Galvanized Metals, Aluminum etc.) – Epoxy High Performance System (EXT 5.1E as amended):

.1 Primer: 1 coat rust inhibitive primer (MPI #107):

.1 "Pro Industrial Pro-Cryl Universal Metal Primer, <100 g/L" by Sherwin Williams
.2 " Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series)" PPG Paint and Dulux Paint by PPG.
.3 Ultra Spec HP D.T.M. Primer FP04" by Benjamin Moore

.2 Finish Coats: 2 coats epoxy coating (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 " Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG.
.3 "Ultra Spec HP D.T.M. Acrylic Semi-Gloss FP29 (MPI 153)" by Benjamin Moore

.10 Substrate: Wood – Opaque Latex Finish:

.1 Glue Laminated Lumber (EXT 6.1L as amended),

.1 Primer: 1 coat exterior wood latex primer (MPI #6)

.1 "Exterior Latex Wood Primer, <100 g/L" by Sherwin Williams
.2 "Seal Grip Universal Acrylic Prime (17-921XIC) – PPG Paint or Weatherguard Exterior Acrylic Primer (1535) – Dulux Paint by PPG
.3 "Fresh Start High-Hiding All-Purpose Primer K046"by Benjamin Moore

.2 Finish Coats: 2 coats exterior latex coating (MPI #10, #11, #15)

.1 "A-100 Exterior Latex, <50 g/L" by Sherwin Williams
.2 " Sun Proof Exterior Latex (72-110XIC, 76-110XIC & 78-811XIC) – PPG Paint or Weatherguard Exteior Acrylic (1530, 1540 & 1550) Dulux Paint – by PPG.
.3 "K447/K448/K449 Ultra Spec Exterior" by Benjamin Moore

.2 Dimension Lumber including but not limited to columns, beams, exposed joists, underside of decking, siding, fencing etc. (EXT 6.2M as amended)

.1 Primer: 1 coat exterior wood latex primer (MPI #6)

.1 "Exterior Latex Wood Primer, <100 g/L" by Sherwin Williams

.2 " Seal Grip Universal Acrylic Prime (17-921XIC) – PPG Paint or Weatherguard Exterior Acrylic Primer (1535) – Dulux Paint by PPG
.3 " Fresh Start High-Hiding All-Purpose Primer K046by Benjamin Moore

.2 Finish Coats: 2 coats exterior latex coating (MPI #10, #11, #15)

.1 "A-100 Exterior Latex, <50 g/L" by Sherwin Williams
.2 " Sun Proof Exterior Latex (72-110XIC, 76-110XIC & 78-811XIC) – PPG Paint or Weatherguard Exteior Acrylic (1530, 1540 & 1550) Dulux Paint – by PPG
.3 "K448 Ultra Spec Exterior" by Benjamin Moore

.3 Dressed Lumber including but not limited to doors, door and window frames, casings, battens, smooth fascias etc. (EXT 6.3L as amended)

.1 Primer: 1 coat exterior wood latex primer (MPI #6)

.1 "Exterior Latex Wood Primer, <100 g/L" by Sherwin Williams
.2 " Seal Grip Universal Acrylic Prime (17-921XIC) – PPG Paint or Weatherguard Exterior Acrylic Primer (1535) – Dulux Paint by PPG
.3 " Fresh Start High-Hiding All-Purpose Primer K046 " by Benjamin Moore

.2 Finish Coats: 2 coats exterior latex coating (MPI #10, #11, #15,)

.1 "A-100 Exterior Latex, <50 g/L" by Sherwin Williams
.2 " Sun Proof Exterior Latex (72-110XIC, 76-110XIC & 78-811XIC) – PPG Paint or Weatherguard Exteior Acrylic (1530, 1540 & 1550) Dulux Paint – by PPG
.3 "K448 Ultra Spec Exterior" by Benjamin Moore

.4 Wood Paneling including but not limited to plywood siding, fascias, soffits etc. (EXT 6.4K as amended)

.1 Primer: 1 coat exterior wood latex primer (MPI #6)

.1 "Exterior Latex Wood Primer, <100 g/L" by Sherwin Williams
.2 " Seal Grip Universal Acrylic Prime (17-921XIC) – PPG Paint or Weatherguard Exterior Acrylic Primer (1535) – Dulux Paint by PPG
.3 "K169 Super Spec Latex Exterior Primer" by Benjamin Moore

.2 Finish Coats: 2 coats exterior latex coating (MPI #10, #11, #15)

.1 "A-100 Exterior Latex, <50 g/L" by Sherwin Williams
.2 " Sun Proof Exterior Latex (72-110XIC, 76-110XIC & 78-811XIC) – PPG Paint or Weatherguard Exteior Acrylic (1530, 1540 & 1550) Dulux Paint – by PPG
.3 "K448 Ultra Spec Exterior" by Benjamin Moore

.11 Substrate: Wood – Fire-retardant Coating:

.1 Primer: As recommended by manufacturer.

.2 Finish Coats: Apply ULC approved fire-retardant (MPI #126) coats in strict accordance with manufacturer's instructions:

.1 "Flame Control" by Sherwin Williams (Not MPI #126) or approved equivalent.

.12 Substrate: Plaster/Stucco/EIFS (Walls and Soffits) – Latex (EXT 9.1J as amended)

.1 Regular Type:

.1 Primer: 1 coat exterior primer (MPI #4):

.1 "Loxon Concrete & Masonry Primer, <100 g/L" by Sherwin Williams

.2 “Seal Grip Universal Acrylic Prime (17-921XIC) – PPG Paint or Weatherguard Exterior Acrylic Primer (1535) – Dulux Paint by PPG
.3 " Ultra Spec Hi-Build Block Filler K571" by Benjamin Moore

.2 Finish Coats: 2 coats exterior latex coating (MPI #10, #11, #15)

.1 "A-100 Exterior Latex, <50 g/L" by Sherwin Williams
.2 "Sun Proof Exterior Latex (72-110XIC, 76-110XIC & 78-811XIC) – PPG Paint or Weatherguard Exteior Acrylic (1530, 1540 & 1550) Dulux Paint – by PPG
.3 "K448 Ultra Spec Exterior" by Benjamin Moore

OR

.2 High Build Type:

.1 Primer (if required): 1 coat alkali resistant, WB primer (MPI #3):

.1 "Loxon Concrete & Masonry Primer, <100 g/L" by Sherwin Williams
.2 " Ultra Spec Hi-Build Block Filler K571" by Benjamin Moore
.3 “Seal Grip Universal Acrylic Prime (17-921XIC) – PPG Paint or Weatherguard Exterior Acrylic Primer (1535) – Dulux Paint by PPG

.2 Finish Coats: 2 coats high build coat exterior latex coating (MPI #10)

.1 "Loxon XP High Build Coating" by Sherwin Williams
.2 " Regal Select High Build Flat K400" by Benjamin Moore
.3 Perma-Create High-Build Acrylic (4-22XIC) – PPG Paint and Dulux Paint by PPG

3.10 INTERIOR PAINT FINISH SCHEDULE

.1 **Standard Performance Finishes (PT) - for public areas including lobbies, corridors, waiting areas, patient rooms etc. not subject to high abuse (Refer to Room Finish Schedule for specific locations)**

.1 Substrate: Concrete Vertical Surfaces (including undersides of mezzanines and stairs etc.) - Latex (Over Alkali-resistant Primer) (INT 3.1A as amended):

.1 Primer: 1 coat alkali-resistant primer (MPI #3)

.1 "Loxon Concrete & Masonry Primer, <100 g/L" by Sherwin Williams
.2 " Seal Grip Universal Acrylic Primer (17-921XIC) – PPG Paint or Grippeer Universal Acrylic Primer (60000A) – Dulux Paint by PPG.
.3 "Ultra Spec 500 Interior Primer K534" by Benjamin Moore

.2 Top Coats: 2 coats latex Interior, Institutional Low Odor/VOC (MPI #143, MPI #144, #145)

.1 Zero VOC Latex Paint:

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 " Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG.
.3 "Ultra Spec 500 Interior Finish" by Benjamin Moore

OR

.2 Zero VOC and Silica-free Latex Paint:

.1 "Harmony Interior Latex — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "Ultra Spec 500 Interior Finish" by Benjamin Moore
.3 “Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG.

.2 Substrate: Concrete Masonry Units - Institutional Low Odour/VOC Latex Finish (INT 4.2E as amended):

.1 Primer: 1 coat latex interior block filler (MPI #4):

.1 "PrepRite Block Filler, 45 g/L" by Sherwin Williams
.2 " Speedhide Hi Fill Acrylic Block Filler (6-15XIC) " - PPG Paint or Glidden PRO Latex Blockfiller (20056A) – Dulux Paint by PPG.
.3 “Ultra Spec Masonry Block Filler K571”by Benjamin Moore

.2 Top Coats: 2 coats latex Interior, Institutional Low Odor/VOC (MPI #143, MPI #144, #145)

.1 Zero VOC Latex Paint:

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 " Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG
.3 "Ultra Spec 500 Interior Finish" by Benjamin Moore

OR

.2 Zero VOC and Silica-free Latex Paint:

.1 "Harmony Interior Latex — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "Ultra Spec 500 Interior Finish" by Benjamin Moore
.3 “Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG

.3 Substrate: Gypsum Board and Plaster Ceilings and Soffits - Institutional Low Odour/VOC Latex Finish (gypsum wallboards, textured plasters, etc.) (INT 9.2M as amended)

.1 Primer: 1 coat multi-purpose latex interior primer sealer (MPI #149)

.1 Zero VOC Latex Primer:

.1 "ProMar 200 Zero VOC Interior Latex Primer, 0 g/L" by Sherwin Williams
.2 "Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG.
.3 "Ultra Spec 500 Waterborne Interior Primer Sealer K534" by Benjamin Moore

OR

.2 Zero VOC and Silica-free Latex Primer:

.1 "Harmony Interior Latex Primer — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "Ultra Spec 500 Waterborne Interior Primer Sealer" by Benjamin Moore
.3 Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG.

.2 Top Coats: 2 coats latex Interior, Institutional Low Odor/VOC (MPI #143, MPI #144, #145)

.1 Zero VOC Latex Paint:

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG."Ultra Spec 500 Interior Finish" by Benjamin Moore

OR

.2 Zero VOC and Silica-free Latex Paint:

.1 "Harmony Interior Latex — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "Ultra Spec 500 Interior Finish" by Benjamin Moore
.3 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG

.4 Substrate: Gypsum Board Walls - Institutional Low Odour/VOC Latex Finish (gypsum and fiberglass faced wallboards, textured plasters, etc.) (INT 9.2M as amended)

.1 Primer: 1 coat multi-purpose latex interior primer sealer (MPI #149)

.1 Zero VOC Latex Primer:

.1 "ProMar 200 Zero VOC Interior Latex Primer, 0 g/L" by Sherwin Williams
.2 Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG.
.3 "K534 Ultra Spec 500 Waterborne Interior Primer Sealer"by Benjamin Moore

.2 Zero VOC and Silica-free Latex Primer:

.1 "Harmony Interior Latex Primer — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "Ultra Spec 500 Waterborne Interior Primer Sealer" by Benjamin Moore
.3 Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG.

.2 Top Coats: 2 coats latex Interior, Institutional Low Odor/VOC (MPI #143, MPI #144, #145)

.1 Zero VOC Latex Paint:

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 " Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG.
.3 "Ultra Spec 500 Interior Finish" by Benjamin Moore

.2 Zero VOC and Silica-free Latex Paint:

.1 "Harmony Interior Latex — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "Ultra Spec 500 Interior Finish" by Benjamin Moore
.3 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG

.5 Substrate: Fiberglass Mat Faced Gypsum Board Walls (Moisture resistant gypsum board, abuse resistant gypsum board, impact resistant gypsum board) (Non-MPI System)

.1 Primer: 1 coat high build surfacer (Minimum DFT: as recommended by manufacturer but not less than 10 mils)

.1 "Builders Solution, <50 g/L" by Sherwin Williams
.2 "Speedhide Maxbuild High Build Drywall Surfacer (6-4C) " - PPG Paint or X-Pert Latex High Build Primer Sealer (11020A) – Dulux Paint by PPG.

.2 Sealing Coat: As recommended by Paint manufacturer.
.3 Top Coats: 2 coats latex Interior, Institutional Low Odor/VOC (MPI #143, MPI #144, #145)

.1 Zero VOC Latex Paint:

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 "Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG
.3 "Ultra Spec 500 Interior Finish" by Benjamin Moore

OR

.2 Zero VOC and Silica-free Latex Paint:

.1 "Harmony Interior Latex — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "Ultra Spec 500 Interior Finish" by Benjamin Moore
.3 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG.

.6 Substrate: Exposed Cement Board (Non-MPI System)

.1 Primer: 100% acrylic polymer liquid priming coat "PRIMEX Liquid Coat" by Adex Architectural Coatings; www.adex.ca or approved equivalent by Dryvit; www.dryvit.com in number of coats recommended by Cement board manufacturer and Paint manufacturer.
.2 Top Coats: 100% acrylic polymer liquid top coat "PRIMEX Finish Coat" by Adex Architectural Coatings; www.adex.ca or approved equivalent by Dryvit; www.dryvit.com in number of coats recommended by Cement board manufacturer and Paint manufacturer.

.7 Substrate: Painted Wood (Doors, Frames, Trims, Rails etc.) – latex finish (INT 6.3V as amended)

.1 Primer: 1 coat multi-purpose latex interior primer sealer (MPI #39)

.1 "Multi-Purpose Latex Primer" by Sherwin Williams
.2 Seal Grip Universal Acrylic Primer (17-921XIC) – PPG Paint or Grippeer Universal Acrylic Primer (60000A) – Dulux Paint by PPG.
.3 “Fresh Start High-Hiding All-Purpose Primer K046” by Benjamin Moore

.2 Top Coats: 2 coats acrylic Interior, Institutional Low Odor/VOC (MPI #147)

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 " Pure Performance Interior Latex Zero VOC (9-500C Series)" – PPG Paint or Ultra Zero VOC Interior Latex (97800 Series) – Dulux Paint by PPG
.3 "Ultra Spec 500 Waterborne Interior Finish" by Benjamin Moore

.8 Substrate: Stained Wood (Trims, Rails etc.) – polyurethane varnish (INT 6.3E as amended)

.1 Stain: 1 coat interior wood stain (semi-transparent) (MPI #90)

.1 "Minwax Wood Finish Stain, <250 g/L" by Sherwin Williams
.2 Professional Wood Finishes Interior Fast Dry Oil Based Wood Stain (PWF150) – Dulux Paint by PPG
.3 Approved equivalent by Benjamin Moore

.2 Top Coats: 2 coats clear moisture cure polyurethane varnish (MPI #56, #57):

.1 "Minwax Waterbased Polyurethane Varnish, <275 g/L" by Sherwin Williams
.2 Professional Wood Finishes Interior Polyurethane Oil Based Varnish (PWF120 or PWF100) – Dulux Paint by PPG.

.9 Substrate: Ferrous Metals

.1 Doors, Frames, Miscellaneous Metals etc.) - Water Based Light Industrial Coating (INT 5.1B or INT 5.18 as amended)

.1 Primer: 1 coat rust inhibitive primer (MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) – PPG Paint or Dulux Paint by PPG.
.3 “Ultra Spec HP D.T.M. Primer FP04” by Benjamin Moore

.2 Top Coats: 2 coats acrylic Interior, Institutional Low Odor/VOC (MPI #147, MPI #153):

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 " Pure Performance Interior Latex Zero VOC (9-500C)" – PPG Paint or Ultra Zero VOC Interior Latex (97800 Series) – Dulux Paint by PPG
.3 " K540 Ultra Spec 500 Waterborne Interior Finish" by Benjamin Moore

.2 Handrails (INT 5.1K as amended)

.1 Primer: 1 coat rust inhibitive primer (MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) " – PPG Paint and Dulux Paint by PPG
.3 " Ultra Spec HP D.T.M. Primer FP04” by Benjamin Moore " by Benjamin Moore

.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterbased Epoxy, 0 g/L" by Sherwin Williams
.2 " Command Gloss V390 (Not MPI approved) " by Benjamin Moore
.3 Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG.

.10 Substrate: Galvanized Metal

.1 Doors, Frames, Miscellaneous Metals etc. (INT 5.3N or 5.3K as amended)

.1 Primer: 1 coat water-based galvanized primer (MPI #134)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) – PPG Paint and Dulux Paint by PPG.

.3 "Ultra Spec HP D.T.M. Primer FP04" by Benjamin Moore

.2 Top Coats: 2 coats acrylic Interior, Institutional Low Odor/VOC (MPI #147, MPI #153)

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic (90-16XX Series) – PPG Paint and Dulux Paint by PPG
.3 "K540 Ultra Spec 500 Waterborne Interior Finish" by Benjamin Moore

.2 Handrails (INT 5.1K as amended)

.1 Primer: 1 coat rust inhibitive primer (MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) – PPG Paint and Dulux Paint by PPG.
.3 "Super Spec High Performance Acrylic Metal Primer" by Benjamin Moore

.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterbased Epoxy, 0 g/L" by Sherwin Williams
.2 Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG
.3 " Command Gloss V390 (Not MPI approved)" by Benjamin Moore

.11 Substrate: Aluminum

.1 Primer: 1 coat quick dry primer (MPI #76, MPI #95, MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) – PPG Paint and Dulux Paint by PPG.
.3 "KP04 Super Spec High Performance Acrylic Metal Primer" by Benjamin Moore

.2 Top Coats: 2 coats acrylic Interior, Institutional Low Odor/VOC (MPI #147, MPI #153)

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic (90-16XX Series) - PPG Paint and Dulux Paint by PPG
.3 "K540 Ultra Spec 500 Waterborne Interior Finish" by Benjamin Moore

.2 **High Performance Finishes (PT-E) - (Refer to Room Finish Schedule for specific locations).**

.1 Substrate: Concrete Horizontal Surfaces (Floors and Stairs):

.1 Refer to Section 03 35 00

.2 Substrate: Concrete Vertical Surfaces (including undersides of mezzanines and stairs etc.) - Epoxy Modified Latex (INT 3.1G as amended):

.1 Primer: As recommended by top coat manufacturer.
.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 Corotech Acrylic Epoxy V450 by Benjamin Moore

.3 Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG

.3 Substrate: Concrete Masonry Units – Epoxy modified latex (INT 4.2J as amended)

.1 Primer: 1 coat latex interior block filler (MPI #4):

.1 "PrepRite Block Filler, 45 g/L" by Sherwin Williams
.2 "Speedhide Hi Fill Acrylic Block Filler (6-15XIC) " - PPG Paint or Glidden PRO Latex Blockfiller (20056A) – Dulux Paint by PPG
.3 ”Ultra Spec Masonry Block Filler K571” by Benjamin Moore

.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG
.3 " Corotech V440 Water-Based Epoxy (Not MPI approved to #115)" by Benjamin Moore

.4 Substrate: Gypsum Board and Plaster Ceilings and Soffits **below 6096 mm (20’ – 0”)** (gypsum and fiberglass faced wallboards, textured plasters, etc.) - Institutional Low Odour/VOC Latex Finish (INT 9.2M as amended)

.1 Primer: 1 coat multi-purpose latex interior primer sealer (MPI #149)

.1 Zero VOC Latex Primer:

.1 "ProMar 200 Zero VOC Interior Latex Primer, 0 g/L" by Sherwin Williams
.2 "" Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG.
.3 "K534 Ultra Spec 500 Waterborne Interior Primer Sealer" by Benjamin Moore

OR

.2 Zero VOC and Silica-free Latex Primer:

.1 "Harmony Interior Latex Primer — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "K534 Ultra Spec 500 Waterborne Interior Primer Sealer" by Benjamin Moore
.3 " Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG.

.2 Top Coats: 2 coats latex Interior, Institutional Low Odor/VOC (MPI #143, MPI #144, #145)

.1 Zero VOC Latex Paint:

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG
.3 "K536 Ultra Spec 500 Interior Finish" by Benjamin Moore

OR

.2 Zero VOC and Silica-free Latex Paint:

.1 "Harmony Interior Latex — Odor Eliminating Technology, 0 g/L" by Sherwin Williams
.2 "K536 Ultra Spec 500 Interior Finish" by Benjamin Moore
.3 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG

.5 Substrate: Gypsum Board and Plaster Ceilings and Soffits **above 6096 mm (20' – 0")** (gypsum and fiberglass faced wallboards, textured plasters, etc.) - Institutional Low Odour/VOC Latex Finish (INT 9.2M as amended)

.1 Top Coats: 2 coats water based dry fall coating (MPI #118, MPI#226)

.1 "Low VOC Waterborne Acrylic Dryfall, <50 g/L" by Sherwin Williams
.2 "Speedhide Interior Latex Dry Fog (6-72XXl Series) – PPG Paint or Spraymaster Interior Latex Dryfall (10112 or 10120A) – Dulux Paint by PPG.
.3 "Latex Dry Fall K395 " by Benjamin Moore

.6 Substrate: Gypsum Board Walls (gypsum wallboards, textured plasters, etc.) – Epoxy Modified Latex (INT 9.2F as amended)

.1 Primer: 1 coat multi-purpose latex interior primer sealer (MPI #50)

.1 "ProMar 200 Zero VOC Interior Latex Primer, 0 g/L" by Sherwin Williams
.2 " Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG.
.3 "K534 Ultra Spec 500 Waterborne Interior Primer Sealer" by Benjamin Moore

.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG
.3 "Corotech V440 Water-Based Epoxy (Not MPI approved to #115)" by Benjamin Moore

.7 Substrate: Fiberglass Mat Faced Gypsum Board Walls (Moisture resistant gypsum board, abuse resistant gypsum board, impact resistant gypsum board) (Non-MPI System)

.1 Primer: 1 coat high build surfacer (Minimum DFT: as recommended by manufacturer but not less than 10 mils)

.1 "Builders Solution, <50 g/L" by Sherwin Williams
.2 "Speedhide Maxbuild High Build Drywall Surfacer (6-4C) " PPG Paint or X-Pert Latex High Build Primer Sealer (11020A) – Dulux Paint by PPG.

.2 Sealing Coat: As recommended by paint and board manufacturer.
.3 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 "Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG
.3 " Corotech V440 Water-Based Epoxy (Not MPI approved to #115)" by Benjamin Moore

.8 Substrate: Ferrous Metals

.1 Unexposed Miscellaneous Ferrous Metals (with existing shop coat primer): No further finishing required except for touch-up of damaged surfaces. Prime with *Product* recommended by manufacturer for specific substrate.

.2 Doors, Frames, Miscellaneous Metals etc. - Water Based Light Industrial Coating (INT 5.1B or INT 5.18 as amended)

.1 Primer: 1 coat rust inhibitive primer (MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) PPG Paint and Dulux Paint by PPG
.3 “Ultra Spec HP D.T.M. Primer FP04”by Benjamin Moore

.2 Top Coats: 2 coats acrylic Interior, Institutional Low Odor/VOC (MPI #147, MPI #153):

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams
.2 "Pitt-Tech Plus EP DTM Acrylic (90-16XX Series) PPG Paint and Dulux Paint by PPG.
.3 "K540 Ultra Spec 500 Waterborne Interior Finish" by Benjamin Moore

.3 Handrails (INT 5.1K as amended)

.1 Primer: 1 coat rust inhibitive primer (MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 ""Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) PPG Paint and Dulux Paint by PPG
.3 “Ultra Spec HP D.T.M. Primer FP04” by Benjamin Moore

.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG.
.3 " Corotech V440 Water-Based Epoxy (Not MPI approved to #115)" by Benjamin Moore

.9 Substrate: Galvanized Metal

.1 Repair of Galvanized Metals: Touch-up damaged surfaces with zinc-rich coating.

.1 Primer: 1 coat organic zinc-rich epoxy primer:

.1 "Zinc Clad 5" by Sherwin Williams
.2 “Corotech Organic Zinc Rich Primer V170” by Benjamin Moore
.3 Metalhide One Pac Zinc Rich Primer – PPG Paints and Dulux Paint by PPG

.2 Doors, Frames, Miscellaneous Metals etc. – Institutional Low Odor/VOC (INT 5.3N or 5.3K as amended)

.1 Primer: 1 coat water-based galvanized primer (MPI #134)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) PPG Paint and Dulux Paint by PPG
.3 “Ultra Spec HP D.T.M. Primer FP04” by Benjamin Moore

.2 Top Coats: 2 acrylic Interior, Institutional Low Odor/VOC (MPI #147)

.1 "Pro Industrial Zero VOC Acrylic, 0 g/L" by Sherwin Williams

.2 " Pure Performance Interior Latex Zero VOC (9-500C)" – PPG Paint or Ultra Zero VOC Interior Latex (97800 Series) – Dulux Paint by PPG
.3 "K540 Ultra Spec 500 Waterborne Interior Finish" by Benjamin Moore

.3 Handrails (INT 5.1K as amended)
.1 Primer: 1 coat rust inhibitive primer (MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) PPG Paint and Dulux Paint by PPG
.3 “Ultra Spec HP D.T.M. Primer FP04” by Benjamin Moore Moore

.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG
.3 " Corotech V440 Water-Based Epoxy (Not MPI approved to #115)" by Benjamin Moore

.3 **Very High Performance Finishes - for areas including Operating Rooms, Showers, Surgical Suites etc. subject to extreme Moisture/Soiling/Abuse (Refer to Room Finish Schedule for specific locations)**

.1 Substrate: Concrete Masonry Units

.1 Refer to Section 09 96 56.

.2 Substrate: Gypsum Board and Plaster Ceilings and Soffits (gypsum and fiberglass faced wallboards, textured plasters, etc.)

.1 Refer to Section 09 96 56.

.3 Substrate: Gypsum Board Walls (gypsum and fiberglass faced wallboards, textured plasters, etc.)

.1 Refer to Section 09 96 56.

.4 Substrate: Ferrous and Non-Ferrous Metals (including Doors, Frames, Handrails and Miscellaneous Metals) – Epoxy-Modified Latex (INT 5.1K as amended)

.1 Primer: 1 coat rust inhibitive primer (MPI #107)

.1 "Pro Industrial Pro-Cryl Universal Primer, <100 g/L" by Sherwin Williams
.2 Pitt-Tech Plus EP DTM Acrylic Primer (90-19XX Series) PPG Paint and Dulux Paint by PPG
.3 "KP04 Super Spec High Performance Acrylic Metal Primer" by Benjamin Moore

.2 Top Coats: 2 coats water-based epoxy (MPI #115)

.1 "Pro Industrial Zero VOC Waterborne Epoxy, 0 g/L" by Sherwin Williams
.2 Aquapon WP EP Waterborne Epoxy 98E-X Series– PPG Paint and Dulux Paint by PPG
.3 "Corotech V440 Water-Based Epoxy (Not MPI approved to #115)" by Benjamin Moore

.4 **Miscellaneous General Areas**

.1 Substrate: Concrete Horizontal Surfaces (Floors and Stairs):

.1 Refer to Section 03 35 00

.2 Substrate: Ferrous Exposed Ceilings and Decking (including bar joists) above 6096 mm (20’ – 0”) – Water-based Dry Fall (INT 5.1CC as amended)

.1 Primer:

.1 Shop-applied Q.D primer (MPI #275): Refer to Section 05 12 00.

.2 Top Coats: 1 coat water based dry fall coating (MPI #118, MPI#226)

.1 "Low VOC Waterborne Acrylic Dryfall, <50 g/L" by Sherwin Williams
.2 ""Speedhide Interior Latex Dry Fog (6-72XXI Series) – PPG Paint or Spraymaster Interior Latex Dryfall (10112 or 10120A) – Dulux Paint by PPG.
.3 " Latex Dry Fall K395 " by Benjamin Moore

.3 Substrate: Galvanized Exposed Ceilings and Decking (including bar joists) above 6096 mm (20’ – 0”) – Water-based Dry Fall (INT 5.1CC as amended)

.1 Top Coats: 2 coats water based dry fall coating (MPI #118, MPI#226)

.1 "Low VOC Waterborne Acrylic Dryfall, <50 g/L" by Sherwin Williams
.2 ""Speedhide Interior Latex Dry Fog (6-72XXI Series) – PPG Paint or Spraymaster Interior Latex Dryfall (10112 or 10120A) – Dulux Paint by PPG.
.3 " Latex Dry Fall K395 " by Benjamin Moore

.4 Substrate: Non-insulated Pipes, Ducts, Conduit, Valves, Fittings and Equipment and Ancillary Items where "Exposed" in Completed Work

.1 Primer: As recommended by manufacturer for specific substrate.
.2 Top Coats: 2 coats latex coating (MPI #53)

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 "Speedhide PRO-EV Zero Interior Latex (12-110XIC) PPG Paint or Ultra Zero VOC Interior Latex (97500) Dulux Paint by PPG
.3 "K536 Ultra Spec 500 Waterborne Interior Finish" by Benjamin Moore

.5 Substrate: Canvas and Cotton Coverings (Pipe and Duct Coverings, etc.) – Institutional Low Odor/Low VOC (INT 10.1D as amended)

.1 Primer: 1 coat multi-purpose latex interior primer sealer (MPI #50)

.1 "ProMar 200 Zero VOC Interior Latex Primer, 0 g/L" by Sherwin Williams
.2 Pure Performance Interior Latex Primer (9-900C) " – PPG Paint or Ultra Zero VOC Interior Latex Primer (97600) – Dulux Paint by PPG
.3 "K534 Ultra Spec 500 Waterborne Interior Primer Sealer" by Benjamin Moore

.2 Top Coats: 2 coats latex Interior, Institutional Low Odor/VOC (MPI #143, MPI #144, #145)

.1 Zero VOC Latex Paint:

.1 "ProMar 200 Zero VOC, 0 g/L" by Sherwin Williams
.2 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG
.3 "K536 Ultra Spec 500 Interior Finish" by Benjamin Moore

.2 Zero VOC and Silica-free Latex Paint:

.1 "Harmony Interior Latex — Odor Eliminating Technology, 0 g/L" by Sherwin Williams

.2 "K536 Ultra Spec 500 Interior Finish" by Benjamin Moore
.3 Pure Performance Interior Latex Zero VOC 9-line" – PPG Paint or Ultra Zero VOC Interior Latex (97XXX Series) – Dulux Paint by PPG

.5 Substrate: Steel (High Heat) including heat exchangers, breeching, pipes, flues, stacks etc. – Heat Resistant Enamel – Maximum 205 deg C (400 deg F) (INT 5.2A as amended):

.1 Primer: As recommended by manufacturer.

.2 Finish Coats: Apply heat resistant enamel (MPI #21) coats in strict accordance with manufacturer's instructions:

.1 "Heat Flex Hi Temp 500" by Sherwin Williams
.2 PPG Hi-Temp 500- PPG Paint and Dulux Paint - by PPG

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* visual display boards including but not limited to following:

.1 markerboards (WB).

.2 auxiliary materials required for a complete installation.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Section 01 30 00.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Section 01 30 00. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Section 01 70 00, for adhesives, sealants and any other material designated by Consultant.

.3 Samples: Submit in accordance with Division 01.

.1 Submit sample panels not less than 216 mm x 280 mm (8-1/2” x 11”) for each type of markerboard and indicated. Include sample panel for each color, texture, and pattern required.

.2 Aluminum Trim and Accessories: Samples of each finish type and color, on 6 inch long sections of extrusions and not less than 4 inch squares of sheet or plate, showing the full range of colors available.

.4 Shop Drawings: Submit in accordance with Division 01.

.1 Submit Shop Drawings or catalogue sheets fully illustrating work of this Section. Ensure Shop Drawings indicate details of concealed mounting equipment, anchorage and frame detail as well as accessories.

.2 For projection screens, ensure Shop Drawings indicate location of screen centrelines, seams in viewing surfaces, drop lengths, details of concealed mounting equipment, anchorage and frame detail as well as accessories.

.3 Provide detailed descriptions and item numbers showing quantity, colour, model numbers and installation instructions.

.4 Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication to ensure proper fitting of work. Do not fabricate work until Shop Drawings have been reviewed.

.5 Operation and Maintenance Data: Submit manufacturer's operation and maintenance data in accordance with Section 01 70 00.

.1 Parts List: Submit manufacturer's parts lists; include servicing frequencies, instructions for adjustment and operation applicable to each type of component or hardware, and name, address and telephone number of nearest authorized service representative

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Mock-ups: Provide Mock-ups in locations designated by Consultant and as required to demonstrate quality of workmanship. Maintain Mock-ups during construction in an undisturbed condition as a standard for judging the completed work. Approved Mock-ups may become part of completed Work if undisturbed at time of Substantial Performance of the Work

.3 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver packaged materials in original, undamaged containers with manufacturer's labels and seals intact. Handle and store materials in accordance with manufacturer's and Supplier's recommendations to prevent damage thereto.

.2 Protect the work of this Section from damage. Protect other work from damage resulting from work of this Section. Replace damaged work which cannot be satisfactorily repaired, cleaned or restored.

1.7 WARRANTY

.1 Warrant work of this Section (markerboards) for period of 10 years from Substantial Performance of the Work against defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to: fading, crazing, peeling, chipping, and surface becoming slick, glassy or otherwise unsuitable for use.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 ASI Visual Display Products; https://asi-visualdisplayproducts.com/

.2 Egan Visual; www.egan.com

.3 Martack Specialties; www.martackspecialties.com

.2 Substitution Limitations: This Specification is based on Egan's *Products*. Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Conform to National Building Code of Canada requirements;

.2 Ensure barrier free usage in accordance with CAN/CSA B-651

2.3 MATERIALS

.1 Magnetic Markerboards (WB-1/WB-2/WB-4): Provide coated steel marker boards that function as a magnetic bulletin board in addition to providing writing and erasing capabilities when used with liquid felt tipped markers. Refer to *Drawings* and schedules for locations and sizes.

.1 Finish Surface: white porcelain enamelled magnetic steel on particleboard core, framed in clear anodized aluminum perimeter trim and marker tray complete with hanging brackets.

.2 Metal Trim and Accessories: Fabricate frames and trim of not less than 1.6 mm (0.062") thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single length units wherever possible; keep joints to a minimum. Miter corners to a neat, hairline closure.

.3 Marker Tray: *Provide* manufacturer's standard continuous box type aluminum marker tray with slanted front and cast aluminum end closures for each markerboard.

.4 Acceptable *Products*: *Provide* "EVS Magnetic Markerboards" by Egan Visual Inc or "ASP Porcelain Markerboards; Rite on – Wipe Off" by Architectural School *Products*.

.5 *Provide* each unit with 12 dry-erase pens in 4 colours and dust-free cloth.

.6 For WB-4 enclosure refer to Section 06 40 00.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 *Install* work of this Section in accordance with manufacturer's published recommendations.

.2 Projection screens:

.1 Install with screen cases in position and relationship to adjoining construction as indicated, securely anchored to supporting substrate, and in manner that produces a smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surfaces when screen is lowered.

.3 Markerboards and Tackboards:

.1 Deliver factory built markerboard units completely assembled in one piece without joints, wherever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to Consultant.

.2 When overall dimensions require delivery in separate units, prefit components at factory, disassemble for delivery, and make final joints at site. Use splines at joints to maintain surface alignment.

.3 Install units in locations and at mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for a complete installation.

.4 Coordinate job site assembled units with grounds, trim, and accessories. Join parts with a neat, precision fit.

3.3 ADJUSTING AND CLEANING

.1 Verify that accessories required for each unit have been properly installed and that operating units function properly. Clean and adjust units in accordance with the manufacturer's instructions.

.2 Verify that motorized projection screens have been wired properly and function without faults.

.3 Break in markerboards as recommended by manufacturer.

3.4 PROTECTION

.1 Protect installed *Products* until completion of project. Touch-up, repair or replace damaged *Products* prior to Substantial Performance to satisfaction of *Consultant* and at no expense to *Owner*.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* cubicle & IV track and accessories including but not limited to following:

.1 collapsible curtain track system.

.2 patient cubicle curtains.

.3 curtain carriers.

.4 shower curtains.

.5 additional support for carriers at ceiling.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Section 01 30 00.

.2 Coordination:

.1 Coordinate layout and installation of cubicle tracks, accessories, curtains and suspension systems with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Section 01 30 00.

.1 Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions.

.2 Include durability, laundry temperature limits, fade resistance, and fire-test-response characteristics for each type of curtain fabric indicated.

.3 Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Section 01 70 00, for adhesives, sealants and any other material designated by Consultant.

.3 *Shop Drawings*: Submit *Shop Drawings* for work of this Section in accordance with Section 01 30 00.

.1 Show layout and types of cubicles, sizes of curtains, number of carriers, anchorage details and conditions requiring accessories. As a minimum show following items on Shop Drawings:

.1 layout and types of cubicles,

.2 number of carriers,

.3 anchorage details, blocking and conditions requiring accessories,

.4 dimensions taken from field measurements.

.2 Submit reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

.1 Suspended ceiling components.

.2 Structural members to which suspension systems will be attached.

.3 Items penetrating finished ceiling, including the following:

.1 Lighting fixtures.
.2 Air outlets and inlets.
.3 Speakers.
.4 Sprinklers.
.5 Access panels.

.4 Field Measurements: Where cubicles are indicated to fit to adjacent construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delay to work of this Section

.5 Samples: Submit samples in accordance with Section 01 30 00. Submit following samples in sizes indicated:

.1 Track minimum 300 mm (12") long.

.2 Netting fabric minimum 300 mm (12") square.

.3 Curtain fabric minimum 300 mm (12") square, showing complete curtain pattern repeat, from dye lot used for work of this Section, with specified treatment applied. Mark top and face of materials.

.4 Curtain carrier: Full size unit.

.6 Certificates:

.1 Submit certificates signed by manufacturers certifying that products comply with requirements.

.7 Closeout Submittals: Submit maintenance instructions in accordance with Section 01 70 00. Ensure maintenance instructions specify warnings of any maintenance practice or materials which may damage or disfigure work of this Section.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Build *Mock-up* of typical cubicle, complete with track, curtain as shown on Drawings.

.2 Approved *Mock-ups* may become part of the completed Work if undisturbed at time of Substantial Performance of the Work.

.3 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.4 Source Quality Control: Supply fabric without flaws and/or defects. Inspect for flaws using a light source table and on an unlit flat table.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Comply with material manufacturer's ordering instructions and lead time requirements to avoid delays.

.2 Deliver components containerized, cartooned or crated to provide protection during transit. Include with bid any necessary storage precautions required for the product being offered.

.3 Inspect components upon delivery for damage. Remove and replace damaged items as described.

1.7 MAINTENANCE

.1 Extra Materials: Supply following additional curtains to Owner's housekeeping staff in accordance with Section 01 70 00, packaged with protective covering for storage and identified with labels describing contents.

.1 Curtain Carriers and Track End Caps: Full-size units equal to 3% of amount installed, but no fewer than 10 units.

.2 Curtains: Full-size units equal to 5% of amount installed, but no fewer than 10 units.

1.8 PROJECT CONDITIONS

.1 Environmental Limitations: Do not install cubicles until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.9 WARRANTY

.1 Warrant work of this Section for period of 5 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Curtain Tracks:

.1 A.R. Nelson Co.; www.arnelson.com

.2 C/S Construction Specialties, Ltd.; www.c-sgroup.com

.3 Cartsplus Healthcare *Product*s Ltd.; www.cartsplushealthcare.com

.4 InPro Corporation; www.inprocorp.com

.5 Silent Gliss Canada Limited; www.silentgliss.ca

.6 Imperial Fastener Company; www.imperialfastener.com

.7 SWS Group; www.swsdetention.com

.2 Substitution Limitations: This Specification is based on InPro's *Products*. Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Flammability: Provide curtain fabrics meeting National Building Code of Canada flammability requirements and identical to those that have passed NFPA 701 and CAN/ULC S109 (Small Scale vertical burn requirements) when tested by independent testing and inspecting agency acceptable to authorities having jurisdiction

.2 Design and Performance Requirements:

.1 Provide lateral stability in any cubicle layout to prevent weakening of wall and ceiling fixtures by lateral movement; Provide V-hangers for lateral stability to stabilize straight track to suit design layout

.2 Provide curtains meeting or exceeding following requirements:

.1 Fabric Performance Requirements:

.1 Flammability: As specified in this Section
.2 Light fastness: AATCC Method 16A exceeding 60 hours. Class 4.5.
.3 Antibacterial and antifungal resistance:

.1 AATC Test Method 147: Pass
.2 AATC Test Method 30: Pass

.2 Provide fabrics that are washable to a temperature of not less than 71 deg C (160 deg F).

.3 Provide cubicle and shower curtains for curtain tracks, custom made 10% wider than track length.

2.3 MATERIALS

.1 Curtain Tracks:

.1 Safety Cubicle Curtain Track (CCTK-20/SCTK-20): complete with glider, collapsible carriers and dust covers.

.1 Extruded-Aluminum Track: Extruded 6063-T5 aluminum, ceiling mounted track, not less than 14 mm (9/16") wide by 36 mm (1-1/64") high; with minimum wall thickness of 1.27 mm (0.050")

.2 Curved Sections: Where required, factory form curved sections to radius indicated on Drawings and Supply in 1 piece without joints up to 7200 mm (24' -0").

.3 Finish: Clear anodized

.4 Track Accessories: Fabricate splices, end caps, connectors, end stops, coupling and joining sleeves, wall flanges, brackets, ceiling clips, and other accessories from same material and with same finish as track.

.5 End Stop: Removable with carrier hook. Provide dust cover strips to suit track profile.

.6 Breakaway Curtain Carriers: breakaway curtain carriers designed to allow curtains to detach from tracks with a pulling force of no more than 10 lbf (45 N).

.7 Exposed Fasteners: Tamper-resistant, stainless steel.

.8 Concealed Fasteners: Hot-dip galvanized

.9 Acceptable Products: "UltraCube™ Cubicle Track" complete with Pop Out Carrier "CE9026" by InPro Corporation or approved equivalent.

.2 Curtain Fabric:

.1 Cubicle Curtain Fabric: polyester, inherently and permanently flame resistant (FR or Treva CS), stain resistant, and antimicrobial. Ensure curtains meet flammability requirements specified in this Section.

.2 Shower Curtain Fabric:

.1 100% Polyester Jacquard with Visa Finish, 1830 mm (72") wide, Superior Stain and Odor Release Properties, Antimicrobial, Specially formulated to resist mildew growth on the surface, Intrinsically Fire Retardant™ by Millikon & Co, Textile meeting National Building Code of Canada flammability requirements including NFPA-701 Small Scale Fire Retardant Test.

.1 Netting material above: 450 mm (18") wide.
.2 Colour: to be selected by *Consultant* at a later date from manufacturer's full range.
.3 Acceptable Products: "Shower Shield IFR" distributed by Pride Contract or approved equivalent.

2.4 FABRICATION

.1 Fabricate curtains to comply with the following requirements:

.1 Stitching: Provide stitching of first quality to produce best appearance against shrinkage. Provide drapery free from creases and wrinkles.

.2 Width: Equal to track length from which curtain is hung plus 10% added fullness, but not less than 305 mm (12") added fullness. Provide allowance for stretching and sag.

.3 Length: Ensure curtains extend from underside of netting fabric to following distance above finished floor:

.1 Cubicle Curtains: 305 mm (12") above finished floor.

.2 Shower Curtains: 13 mm (1/2") above finished floor.

.4 Netting Fabric (Mesh): Provide netting fabric manufactured from 100% Trevira, fire resistant polyester with 13 mm (1/2") openings in following heights:

.1 305 mm (12") high at top of curtain for rooms with ceilings at or below 2415 mm (95")

.2 610 mm (24") high at top of curtain for rooms with ceilings between 2415 mm (95") and 2750 mm (108").

.3 860 mm (34") high at top of curtain for rooms with ceilings over 2750 mm (108").

.5 Header/Top Hem: Provide curtains with matching header of fabric, not more than 50mm (2") and not less than 25 mm (1") wide top hem, triple width, and double stitched to body of curtain, or to mesh.

.6 Side Hems: Provide curtains with minimum side hem of 25mm (1"), double width and lock stitched. Provide french seams at panel seams and match fabric pattern and weave at adjacent panels. Ensure fabric is not railroaded unless otherwise indicated by Consultant.

.7 Bottom Hem: 25 mm (1") in width, double thickness and double lock stitched.

.8 Vertical Seams: Not less than 13 mm (1/2") wide, double turned and double stitched.

.9 Provide cloth label sewn into top hem of each curtain and mark each with curtain size.

.10 Provide two-piece, rolled-edge, rustproof, nickel-plated brass grommets machined into top hem at maximum 150 mm (6") on centre and not further than 13 mm (1/2") from each end.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Coordinate location of support framing and blocking with other trades prior to installation of track and accessories.

3.3 INSTALLATION

.1 *Install* readily cleanable track and accessories in accordance with manufacturer's printed instructions. *Provide* track fabricated from one continuous length.

.2 Install track, secure, rigid, and true to ceiling line. Ensure track is secured rigidly with no fastening devices used within channel and all fixtures are mounted to top of profile.

.3 Install collapsible curtain and curtain track system in locations indicated in accordance with system manufacturer's recommendations.

.4 Install cubicle tracks with one or a combination of the following methods to suit site conditions and to Consultant's satisfaction based on selections made during Shop Drawing review:

.1 Surface Track Mounting:

.1 Fasten surface track mounted tracks at intervals of not less than 600 mm (24"). Fasten support at each splice and tangent point at each corner. Center fasteners in track to ensure unencumbered carrier operation. Attach track to ceiling as follow:

.1 [Mechanically fasten directly to bottom of concrete deck with anchor screws;]
.2 Gypsum Board Ceilings: Mechanically fasten directly to finished ceiling with toggle bolts.
.3 Suspended Acoustic Ceilings: Mechanically fasten to suspended ceiling grid with screws.

.2 Suspended Track Mounting: *Install* track with suspended supports at intervals of not more than 4200 mm (84"). Fasten support at each splice and tangent point at each corner. Secure ends of track to wall with flanged fittings or brackets.

.3 Recessed Track Mounting:

.1 Fasten track at intervals recommended by manufacturer. Fasten support at each splice and tangent point at each corner.

.2 Locate recessed track as indicated on approved Shop Drawings for appropriate substrate and in compliance with manufacturer's installation instructions.

.5 Track Accessories: *Install* end caps, connectors, end stops, coupling, hangers and joining sleeves and other accessories as required for secure and operational installation. *Install* dust cover strip to reduce risk of cross infection.

.6 *Provide* curtain carriers adequate for 150 mm (6") spacing along full length of curtain unless indicated otherwise.

.7 *Provide* removable end stops to cover any open end of track with provision to insert cubicle guides. *Provide* internal splices to extend length of track to hold glide surfaces in tight and proper alignment to suit design layout.

.8 Curtains: Hang curtains on each curtain track.

3.4 DEMONSTRATION

.1 *Provide Owner's* maintenance personnel to adjust, maintain safety loading units and on procedures and schedules for changing curtains and maintaining cubicles.

3.5 PROTECTION

.1 Protect installed track to prevent debris from ceiling finishes operations from impending carrier operation.

END OF SECTION

1 - GENERAL

1.1 GENERAL INSTRUCTIONS

.1 Read and conform to:

.1 The Contract CCDC 2-2008, Stipulated Price Contract, including General and Supplementary Conditions as amended in the Contract Documents.

.2 Division 01 requirements and any additional documents referred to therein.

1.2 SUMMARY

.1 Work Included: *Provide* wall protection including but not limited to following:

.1 sheet wall protection coverings

.2 corner guards

.3 hand railing

.4 chair railing

.5 accessories required for a complete installation

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.3 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Full Height: Top of base to underside of ceiling.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 In particular address the following items:

.1 Prior to commencing work of this Section arrange for manufacturer's technical representative to review with *Contractor* and *Consultant*, procedures to be adopted and conditions under which work shall be performed. Inspect surfaces to determine adequacy of existing and proposed conditions.

.2 Coordinate installation with related Sections referenced herein.

.3 Co-operate fully with other *Subcontractors* on *The Work* and promptly proceed with work of this Section as rapidly as job conditions permit.

.4 Co-operate with other Sections for application of all miscellaneous specialties.

.5 *Supply* items to be built-in in ample time to be incorporated into work of other *Subcontractors*, together with measurements and other information required for location of it.

.6 Ensure work which may create dust does not proceed during work related to painting and final finishing.

1.5 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Shop Drawings:

.1 Submit in accordance with Division 01 Ensure Shop Drawings indicate material characteristics, details of construction, connections and relationship with adjacent construction.

.4 Samples: Submit in accordance with Division 01 If requested by Consultant submit samples of Products.

.5 Test and Evaluation Reports: Submit test data substantiating that proposed materials meet performance criteria specified herein. Submit independent test results showing properties and acceptable fire hazard classification of applicable materials.

1.6 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data Submit maintenance instructions in accordance with Division 01 for wall protection specified herein.

1.7 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials: *Supply* following quantity of maintenance material in accordance with Division 01:

.1 Quantity: 5% of *The Work*.

1.8 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.3 Mock-ups: *Provide Mock-ups* in locations designated by *Consultant* and as required to demonstrate quality of workmanship. Maintain *Mock-ups* during construction in an undisturbed condition as a standard for judging the completed work.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: Comply with material manufacturer's ordering instructions and lead time requirements to avoid delays.

1.10 WARRANTY

.1 Warrant work of this Section for period of 3 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to; buckling, opening of seams, bond failure and extensive colour fading.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 *Products* of following manufacturers may be acceptable subject to conformance to requirements of *Drawings*, Schedules and *Specifications*:

.1 C/S Construction Specialties, Ltd.; www.c-sgroup.com

.2 InPro Corporation; www.inprocorp.com

.3 Korogard Wall Protection Systems; http://www.koroguard.com

.4 Panolam Industries International Incorporated; www.panolam.com

.5 Pawling; http://www.pawling.com

.2 Substitution Limitations: This Specification is based on C/S *Products*.

.3 Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Fire Performance Characteristics: Wall panels shall have ULC or UL label indicating that they are identical to those tested in accordance with CAN/ULC S102.2 or Class A tested to ASTM E84 for characteristics, flame spread 25 or less; smoke development 450 or less.

.2 Install systems in accordance with Code regulations concerning access of physically challenged people and requirements of CAN/CSA B651.

.2 Sustainable Characteristics:

.1 VOC Content Requirements for Paints and Coatings: Paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113. Methylene chloride and

perchloroethylene must not be intentionally added in paints, coatings, adhesives, or sealants.

.2 VOC Content Requirements for Adhesives and Sealants: Adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168. Methylene chloride and perchloroethylene must not be intentionally added in paints, coatings, adhesives, or sealants. Do not use adhesives that contain urea formaldehyde.

.3 Design and Performance Requirements:

.4 As far as practical and unless otherwise indicated, Provide PVC-free wall protection materials at scheduled locations except egress corridors as required to meet fire-resistance characteristics stipulated by authorities having jurisdiction. At egress corridors, use minimal amounts PVC-based wall protection materials as indicated on Drawings and Schedules.

.5 Ensure wall protection systems do not contain materials capable of supporting growth of bacteria, fungi or other disease causing organism, or encourage the harbourage of insects or mites. Use components containing antimicrobial additives to retard mildew and bacterial growth. Ensure wall protection systems do not, to any appreciable degree, develop or discharge any electrostatic charge.

.6 Final securement method to be selected based upon construction of supporting wall or partition and manufacturer's recommendations. Provide additional reinforcing as required, fastenings, and necessary anchorage for building in of products.

.7 Ensure manufactured units do not have attached plates, or imprinted or labeled with manufacturer's name or trademark.

.8 Ensure edges of sheet metal which are accessible to users or maintenance personnel are pneumatically sanded to yield smooth safe edges with no sharpness.

.9 Verify that installed products function properly and adjust them accordingly to ensure satisfactory operation.

.10 In mental health areas, *Provide* additional brackets and fasteners to ensure installed assemblies are fully tamper-resistant.

2.3 MATERIALS

.1 Aluminum

.1 Aluminum Extrusions: ASTM B209M, size accurately formed as shown on Drawings, extruded aluminum alloy AA-6063- T5 or T6 for aluminum. Ensure surfaces are free from defects impairing appearance, strength and durability.

.2 Aluminum Sheet: ASTM B221M, Minimum thickness: 3 mm (1/8"); of type and characteristics to match finished extrusions; Concealed sheets to be Utility Aluminum mill finished; for intricate forming with decorative finishes use AA 1100 and for siding and exposed panels use AA-3003 with specified finish.

.2 Stainless Steel:

.1 Stainless Steel Sheet, Strip, Plate, and Flat Bar: ASTM A240 or ASTM A167 or ASTM A666, Type 304 and Type 316 alloy with exposed surfaces having No. 4 polished finish. Sizes as required to meet design requirements.

.2 Stainless Steel Tubing: ASTM A554, Grade MT 304.

.3 Stainless Steel Pipe: ASTM A312M, Grade TP 304.

.4 Provide highest architectural quality in various forms, straight and true. Ensure there are no scratches, scars, creases, buckles, ripples or chatter marks. Provide finish surfaces

suitable for polishing where required. Ensure finished surfaces exposed to view are free of pitting, seam marks, roller marks, oil-canning, stains, discolourations or other imperfections.

.3 Extruded Plastic:

.1 Unless otherwise indicated, *Provide* high impact PVC-Free cover manufactured from PETG plastic containing no PVC in formulation with shadow grain texture. *Provide* units with following characteristics:

.1 Impact Resistance: Minimum 1356 J/m (25.4 ft-lbf/in) in accordance with ASTM D256, Test Method A or ASTM F476 (99.2 lb impact).
.2 Flame-Spread Index: 25 or less per ASTM E84 and CAN/ULC S102.2.
.3 Smoke-Developed Index: 450 or less per ASTM E84 and CAN/ULC S102.2.
.4 Chemical resistance: ASTM D543 or ASTM D1308 (as applicable)

2.4 MANUFACTURED UNITS

.1 SHEET WALL PROTECTION COVERINGS:

.1 Vinyl/Acrylic Wall Protection (SWP): High impact semi-rigid sheet vinyl/acrylic wall cladding, with colour matched tamper-resistant sealant

.1 Sheet Size: Maximum practical sizes to minimize seams unless otherwise indicated on Drawings.
.2 Sheet Thickness: 1.5 mm (0.060”)
.3 Heights: as indicated on Drawings.
.4 Trims: Provide tamper-resistant sealant in lieu of trims at all locations.
.5 Colours: Allow Consultant to select 5 colours at a later date from manufacturer's full range.
.6 Acceptable Products:

.1 PVC-Free:

.1 “Acrovyn 4000” by C/S Construction Specialties Ltd.
.2 “G2” by InPro Corporation

.2 CORNER GUARDS:

.1 Stainless-Steel Corner Guards (SSCG): Satin-finish, 1.6 mm (16 ga.) minimum, Type 304 stainless-steel sheet corner guards; with 90-deg return, unless otherwise indicated; and formed edges. Provide full-height units unless otherwise indicated.

.1 Corner Guard (90°) - SSCG-1:

.1 Wing Length: 89 mm (3-1/2”)
.2 Height: As indicated on *Drawings*
.3 Mounting: Fully-adhered
.4 Corner Radius: 3 mm (1/8”)
.5 Acceptable Products:

.1 “Model No. CO-8" by Construction Specialties Ltd
.2 "Model No. 183" by InPro Corporation.

.2 End wall Protector - SSCG-2:

.1 Wing Length: 89 mm (3-1/2”)
.2 Height: As indicated on *Drawings*
.3 Mounting: Fully-adhered

.4 Acceptable Products:

.1 "Model No. SCO-8" by Construction Specialties Ltd.
.2 "SS-WEFM" by InPro Corporation.

.3 Corner Guard (Angled) - SSCG-3:

.1 Wing Length: 89 mm (3-1/2")
.2 Height: As indicated on *Drawings*
.3 Mounting: Fully-adhered
.4 Corner Radius: 3 mm (1/8")
.5 Angle: Refer to Drawings for angle
.6 Acceptable Products:

.1 "Model No. CO-8M" by Construction Specialties Ltd.
.2 "Model No. 183H" by InPro Corporation.

.2 PVC-Free Corner Guards (CG): Embossed, extruded 2 mm (0.78") thick PVC-free sheet; with 90-degree turn, unless otherwise indicated; and formed edges. Provide full-height units unless otherwise indicated.

.1 Corner Guard (90°) - CG-1:

.1 Wing Length: 75 mm (3")
.2 Height: As indicated on *Drawings*
.3 Mounting: Fully-adhered
.4 Acceptable Products:

.1 "Model No. SM-20AN" by Construction Specialties Ltd.;
.2 "Model No. 150" by InPro Corporation.

.2 End wall Protector - CG-2:

.1 Wing Length: 75 mm (3")
.2 Height: As indicated on *Drawings*
.3 Mounting: Fully-adhered
.4 Acceptable Products:

.1 "Model No. 150D" by InPro Corporation or approved equivalent by Construction Specialties Ltd.

.3 Corner Guard (Angled) - CG-3:

.1 Wing Length: 75 mm (3")
.2 Height: As indicated on *Drawings*
.3 Mounting: Fully-adhered
.4 Angle: Refer to Drawings for angle
.5 Acceptable Products:

.1 "SM-20MN" by Construction Specialties Ltd.
.2 "Model No. 130" by InPro Corporation.

.3 Plastic Rails: Heavy-duty assembly with snap-on-type, minimum 2 mm (0.78") thick, extruded rigid plastic cover installed over continuous, 1-piece, extruded-aluminum retainer.

.1 Bumper Railing/Handrail Combination (HRLG-1AL):

.1 Dimensions and Profile: 140 mm (5-1/2") high complete with psychiatric bracket enclosures.
.2 Acceptable *Products*:

.1 "HRB-4CCMN" by Construction Specialties Ltd or approved equivalent by InPro Corporation.

.2 Chair Rail (CHRLG1):

.1 Dimensions and Profile: 102 mm (4”) high.
.2 Acceptable *Products*:

.1 "Model No. BG-10" by Construction Specialties Ltd.;
.2 Approved equivalent by InPro Corporation.

2.5 FABRICATION

.1 Accurately fit joints and intersecting members in true planes with adequate fastening.

.2 Fit and assemble work of this Section in shop where possible. Execute according to details and reviewed *Shop Drawings*. Where shop fabrication is not possible, execute trial assembly in shop.

.3 Fabricate finished work free from distortion, weld splatter and defects detrimental to appearance and performance.

.4 *Provide* exposed metal fastenings and accessories of the same material, texture, colour and finish as the base metal to which they are applied or fastened, unless otherwise specified.

.5 Do not expose trademarks or labels on finished surfaces.

2.6 ACCESSORIES

.1 *Provide* Prefabricated, injection-molded or otherwise matching end caps and inside and outside corners with concealed splices, cushions, mounting hardware, division bars between panels, and other accessories as required; field adjustable for close alignment with snap-on plastic covers (where applicable).

.2 Adhesives and Sealants: As recommended by manufacturer.

.3 *Provide* psychiatric bracket enclosures at all "Mental Health" areas.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Verify gypsum board substrate smooth, plumb and true, free of waves bulges and within tolerances specified in Section 09 21 16.

.3 Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

.1 For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

.4 Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work implies acceptance of previously completed work.

3.2 PREPARATION

.1 Surface Preparation: Ensure substrate is dry, well-sealed and free of dirt, loose paint, wax and grease. Glossy surfaces may require sanding or priming before installation to help promote adhesion.

3.3 INSTALLATION

.1 Conform to manufacturer's printed instructions for accurate, secure installation. Ensure proper operation.

.2 *Provide* work of this Section true to dimensions, square, plumb, level and free from distortion or defects detrimental to appearance and performance.

.3 *Provide* work of this Section tightly fitted and level and flush to adjacent surfaces and components.

.4 Insulate between dissimilar metals, and metal and masonry materials to prevent electrolysis with bituminous paint to meet specified requirements of CAN/CGSB-1.108-M89; or with methacrylate lacquer, CAN/CGSB-1.159-92 if exposed to view.

.5 Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.

.6 *Provide* all necessary reinforcing including but not limited to steel stud backup and securely fasten components to suit design requirements.

.7 Install impact-resistant wall protection units in locations and at mounting heights indicated on *Drawings*.

.8 *Provide* sheet wall protection covering materials on prime painted gypsum board walls where indicated. Install top and edge moldings, corners, and divider bars as required for a complete installation.

.9 Apply sheet wall protection covering in maximum widths carefully matched for colour, pattern, texture. Avoid shading. Thoroughly wash off excess adhesive from material and adjoining surfaces as work proceeds.

.10 Neatly and closely fit wall protection materials around switches, light outlets, grilles, trim and similar items. Carry wall covering into reveals, jambs, and heads of openings.

.11 Provide tamper-resistant sealant in lieu of trims at all locations.

.12 Take care to ensure wall protection coverings are fully on the wall at inside corners, without coving or subsequently pulling away from the wall.

.13 Apply material to outside corners in a manner which will prevent gathering of air beneath the material on each side of the corner. No joints are allowed within 150 mm (6") of any corner.

.14 Remove material showing evidence of coming loose or showing any blisters, imperfect seams, wrinkles, dried adhesive, or other imperfections, and apply new material.

3.4 CLEANING

.1 Clean adjacent surfaces, which have been soiled or otherwise marred, to completely remove evidence of material causing same.

3.5 PROTECTION

.1 Cover finished surfaces and protect exposed corners and areas vulnerable to damage by persons or by movement of materials, tools or equipment.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* washroom accessories including but not limited to following:

.1 Grab Bars, including L-shaped and safety types.

.2 Mirrors, including safety types.

.3 Paper towel dispensers

.4 Clothing hooks, including safety types.

.5 Soap Dispensers

.6 Shower Shelves

.7 Toilet Paper Dispensers

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 In particular address the following items:

.1 Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

.2 Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate

warning of maintenance practices or cleaning agents detrimental to specified materials. As a minimum indicate the following:

.1 Construction details and dimensions.

.2 Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

.3 Material and finish descriptions.

.4 Features that will be included for Project.

.5 Manufacturer's warranty.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 *Shop Drawings*: Submit *Shop Drawings* for work of this Section in accordance with Division 01. Ensure *Shop Drawings* indicate material characteristics, details of construction, connections and relationship with adjacent construction. Submit *Shop Drawings* in form of catalogue cuts and fully illustrate specified materials with description of components, surface finishes, hardware and securement devices.

.4 Samples: Submit complete samples of each accessory and modular unit to *Consultant* for review of construction quality, materials and finish prior to delivery of required quantities of items. Submit sample of each colour where applicable. No trademark and/or labels are acceptable on exposed finishes.

.5 Maintenance Instructions: Submit maintenance instructions in accordance with Division 01. Submit an accessories schedule, keys and parts manual as part of Project closeout documents. Submit 2 sets of following items of manufacturer's literature:

.1 Technical Data Sheets of each item used for the *Project*.

.2 Service and Parts Manuals.

.3 Name of local representative to be contacted in the event of need of field service of consultation

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in sealed cartons and containers with manufacturer's name and *Product* description clearly marked thereon.

1.7 WARRANTY

.1 Warrant mirrors of this Section for period of 10 years from Substantial Performance of the Work against defects and deficiencies in accordance with General Conditions of the *Contract*. Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of *Consultant* and at no expense to *Owner*. Defects include but are not limited to: deterioration of mirror's silvering.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 ASI Canada

.2 Bobrick

.3 Bradley

.4 Frost

.5 Kingsway Group

.6 Behavioral Safety Products (BeSafe Prod)

.7 Approved equivalent.

.2 Substitution Limitations: Unless indicated otherwise, accessories specified in this Section used in patient-accessible must be ligature-resistant and listed in the New York Province Office of Mental Health – Patient Safety Standards, latest edition.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Install systems in accordance with National Building Code of Canada regulations concerning access of physically challenged and disabled persons and requirements of CAN/CSA B651 and any other requirements from authorities having jurisdiction.

.2 Design and Performance Requirements:

.1 Provide washroom accessories as specified with options indicated. Model numbers may not reflect all options required.

.2 Provide stainless steel collars to accommodate semi-recessed mounting of units whose depth exceeds wall cavity depth.

.3 Edges of sheet metal which are accessible to users or maintenance personnel shall be pneumatically sanded to yield smooth safe edges with no sharpness.

.4 Mount items with concealed fasteners unless otherwise indicated or unavoidable. Where exposed fasteners are unavoidable, use tamper-resistant types.

.5 Concealed Steel Reinforcing:

.1 Provide concealed sheet steel reinforcing to support all wall-mounted accessories. Coordinate with Section 09 21 16.

.2 Provide high capacity concealed steel anchor plates for securing all grab bars, and accessories indicated as "bariatric" on *Drawings* or on Schedules.

.6 Unless otherwise indicated, ensure grab bars are capable of supporting minimum load of 1.3 kN (292 lbs) as required by National Building Code of Canada. Where items are indicated as 'bariatric', they must withstand a minimum load of 4.45 kN (1,000 lbs)

2.3 MATERIALS

.1 Ensure washroom accessories are stainless steel conforming to ASTM A167, Type 304 or Type 302, of 1 type throughout, ANSI No. 4 mechanical brushed finish, of contemporary design, with minimum material thicknesses of components as specified herein. Arrange stainless steel sheet so grain of brushed finish runs vertically in finished installation.

.1 Minimum thickness, any location or component:0.645 mm

.2 Hygienic accessory - exposed double pan doors and panels: 0.645 mm

.3 Hygienic accessory - exposed single pan doors: 1.26 mm

.4 Reinforcement: 1.26 mm

2.4 GRAB BAR - BARIATRIC - SAFETY (GRB-10a, GRB-10b)

.1 Ligature-resistant washroom grab bar with one open end and one closed end cap with security screws.

.2 Finish: Color powder coated as selected by Consultant from manufacturer's full range.

.3 Load capacity: not less than 4.45 kN (1,000 lbs)

.4 Length: 610 mm (24 inches)

.5 Basis-of-Design: "KG270-278 Anti-ligature Grab Bar" by Kingsway Group or approved equivalent.

2.5 GRAB BAR - STANDARD (GRB-1a)

.1 Satin-finish 304 stainless steel grab bar with 1.2mm (18-gauge) wall thickness, and 38mm (1-1/2") grab bar diameter. Provide stainless steel concealed mounting flanges complete with flange covers designed snap over the mounting flange to conceal mounting screws. Grab bar to be heliarc welded to produce single structural unit.

.2 Finish: Peened.

.3 Length: 610 mm (24 inches)

.4 Basis-of-Design: Model No. 6806.99 by Bobrick Washroom Equipment or approved equivalent as follows:

.1 Model No. 3801-P by ASI Group Canada.

.2 Model No. 812-2 by Bradley.

2.6 VERTICAL SHOWER GRAB BAR - BARIATRIC - SAFETY (GRB-13b)

.1 Ligature-resistant washroom grab bar with one open end and one closed end cap with security screws.

.2 Finish: Color powder coated as selected by Consultant from manufacturer's full range.

.3 Load capacity: not less than 4.45 kN (1,000 lbs)

.4 Length: 1067 mm (42 inches)

.5 Basis-of-Design: “KG270-278 Anti-ligature Grab Bar” by Kingsway Group or approved equivalent.

2.7 BARRIER FREE FOLD-DOWN GRAB BAR - BARIATRIC (GRB-16b)

.1 Ligature-resistant fold-down washroom grab bar that is operable with only one hand. Provide mounting plate or solid stop bumper to prevent raised bar from colliding with wall.

.2 Finish: Color powder coated as selected by Consultant from manufacturer’s full range.

.3 Length: 806.5 mm length (wall to end)

.4 Load capacity: not less than 4.45 kN (1,000 lbs)

.5 Basis-of-Design: “KG255” by Kingsway Group or approved equivalent.

2.8 L-SHAPED BARRIER FREE GRAB BAR (GRB-17a)

.1 Ligature-resistant washroom grab bar with one open end and one closed end cap with security screws.

.2 Finish: Color powder coated as selected by Consultant from manufacturer’s full range.

.3 Load capacity: not less than 4.45 kN (1,000 lbs)

.4 Length: 760 mm x 760 mm (30 inches x 30 inches)

.5 Basis-of-Design: “KG279 Anti-ligature Grab Bar” by Kingsway Group or approved equivalent.

2.9 MIRROR - STANDARD (MIR-1)

.1 Frame: Manufactured from type 304 stainless steel angle 19 x19mm (3/4 inch x 3/4 inch), with satin finish with vertical grain on exposed surfaces. One-piece, roll-formed construction with continuous integral stiffener. Provide beveled design on front of angle to hold mirror tightly against frame; prevents exposure to sharp edges. Corners must be Heliarc welded, ground, and polished smooth.

.2 Mirror: No. 1 quality, 6mm (1/4 inch) float/plate glass. Back of Mirror: Protected by full-size, shock-absorbing, water-resistant, non-abrasive 5mm (3/16 inch) thick polyethylene padding.

.3 Overall Size: 610 mm (24 inches) x 915 mm (36 inches).

.4 Basis-of-Design Products: “Model B-290” by Bobrick or approved equivalent as follows;

.1 "Model No. 945" by Frost.

.2 “"Model No. 0600” by ASI Group Canada.

2.10 MIRROR - SAFETY (MIR-2)

.1 Satin-finish 304 stainless steel grab bar with 1.2mm (18-gauge) wall thickness, and 38mm (1-1/2") grab bar diameter. Provide stainless steel concealed mounting flanges complete with flange covers designed snap over the mounting flange to conceal mounting screws. Grab bar to be heliarc welded to produce single structural unit.

.2 Finish: Peened.

.3 Size: 610 mm x 915 mm (24 inches x 36 inches)

.4 Basis-of-Design: “Model No. FM770 (24"x36")” by BeSafe Prod or approved equivalent.

2.11 RECESSED PAPER TOWEL DISPENSER (PTD-2)

.1 Recessed, ligature-resistant paper towel dispenser constructed entirely of type satin-finished type 304 stainless steel. Door to be secured to the cabinet with full-length stainless steel piano hinge complete with tumbler lock.

.2 Basis-of-Design: “Model No. KG11” by Kingsway Group or approved equivalent.

2.12 ROBE HOOK - ANTI LIGATURE (RH-1, RH-2, RH-2b)

.1 Surface-mounted robe hooks made of type 304 stainless steel with rubber tip. Hook must release when load of 40lbs or more is exerted. Provide unit with tamper-resistant mounting screws.

.2 Basis-of-Design: “Model No. KG180 Coat Hook” by Kingsway Group or approved equivalent.

2.13 SOAP DISPENSER - ANTI-LIGATURE (SD-2)

.1 Soap dispenser with satin finish and ligature-resistant design made of type 304 stainless steel. Unit must be equipped with refillable dispenser. When inner cassette is unlocked, it slides downward to reveal internal plastic cartridge for refilling.

.2 Basis-of-Design: “KG07 Ligature Resistant Liquid Manual Soap Dispenser” by Kingsway Group or approved equivalent.

2.14 RECESSED SHOWER SHELF - ANTI-LIGATURE (SSH-1)

.1 Recessed washroom shelf made of high-quality Type 304 stainless steel with ligature-resistant design, and complete with tamper-resistant screws. Provide shelf with self-draining base.

.2 Basis-of-Design: “KG12 Anti-Ligature Recessed Washroom Shelf” by Kingsway Group or approved equivalent.

2.15 TOILET PAPER DISPENSER (TPD-1)

.1 Double-roll toilet tissue dispenser with mechanisms that vandal-resistant with capacity to hold two 115mm (4-1/2") standard-core toilet tissue rolls.

.2 Basis-of-Design: “Model No. B-2840” by Bobrick Washroom Equipment, Inc or approved equivalent.

2.16 TOILET PAPER DISPENSER (TPD-2)

.1 Double-roll toilet tissue dispenser with mechanisms that are ligature-resistant and vandal-resistant with capacity to hold two 115mm (4-1/2") standard-core toilet tissue rolls.

.2 Basis-of-Design: “Model No. KG23” by Kingsway Group or approved equivalent.

2.17 FABRICATION

.1 Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

.2 Use non-corrosive metal fasteners of expansion type, toggle type or other approved type of positive, mechanical anchor as required to suit construction to which accessory is to be

mounted. Exposed fasteners, where permitted, shall be finished to match adjacent accessory surface, and be countersunk.

.3 Where accessories are mounted to sheet metal, *Provide* a minimum 3 mm (1/8") thick full-size metal back-up plate drilled and tapped to receive machine screws and finished to match adjacent sheet metal surface.

.4 Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide keys to Owner.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer.

.2 Verify wall opening for correct dimensions, plumbness of blocking or frames and other preparation that would affect installation of washroom accessories. Install units level, plumb, and firmly anchored in locations and at heights indicated.

.3 Verify spacing of plumbing fixtures and toilet partitions that affect installation of washroom accessories.

.4 Securely fasten accessories, level and plumb using appropriate fastenings as recommended by manufacturer. Fit flanges of accessories snug to wall surfaces.

.5 Provide tamper-resistant sealant around accessories.

.6 *Provide* corrosion resistant fastenings. Where fasteners are exposed, use tamper-proof fasteners finished to match items secured.

.7 Locate washroom accessories where indicated on *Drawings* and where directed by *Consultant*. Obtain *Consultant's* acceptance of exact locations.

.8 Grab Bars, towel bars and any other accessories subject to human loadings: Install to withstand downward specified when tested according to method in ASTM F 446. Provide accessories complete with additional reinforcement whether or not detailed on Drawings and in accordance with manufacturer’s instructions.

3.3 ADJUSTING, CLEANING AND POLISHING

.1 Remove protective coatings and paper including adhesives.

.2 Test mechanisms, hinges, locks and latches.

.3 Adjust and lubricate to ensure washroom accessories are in perfect working order.

.4 Clean and polish mirrors, aluminum and stainless steel surfaces.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* non-welded lockers including but not limited to following:

.1 double-tier lockers with sloping tops.

.2 locker bases.

.3 barrier free, tamper-resistant hardware.

.4 identification plates.

.5 metal trims, end gables, filler panels.

.6 screws, bolts, rivets and other items to bolt and secure lockers together and to structure.

.7 other applicable locker accessories.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 In particular address the following items:

.1 Prior to commencing work of this Section arrange for manufacturer's technical representative to review with Contractor and Consultant, procedures to be adopted and conditions under which work shall be performed. Inspect surfaces to determine adequacy of existing and proposed conditions.

.2 Coordinate installation with related Sections referenced herein.

.3 Co-operate fully with other Subcontractors on the Work and promptly proceed with work of this Section as rapidly as job conditions permit.

.4 Co-operate with other Sections for application of all miscellaneous specialties.

.5 Supply items to be built-in in ample time to be incorporated into work of other Subcontractors, together with measurements and other information required for location of it.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Shop Drawings:

.1 Submit Shop Drawings for work of this Section in accordance with Division 01.

.2 Ensure Shop Drawings clearly indicate compartment layouts, filler panels, sloping tops, finished ends and dimensions, materials being supplied and applicable connections, attachments, reinforcing, anchorage, recessed trims, hardware and location of exposed fastenings.

.3 Clearly cross-reference components on Shop Drawings to Drawings indicating location, number required and name of unit.

.4 Submit 3 copies of Drawings of each locker room showing arrangement, numbering system, colour scheme and number of lockers in room for control purposes.

.5 Field Measurements:

.1 Verify locations of cconcealed framing, blocking, and reinforcements for locker support by field measurements prior to fabrication. Submit necessary templates and instructions where supports or anchors have to be built-in by other Sections.

.2 Do not fabricate work of this Section prior to confirming location of adjacent construction with related trades.

.4 Samples:

.1 Submit samples in accordance with Division 01 samples in following sizes:

.1 Metal locksers
.2 minimum 300 mm (12") long x 460 mm (18") wide x 25 mm (1") thick locker bench material.
.3 each type of hardware.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Structural Design and Inspection: Employ a professional structural engineer carrying a minimum $2,000,000.00 professional liability insurance and registered in the Province of Prince Edward Island in accordance with requirements of Division 01 to:

.1 design the components of the work of this Section requiring structural and seismic performance in accordance with applicable codes and regulations, review design documents, and provide site administration and inspection of this part of the *Work*.

.2 Submit certificate validating seismic assessment and field review of this part of the *Work*

.3 Mock-ups:

.1 Provide Mock-up in location directed by Consultant, for approval, before proceeding with remainder of installation.

.2 Provide sections showing stile anchoring and leveling devices, concealed threaded inserts, panel and stile construction as well as edge construction.

.3 Make adjustments as required. After acceptance, retain approved Mock-up as standard of quality for work of this Section. Mock-up may become part of permanent installation if undisturbed at time of substantial completion.

.4 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in sequence to meet installation schedule. *Provide* protection from marring or other damage.

.2 Carefully unload materials; handle and store in a manner to prevent damage. Remove unsatisfactory materials and replace to *Consultant's* satisfaction at no cost to *Owner*.

1.7 MAINTENANCE

.1 Provide Owner with 2% surplus of following hardware materials matching products installed and packaged with protective covering for storage and identified with labels describing contents: Locks, Identification Plates, Hooks.

1.8 WARRANTY

.1 Warrant Work of this Section for period of 3 years from Substantial Performance of the Work against materials defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to: warpage, hinge separation from panels, structural failure, faulty operation of hardware and delamination.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Lockers and Benches:

.1 Anthony Steel Manufacturing; www.anthonysteel.com
.2 ASI Storage Solutions; www.asilockers.com
.3 General Storage Systems, www.generalstoragesystems.com

.4 Hadrian Manufacturing, Inc. www.hadrian-inc.com
.5 Shanahan's Ltd. www.shanahans.com

.2 Substitution Limitations:

.1 Standard Duty Lockers: This Specification is based on "Traditional Collection" by ASI with riveted and bolted construction and assembly.

.2 Heavy Duty Lockers: This Specification is based on "Traditional Plus Collection" by ASI with riveted and bolted construction and assembly.

.3 Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements

.1 Install systems in accordance with Code regulations concerning access of physically challenged and disabled persons. Comply with CAN/CSA B651 for location of shelves, hardware, and maximum operating forces; comply with accessibility requirements stipulated by ADA, Accessibility Guidelines for Buildings and Facilities.

.2 Design and Performance Criteria

.1 Provide lockers in configurations indicated herein and on Drawings and Schedules complete with stainless steel recessed handles, continuous full length piano hinge, rubber door silences, metal trims, end gables and filler panels.

.2 Seismic Performance:

.1 Design materials specified in this Section to withstand the effects of earthquake motions determined according to National Building Code of Canada and CAN/CSA S832 requirements.
.2 Professional engineer referenced in this Section shall be responsible for designing systems and submitting signed and sealed analysis data and Shop Drawings illustrating seismic-resistant systems.
.3 Refer to Structural documents for seismic sensitivity values

2.3 MATERIALS

.1 Sheet steel: Commercial quality, stretcher levelled standard of flatness; plain commercial galvanized or wipe coated conforming to ASTM A653/A653M. Minimum Galvanizing Thickness: Z275 (G90).

.2 Tubular Steel: Minimum 32 mm (1 1/4") diameter steel tubing.

.3 Bar stock: Hot rolled, CSA G40.20/G40.21, grade 350W, free from mill scale and pitting.

.4 Bolts and Nuts: Zinc plated truss fin head bolts and hex nuts.

.5 Stainless Steel Sheet, Strip, Plate, and Flat Bar: ASTM A167 or ASTM A666, Type 304 alloy with exposed surfaces having No. 4 polished finish. Sizes as required to meet design requirements.

.6 Welding materials: CSA W59.

.7 Bituminous Paint: Isolation Coating, alkali-resistant bituminous paint or epoxy resin solution to provide dielectric separation which will dry to be tack-free and withstand high temperatures.

Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.4 MANUFACTURED UNITS

.1 Locker Configuration: Provide following locker configurations as indicated on Drawings and Schedules:

.1 Locker Types:

.1 Heavy Duty Lockers:

.1 Locker - Double Tier.

.2 Doors:

.1 Heavy Duty Locker Doors: Manufacturer's standard concealed vents.

.1 Widths and Heights: As indicated on Drawings.

.2 Locker Accessories:

.1 Tops: Continuous Sloped Hood as indicated on reviewed Shop Drawings.

.2 Base: Height: 100 mm (4").

.3 Filler Panels: as indicated on reviewed Shop Drawings

.4 Locking Devices:

.1 Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry resistant.

.5 Coat hooks: Type 304, Stainless steel. Provide 1 back hook and 2 side wall hooks for single and double tier lockers as indicated on reviewed Shop Drawings.

.6 Coat Rods: As indicated on reviewed Shop Drawings.

.7 Identification Plates: Surface mounted with rivets or as recommended by locker manufacturer. Fonts: Minimum of 12 mm (1/2") high black font on polished aluminum background.

2.5 FABRICATION

.1 Locker Construction: Provide lockers assembled by riveting or bolting body components together for unitized construction with common intermediate upright separating units. Bolt spacing not to exceed 229 mm (9") o.c. Fabricate from unperforated, cold-rolled steel sheet with thicknesses as follows:

.1 Tops, Sides, Backs and Shelves: 24 gauge (0.6 mm – 0.0239").

.2 Continuous Sloped Tops: 18 ga. (1.214 mm – 0.048").

.3 Bottoms: 16 ga. (1.52 mm – 0.06").

.4 Integral Toe Base: 14 ga. (1.89 mm – 0.0747") thick.

.5 Frames: Channel formed; fabricated from 16 ga (1.52 mm – 0.06") thick, cold-rolled steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.

.1 Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical frame members.

.6 Continuous Hinges: Manufacturer's standard, steel continuous hinge. Provide self-closing hinges, riveted to door and attached to door frame with not less than 2 factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.

.7 Doors (Heavy-Duty Lockers): One-piece; fabricated from 14 ga (1.9 mm – 0.075") thick, cold-rolled steel sheet; formed into channel shape with double bend at vertical edges, and with right-angle single bend at horizontal edges. Provide 16 ga. (1.52 mm – 0.06") full height reinforcement channel for single, double and 3-tier lockers.

.1 Door Style: Vented panel as follows:

.1 Concealed Vents: Slotted perforations in top and bottom horizontal return flanges of doors.

.8 Filler Panels: 20 ga. (0.9 mm – 0.0359") to match locker construction.

2.6 FINISHES

.1 Clean and degrease thoroughly cold rolled steel surfaces and pretreat with iron phosphate corrosion inhibitor. Finish cleaned and degreased cold rolled steel surfaces with abrasion and graffiti resistant coating cured to ensure uniform, smooth, protective tough and durable finish.

.2 Provide manufacturer's standard 2 mm hybrid epoxy/polyester powder, electrostatically applied coating to ensure uniform thickness and baked to cure. Colours: To be selected by Consultant at a later from manufacturer's full range.

.1 Colour Scheme: As selected by *Consultant* at a later date from manufacturer's full range to provide uniform, smooth protective finish. Allow for maximum of 3 colours.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 *Install* metal lockers on integral metal bases as shown on *Drawings*. Securely bolt lockers together in banks.

.2 Install end gables and similar trim materials for sloping top lockers; Install trim full height at battery end and at junctions with other materials. Where required, Provide vertical full height filler panels.

.3 Upon completion, test doors and adjust for ease of operation.

3.3 CLEANING

.1 Clean and Make Good surfaces soiled or damaged. Polish units before final acceptance by *Consultant*.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* miscellaneous specialties including but not limited to following:

.1 90° Convex Mirror (CVX-1)

.2 180° Convex Mirror (CVX-2)

.3 Glove Box Holder (GBH-1)

.4 Hand Sanitizer Dispenser (HS-1)

.5 Hand Sanitizer, Anti-Ligature (HS-2)

.6 Sharps Disposal (SHD)

.7 Trash Receptacle (WR-1)

.8 TV Wall Support

.9 TV screen projector

.10 Laundry chute

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Full Height: Top of base to underside of ceiling.

.3 Installation:

.1 This includes coordination with other Sections, labour, material and equipment necessary for off-loading of equipment, handling, storing and dismantling of parts if required.

.2 Make provisions for transferring items to proper location in building, connections to building services, covering and protecting, final removal of covering and protection and making ready as required to form fully operative equipment.

.3 Install items with security fasteners and security anchoring devices in security areas.

.4 Purchase: This includes labour, materials and equipment necessary for purchase and delivery of equipment to site.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at *Project* site to review *Project* requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 Shop Drawings: Submit Shop Drawings indicating material characteristics, details of construction, connections and relationship with adjacent construction. Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.

.4 Samples: Submit samples if requested by *Consultant* in minimum 300 mm x 300 mm (12” x 12”) size.

.5 Test and Evaluation Reports: Submit test data substantiating that proposed materials meet performance criteria specified herein. Submit independent test results showing properties and acceptable fire hazard classification of applicable materials.

.6 Certificates: Obtain certificate from Professional Engineer responsible for design which includes seismic assessment and field review of this part of the Work, validating that work substantially complies with requirements of the National Building Code of Canada and that requisite field reviews have been completed.

.7 Maintenance Instructions: Submit maintenance instructions in accordance with Division 01.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years’ experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years’ experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.3 *Mock-up*s: *Provide Mock-ups* in locations designated by *Consultant* and as required to demonstrate quality of workmanship. Maintain *Mock-ups* during construction in an undisturbed condition as a standard for judging the completed work.

2 - PRODUCTS

2.1 DESCRIPTION

.1 Regulatory Requirements:

.1 Fire performance characteristics: Provide wall protection system components having ULC or UL label indicating that they are identical to those tested in accordance with CAN/ULC S102.2 or ASTM E84 for Class 1 characteristics, with flame spread of 25 or less and smoke developed of 450 or less.

.2 Install systems in accordance with Code regulations concerning access of physically challenged and disabled persons.

.3 Attach labels to electrical equipment attesting to CSA or Local Utility Company's approval; provide magnetic starters for motors, transformers and overload protection.

.2 Design and Performance Requirements:

.1 Seismic Performance: Design work of this Section to withstand seismic motions determined in accordance with requirements of National Building Code of Canada of Canada and CAN/CSA S832

.2 As far as practical and unless otherwise indicated, Provide PVC-free wall and door protection materials at scheduled locations except egress corridors as required to meet fire-resistance characteristics stipulated by authorities having jurisdiction. Use minimal amounts of PVC-based wall and door protection materials at egress corridors as indicated on Drawings and Schedules.

2.2 MANUFACTURED UNITS

.1 Convex Acrylic Hemispheric Mirrors (CVX): *Provide* impact resistant acrylic surveillance mirrors in sizes shown on *Drawings*. *Provide* units having following characteristics:

.1 Basis-of-Design*:*

.1 90° Convex Mirror (CVX-1): Model No. "PVVH90" by Security Mirror Industries Ltd. or Model No. "DMQ" by CR Laurence; www.crlaurence.ca

.2 180° Convex Mirror (CVX-2): Model No. "PVVH180" by Security Mirror Industries Ltd. or Model No. "DMH" by CR Laurence; www.crlaurence.ca

.2 Hardware, Anchors and Inserts: Provide hardware devices as required for mirror installation.

.2 Glove Box Holder (GBH-1)

.1 Basis-of-Design: "TrippNT 50276 Triple Glove Box Holder – Item #WBB1899999" by Global Industrial or approved equivalent.

.1 "Stainless Steel Glove Dispenser – MDS193095B" by Medline Industries."

.3 Hand Sanitizer Dispenser (HS-1)

.1 Basis-of-Design: Model No. 1920 – Purell LTX-12 by Gojo USA or approved equivalent.

.4 Hand Sanitizer, Anti-Ligature (HS-2)

.1 [TBD]

.5 Sharps Disposal (SHD)

.1 [TBD]

.6 Trash Receptacle (WR-1)

.1 [TBD]

.7 TV Wall Support

.1 [TBD]

.8 Laundry chute

.1 Constructed of heavy gauge extruded aluminum with a clear brushed anodized finish. Provide counterbalanced self-closing chute that automatically closes when door is opened. Design must be enable items to be securely deposited without allowing access to interior compartment.

.2 Provide signage on chute etched or engraved in 35mm high letters as follows: “LAUNDRY ONLY”.

.3 Basis-of-Design: “Mail Chutes, Slots & Book Drops, Model No 1040” by Canadian Mailbox Company or approved equivalent.

2.3 FABRICATION

.1 Accurately fit joints and intersecting members in true planes with adequate fastening.

.2 Fit and assemble work of this Section in shop where possible. Execute according to details and reviewed *Shop Drawings*. Where shop fabrication is not possible, execute trial assembly in shop.

.3 Fabricate finished work free from distortion, weld splatter and defects detrimental to appearance and performance.

.4 Edges of sheet metal which are accessible to users or maintenance personnel shall be pneumatically sanded to yield smooth safe edges with no sharpness.

.5 *Provide* exposed metal fastenings and accessories of the same material, texture, colour and finish as the base metal to which they are applied or fastened, unless otherwise specified.

.6 Do not expose trademarks or labels on finished surfaces.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Conform to manufacturer’s printed instructions for accurate, secure installation. Ensure proper operation.

.2 *Provide* work of this Section true to dimensions, square, plumb, level and free from distortion or defects detrimental to appearance and performance.

.3 *Provide* all necessary reinforcing including but not limited to steel stud backup and securely fasten components to suit design requirements. Ensure proper reinforcing has been provided as necessary.

3.3 PROTECTION

.1 Cover finished surfaces and protect exposed corners and areas vulnerable to damage by persons or by movement of materials, tools or equipment.

END OF SECTION

This page intentionally left blank

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* safety protection padding for following items including but not limited to following:

.1 walls,

.2 doors and frames,

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Sequencing: Coordinate installation with related Sections referenced herein.

.2 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 *Product Data*:

.1 Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets *Provide* required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. *Provide* adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 *Shop Drawings:* Submit *Shop Drawings* in accordance with Division 01. Ensure *Shop Drawings* indicate material characteristics, details of construction, connections and relationship with adjacent construction.

.4 Samples:

.1 Submit in accordance with Division 01; Submit 3 samples of each type of material provided under this Section size for review of protective padding system for use in safety cells and seclusion rooms. Minimum sample size: 75 mm x 75 mm (3”x3”)

.5 Operation and Maintenance Data: Maintenance Data: Submit 3 copies of detailed instructions for maintaining, preserving and keeping rubber flooring clean and give adequate warning of maintenance practices or materials detrimental to safety padding.

.6 Site Quality Control Submittals: Submit a diagram of area showing locations and results of each of the following tests as required by pre-installation testing:

.1 Calcium chloride test

.2 Acidity and alkalinity test

.3 Relative humidity test

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 *Mock-up*s: *Provide Mock-ups* in locations designated by *Consultant* and as required to demonstrate quality of workmanship. Maintain *Mock-ups* during construction in an undisturbed condition as a standard for judging the completed work.

.3 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: Comply with material manufacturer's ordering instructions and lead time requirements to avoid delays.

1.7 PROJECT CONDITIONS

.1 Ambient Conditions: *Provide* minimum temperature of 18 deg C (65 deg F) and humidity manufacturer's recommendations, during and after installation. Do not expose safety padding panels to direct sunlight during or after installation.

1.8 WARRANTY

.1 Warrant work of this Section for period of 5 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to: loss of adhesion, resiliency or delaminating; buckling, bond failure or extensive colour fading.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Safety Padding:

.1 Marathon Engineering Corporation; www.goldmedalsafetypadding.com .
.2 Approved equivalent.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 Fire Performance Characteristics:

.1 Provide wall panels with the following surface burning characteristics when tested in accordance with requirements ASTM E84 and ULC S102 by testing and inspecting organizations acceptable to authorities having jurisdiction. Identify wall panels with appropriate markings of applicable testing and inspecting organization.

.1 Flame Spread: ≤ 5
.2 Smoke Development: ≤ 20.

.2 Design and Performance Requirements:

.1 Verify that installed products function properly, and adjust them accordingly to ensure satisfactory operation;
.2 Ensure padding is self-extinguishing, provides maximum safety when applied to floor, walls;
.3 Ensure applied padding material is uniform, smooth and without cracks or open seams;
.4 Material shall be fungus resistant with scuff resistant resinous coating which shall be easily cleanable with mild detergent.

.3 Ensure all holes are filled with manufacturer's recommended filler.

2.3 MATERIALS

.1 Padded Wall (PW): *Provide* protective safety padding material manufactured from resinous material and meeting performance requirements specified herein.

.1 Acceptable *Products*: "Gold Medal Safety Padding" manufactured by Marathon Engineering Corporation or approved equivalent.

.2 Vertical Panels: Prefabricated from 25 mm (1") nominal padding thickness bonded on 11 mm (7/16") thick OSB. Total Thickness: 38 mm (1-1/2") thick.

.3 Door Jambs: *Provide* 12 mm (1/2") thick safety padding. Total door jamb thickness: 25 mm (1").

.2 Fasteners: *Provide* non-corrosive fasteners for use in attachment of vertical panels as recommended by manufacturer.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Comply with manufacturer's recommendations including the following:

.1 Substrates conditions (clean, dry, free of depressions, raised areas or other defects which would telegraph through the installed resilient material).

.2 Temperature of padding materials and substrate .

.3 Moisture conditions and adhesive bond tests.

.4 Confirmation that curing, hardening, and sealing compounds have not been used on concrete. Remove such compounds before proceeding

.5 Confirmation that vapor barrier below slab has been installed for applications on concrete slabs-on-grade or below grade. Do not proceed with work unless written confirmation of such conditions is received and submitted.

3.2 INSTALLATION

.1 Mechanically fasten vertical panels to walls.

.2 *Provide* number of fasteners per panel be in accordance with manufacturer's recommendations based on type of substrate.

.3 *Provide* approximated gap of 3 mm (1/8") ± 1.5 mm (1/16") between panels. Fill gaps with manufacturer's recommended compound. Sand cured compound to meet adjacent edges. Fill fastener holes with manufacturer's recommended compound. Sand finished installation.

.4 *Provide* manufacturer's recommended top coat upon completion of sanding of surfaces (walls, doors, ceiling and floor).

3.3 CLEANING

.1 Clean adjacent surfaces, which have been soiled or otherwise marred, to completely remove evidence of material causing same

3.4 PROTECTION

.1 Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* motorized roller window shades including but not limited to following:

.1 motorized roller window shade assembly complete with translucent shades installed in gypsum board assemblies as required to meet design requirements.

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Operational and Functional Component (OFC): Components within building which are directly associated with the function and operation of the facility. OFCs consist of architectural components, building services components, and building contents. Items specified herein may be designated as OFCs and may need to be designed in accordance with performance requirements specified herein and in Section 13 48 50.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

.2 In particular address the following items:

.1 Prior to commencing work of this Section arrange for manufacturer's technical representative to review with Contractor and Consultant, procedures to be adopted and conditions under which work shall be performed. Inspect surfaces to determine adequacy of existing and proposed conditions.
.2 Cooperate and Coordinate with Electrical Division for their services. Allow access to associated trades for purpose of performing pre-wiring and partial mounting of electrical equipment and concealed wiring required by design. Exposed wiring is not acceptable.
.3 Coordinate installation with related Sections referenced herein.
.4 Co-operate fully with other Subcontractors on the Work and promptly proceed with work of this Section as rapidly as job conditions permit.
.5 Co-operate with other Sections for application of all miscellaneous specialties.
.6 Supply items to be built-in in ample time to be incorporated into work of other Subcontractors, together with measurements and other information required for location of it.

.7 Ensure work which may create dust does not proceed during work related to painting and final finishing.

1.4 SUBMITTALS

.1 Product Data: Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.3 *Shop Drawings*: Submit *Shop Drawings* for *Work* of this Section in accordance with Division 01.

.1 Submit *Shop Drawings* which clearly indicate shade sizes, electrical wiring, locations, operation, methods of attachment, and description of components. Indicate each component, size, shape, material, thickness, gauge, finish, methods of joining, joint locations, fastening devices, anchorage components, methods of attachment and relationship with adjacent components and construction.

.1 Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.

.2 Submit reflected ceiling plans, drawn to scale, showing following items coordinated with each other, based on input from installers of items involved:

.1 Ceiling suspension system members and attachment to building structure.
.2 Ceiling-mounted or penetrating items including light fixtures, air outlets and inlets, speakers, sprinklers, recessed shades, and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
.3 Shade mounting assembly and attachment.
.4 Size and location of access to shade operator and adjustable components.

.3 Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication to ensure proper fitting of work. Do not fabricate work until Shop Drawings have been reviewed.

.4 Samples: Submit samples in accordance with Division 01. Submit following samples in sizes indicated:

.1 Submit sample shade fully representing shades to be provided complete with head rail, end caps, gears, sprocket wheels, motors, brackets and similar accessories.

.2 Submit samples of fabrics complete with edge reinforcing and finish colours for selection and approval. Do not order material until colour samples have been approved. Fabric sample: minimum 300 mm (12") square.

.5 Test Data: Submit test data substantiating that proposed shade fabric meets all performance criteria specified herein. Submit independent test results showing properties and acceptable fire hazard classification of shade fabric.

.6 Certificate: Submit written certification that materials, systems, and assemblies have been installed in accordance with manufacturer's requirements.

.7 Maintenance Instructions: Submit maintenance instructions in accordance with Division 01. Indicate methods for maintaining roller shades and finishes; precautions about cleaning

materials and methods that could be detrimental to fabrics, finishes, and performance and operating hardware

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years' experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Licensed Professionals: Employ a full time professional structural engineer registered in the Province of Prince Edward Island, carrying minimum $2,000,000.00 professional liability insurance to:

.1 design the components of the work of this Section requiring structural performance in accordance with applicable codes and regulations, review design documents, and provide site administration and inspection of this part of the *Work*.

.2 Submit certificate validating seismic assessment and field review of this part of the *Work*

.3 Mock-ups: Provide Mock-ups in locations designated by Consultant and as required to demonstrate quality of workmanship. Maintain Mock-ups during construction in an undisturbed condition as a standard for judging completed work. Reviewed *Mock-up* may form part of final installation if undisturbed at time of *Substantial Performance of the Work*.

.4 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site only when work of this Section can be started.

.2 Before delivery to site verify each assembly for proper operation. Clean each assembly of marks and smudges prior to providing wrap up protective covering.

.3 *Provide* necessary crating and bundling for shipment of components to site including protection against weather likely to impair adequacy or appearance of material in finished assembly.

.4 Remove and replace damaged units at no additional cost to *Owner*.

1.7 WARRANTY

.1 Warrant *Work* of this Section for period of 2 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the *Contract*. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of *Consultant* and at no expense to *Owner*. Defects include but are not limited to: deformation of members, mechanical failure, motor failure and failure of system to operate as designed.

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Altex; www.altex.ca

.2 Hunter Douglas Contract; www.hunterdouglas.com

.3 Nysan Shading Systems Ltd.; www.nysan.com

.4 Solarfective *Products* Limited; www.solarfective.com

.5 Sun Glow; www.mysunglow.com

.6 Sun*Project* Canada Inc.; www.sun*Project*.com

.7 Urban Edge Shading, Inc.; www.urbanedgeshading.com

.2 Substitution Limitations: This Specification is based on Altex *Products*.

.3 Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant's opinion, and subject to Consultant's review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 All electrical components shall conform to Canadian Hydro Electrical Code, Electrical Inspection Department Bulletins, Local Hydro Electric Safety Code and Canadian Standards Association. All components shall have CSA approval label.

.2 Flammability: Ensure fabric meets National Building Code of Canada flammability requirements, NFPA-701 and CNAN/ULC S109 Small Scale vertical burn requirements when tested by independent testing and inspecting agency acceptable to authorities having jurisdiction.

.1 Light fastness: AATCC Method 16A exceeding 60 hours. Class 5.
.2 Antibacterial and antifungal resistance:

.1 AATC Test Method 147: Pass
.2 AATC Test Method 30: Pass

.2 Design and Performance Requirements

.1 Seismic Performance: Design work of this Section to withstand seismic motions determined in accordance with requirements of National Building Code of Canada and CAN/CSA S832. Professional engineer referenced in this Section shall be responsible for designing systems and submitting signed and sealed analysis data and Shop Drawings illustrating seismic-resistant systems. Refer to Structural documents for seismic sensitivity values

.2 Design motorized roller window shade system with solenoid activated disc brake mechanism with infinite positioning so that shade is capable of stopping and holding at any position within window opening, controlled from single or remote location.

.3 *Provide* factory assembled roller window shade units consisting of surface mounted roller shade units on face of frames or at ceiling with two end brackets, complete with shade roller tube, extruded fascia, switches, brake, motor, gearbox, hembar, fabric, fastenings, anchorages and accessories specified and required.

.4 Provide installation brackets that facilitate easy removal and replacement of blinds.

.5 *Provide* assemblies to suit adjacent ceilings and finishes. Ensure removal does not require disassembly of shade unit. *Provide* left or right hand operative option as required to suit design requirements. *Provide* side and sill channels at locations requiring blackout shades.

.6 Fabric Performance Requirements:

.1 *Provide* shade fabric capable of hanging flat without buckling or distortion easy to clean and wipeable.
.2 Window coverings will allow control of exterior light entering room during daylight hours and provide privacy during daylight and non-daylight hours.
.3 Provide black-out window coverings where indicated on Drawings, provide materials, tracks, seals, and operation suited to that purpose.
.4 Use window coverings manufactured from materials and mechanisms that minimize cleaning and maintenance operations and maximize infection prevention and control.
.5 Consider colour of window coverings and the impact this will have on mechanical system.
.6 Ensure edge when trimmed, hangs straight without raveling with unguided roller shade cloth rolling true and straight without shifting sideways more than $\pm$ 3 mm (1/8") in either direction due to wrap distortion or weave design.
.7 Fabric will be inherently anti-static, flame retardant, fade and stain resistant, light filtering, room darkening, & blackout fabrics providing openness factors specified herein. Fabric containing fiberglass, PVC, polyester, acrylic or vinyl laminates.

2.3 MATERIALS

.1 Extruded Aluminum Tube: ASTM B209M, Aluminum 6063-TE alloy 67 mm (2.65") diameter tube with internal keyway for tubular motor. Tube shall be extruded with two fabric mounting channels. Channels shall be designed to accept extruded vinyl spline.

.2 Sheet Steel: ASTM A653/A653M-98, Designation Z275, stretcher levelled commercial quality galvanized steel.

.3 Galvanizing of odd shaped components: ASTM A153/A153M; minimum weight of zinc coating, in ounces per sq ft of surface in accordance with Table 1 of ASTM A153/A153M, for various classes of materials used on Project.

.4 Shading Fabric: *Provide* vinyl coated polyester yarn. *Provide* fabric tensioned in finishing range prior to heat setting to keep wrap ends straight and minimize or eliminate weave distortion to keep fabric flat. Ensure fabric is dimensionally stable, non-flammable and moisture, UV, heat and fungi resistant.

.1 Solar Control Fabric:

.1 *Provide* "SheerWeave Style 4400" by Phifer Wire *Products* or approved equivalent with following characteristics:

.1 Openness Factor: 3% + 0.0%
.2 UV. Blockage: 97%
.3 Thickness: 0.94 mm (0.037")
.4 Mesh Weight: 702 g/m^2 (21 oz/yd^2).
.5 Stiffness (mg): 650 warp, 450 fill.
.6 Composition: 25% polyester, 75% vinyl coated polyester.
.7 Stretch: 1.5% warp, 4.0% fill

.2 Fabric Colour: Selected by *Consultant* from standard colour range of the specified manufacturer. Shade fabric on any one floor to be from the same dye lot.

2.4 MANUFACTURED UNITS

.1 Single Roller Window Shades – Mental Health Areas (RBL-1):

.1 *Provide* motorized single roller shade system designed for lifting shades of type, size, weight, construction, use, and operation frequency indicated; complete with electric motors and factory-prewired controls, stations, devices, switches and required accessories. Coordinate operator requirements and electrical characteristics with Division 26.

.1 Operation: wall-switch-operated control station or Remote control to be selected at a later date.

.2 Hembar: Sewn-in, clear anodized aluminum type with end caps

.3 Custom trim: Extruded aluminum to shapes and profiles indicated, where adjacent finishes abut the shade assembly, and to Provide attachment for adjacent finish, finished to match fascia/soffit.

.4 Blackout Channels: Extruded aluminum 28 mm (1-1/8") by 38 mm (1-1/2") complete with 12 mm (1/2") fuzz. *Provide* blackout channels at sides and sills.

.5 Ceiling cover plate: Where indicated or required, Provide clear anodized aluminum finish for bottom coverage of shade (semi-enclosure) for recessed application in ceiling.

.6 Mounting: Ceiling-Mounted or Frame-Mounted as indicated on Drawings.

.7 Acceptable *Products*: “Deko SafeGuard” by Altex.

2.5 COMPONENTS

.1 Extruded Vinyl Spline: Asymmetrical locking channels and embossed fabric guide for use with 64 mm (2.55") diameter tube. Spline shall be snapped and locked into tube and have sufficient capacity to support fabric shade. Spline shall be readily removable without dismounting tube from end brackets.

.2 End Brackets: 3.2 mm (1/8") steel to be mounted to wall, jamb or ceiling as required and indicated on Drawings. *Provide* brackets permanently installed and capable of accepting fascia.

.3 End Plug: End cap shall have steel pin which permits up to 7.9 mm (5/16") lateral adjustments in tube width.

.4 Fascia: *Provide* extruded 6063-T5 aluminum fascia with minimum thickness recommended by manufacturer to suit design that shall clip on to extruded aluminum mounting clips and brackets without any exposed fastening devices. Fascia shall not cover top of bracket when in place to ensure airflow over top of shade and bracket assembly. If required for larger shade sizes, *Provide* break formed 0.9 mm (20 ga) satin coated steel clipped to hanger clips without use of exposed fastening devices.

.5 Closure and Hanger: *Provide* extruded S063-T5 aluminum closure hanger and closure cover with anodized or painted finish, fastened inside the pocket. If required for larger shade sizes, *Provide* break formed 0.9 mm (20 ga) satin coated steel closure cover.

.6 Side and Bottom Channels (for Blackout shades): Extruded aluminum channels 28 mm (1-1/8") by 38 mm (1-1/2") complete with 12 mm (½") fuzz to reduce light infiltration around the sides and sills of the shades.

.7 Centre Support Assembly: Steel bracket 3.2 mm (1/8") shall have vertically adjustable plastic saddle and aluminum connector axle. At curved wall, more than one shade shall be driven by one operator through universal axles.

.8 Hembar: Extruded aluminum profile with hollow section, single lengths for each shade panel.

.9 Motors: *Provide* interference free motors with built-in thermal overload protection, brake, permanently lubricated bearings, and limit switches; sized by shade manufacturer to start and operate size and weight of shade considering service factor or considering Project's service conditions without exceeding nameplate ratings. *Provide* listed and labeled to comply with UL and CSA C22.1. Coordinate with Division 26 for provision of wiring and electrical requirements for shade assemblies.

2.6 FINISHES

.1 Cleaning and Shop Painting for Concealed Steel Sheet Finishes: Hot dip galvanized, complying with ASTM A123/A123M.

.2 Aluminum Finish:

.1 Architectural Class II; Clear anodized in accordance with Aluminum Association Finish Designation AA-M12-C22-A31.

.3 Dielectric Separator: To *Provide* die-electric separation between two dissimilar metals and prevent galvanic reaction. Best grade, quick drying non-staining alkali resistant bituminous paint or epoxy resin solution or membrane type acceptable to *Consultant*.

2.7 FABRICATION

.1 Coordinate and verify job site dimensions affecting this work. Submit in writing dimensions or conditions which vary from those on reviewed *Shop Drawings* or detrimental to installation. Obtain corrective measures from *Consultant* prior to fabrication. Ensure suitability of adjacent building components in relationship to work of this Section.

.2 Submit in writing defects in work prepared under other Sections. Commencement of work shall imply acceptance of substrates and conditions.

.3 Roller Window Shade Assembly:

.1 Design and fabricate heavy duty roller window shade assembly to keep maintenance to minimum.

.2 Motorized roller window shade assembly shall operate smoothly having capability to adjust stop and hold at an infinite number of positions as required.

.3 Assembly at highest and lowest shade position shall have automatic stop to prevent over winding or unrolling.

.4 Assembly mechanism shall have structural capacity to accommodate specified shades in window sizes required for this *Project*. Design assembly mechanism to suit size of windows and mass of system.

.4 Shade Mounting Brackets:

.1 *Provide* mounting in accordance with reviewed *Shop Drawings* as required to keep brackets totally concealed from view when fully assembled. *Provide* means of attaching fabric without exposed hardware.

.2 *Provide* assembly to prevent accidental dislocation of tube and shade.

.5 Roller Tube:

.1 Design extruded aluminum alloy roller tube to suit assembly design with either end of tube to engage drive system through internal or external extruded keyway. Extruded roller tube shall have wall thickness to suit design requirements with minimum wall thickness of 1.39 mm (0.0547") with reinforcement for fabric to provide anti-deflection support for wide span shades. Formed aluminum tube is unacceptable.

.2 Design tubes to be removable without removing the drive assembly, block resetting, or readjusting the pre-set stops. Shade tube shall be self aligning.

.3 Roller tube shall be sized and reinforced internally as necessary to prevent excessive deflection in span of tube. Excessive deflection is defined by observation whereby shades in their open position reveal puckering, sagging or billowing, or where the tube deflects beyond 4% of roller length.

.4 Each roller tube shall be identified to its location in accordance with reviewed *Shop Drawings*.

.6 Fabric Mounting Spline:

.1 Fabricate snap-in-place spline of extruded vinyl with asymmetrical insertion locking channels and embossed fabric guide. Spline shall have sufficient capacity to hold shades when spline is snapped and locked into the tube. Fabric shade shall be readily removable without removing the tube from the retainer brackets, or removing the brackets from the wall.

.7 Snap-In-Place Fascia:

.1 *Provide* rectangular formed metal fascia where shown of minimum 1.29 mm (0.0507") thick formed aluminum or extruded aluminum of minimum 2 mm (0.078") thick housing.

.2 Finished fascia shall return back at bottom to permit a maximum opening of 50 mm (2"). Furnish in lengths of up to 3000 mm (10'-0") unsupported without any visible sag or distortion.

.3 Fascia members are not required for overhead concealed application.

.4 Where shades are face mounted to faceted window arrangement, *Provide* matching closure section and bridging clips between ends of abutting units.

.8 Shade Fabric Hem Tube:

.1 At manufacturer's option, hem tube may be extruded aluminum, rectangular in shape, designed to hang perfectly perpendicular, and to totally conceal any heat-set or sewn seams within the tube. The internal spline shall secure the fabric evenly across its full width. *Provide* a separate port within the tube to allow storage of non-corrosive weight.

.9 Shade Fabrication:

.1 Do necessary cutting and sewing of fabric to produce finished *Product* having neat, even appearance and meeting performance requirements specified.

.2 Fabricate shades with no vertical seams, and with a maximum of 2 horizontal seams per shade. Furnish fabric in adequate width to avoid horizontal seams at spacings of less than 1900 mm. (75") Seams shall be straight, even and offer minimum visual obstruction.

.3 Fabric shall track perfectly straight in its movement to within ±1% of its width from fully open to fully closed position, and when rolled onto tube, it shall be stacked in layers to within ± 3 mm (1/8") of edge alignment.

.4 Bottom edge shall hang straight and true, with hem weights totally enclosed in extruded hem tube. Heat sealing alone is not acceptable.

.5 All sewing shall incorporate heavy denier polyester yarn and machine stitching shall be straight and neatly finished with no loose threads visible in finished work. Heat seaming is not acceptable in areas in which fabric is exposed.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Examine adjoining work on which this work depend. Verify governing dimensions, elevations, minimum clearances. Confirm that conditions are satisfactory before proceeding. Commencement of work shall be deemed to be acceptance of conditions and substrates.

3.2 INSTALLATION

.1 Coordinate installation and fastenings with trades providing adjacent components. Coordinate location of support framing and blocking for installation of roller window shades.

.2 *Provide*, as part of work of this Section, custom trim components including gypsum board and tee bar trim items to accommodate adjacent ceiling systems and finishes to approval of *Consultant*.

.3 *Install* shades in accordance with manufacturer's instructions in accordance with reviewed *Shop Drawings* and as indicated, in true, flat planes.

.4 Securely attach all installation fittings to their mounting surfaces with screws of correct length and type, and with compatible plugs or anchors where required.

.5 Lock the drive end wheel of the motor to the tube, using screws. A notched section in the tube turns the ring which activates the shade assembly. Upper and lower stop positions are adjusted with hex key limit switches located on motor end.

.6 Maximum tow motors shall be operated by a single position rocker switch control, located remotely as directed by the *Consultant*. Where required, motor shall be hooked up to a “Motor Group Control” (MGC) located as shown on Manufacturer’s wiring diagrams. Manufacturer shall supply switch and MGC for installation and hook-up by the electrical contractor, CSA or UL approved. *Provide* brushed stainless steel switch cover plates (1, 2, 3 or 4 gang) as required.

.7 Hang shades to substrate in a rigid and secure manner using fastener types and arrangements shown on *Shop Drawings*. Shades shall have a 15 mm (5/8") air space at sill.

.8 Ensure penetrating fastener do not interrupt continuity of air/vapour barrier integrity.

.9 Shades and their fabrics shall hang flat at vertical installation without buckling or distortion. Edge when trimmed, shall hang straight without curling or ravelling.

.10 Unguided roller shade cloth shall roll true and straight without shifting sideways more than ±3 mm (1/8") in either direction due to warp distortions or weave design.

3.3 ADJUSTMENT AND CLEAN-UP

.1 Adjust shades for smooth operation and correct alignment. Perform system operation, service and replacements methods in presence of *Owner’s* personnel.

.2 Remove protective coating. Clean shades and remove finger marks and smudges from shades and adjacent surfaces.

.3 Leave shades in raised position at completion of work of this Section.

.4 Upon completion of the work of this Section, remove all Products, materials, debris and equipment from the site.

.5 Leave site in a neat and tidy condition, acceptable to *Consultant*.

.1 Do all touch-up required to satisfaction of *Consultant*.

3.4 SCHEDULES

.1 Roller Shade Fabric Schedules:

.1 Single Roller Window Shade (RBL-1):

.1 Translucent Fabric: “SheerWeave Style 2410” or approved equivalent; 3% Open Factor

END OF SECTION

1 - GENERAL

1.1 SUMMARY

.1 Work Included: *Provide* stainless steel health care casework including but not limited to following:

.1 Stainless Steel Casework

.2 Stainless Steel Countertops

.2 Related Requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCES

.1 Definitions:

.1 Post-Disaster Building: This facility is classified as post disaster as defined in the National Building Code of Canada. Post-disaster building means a building that is essential to provision of services in event of a disaster.

.2 Reference Standards: Latest published editions of reference standards listed in this Section in effect as of Bid Closing Deadline of the Project, including any amendments adopted, are applicable unless otherwise indicated.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Prior to starting work of this Section, convene a pre-installation meeting at Project site to review Project requirements and site conditions with pertinent parties. Conform to requirements of Division 01.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's literature and data sheets for each type of material provided under this Section for *Project* in accordance with requirements of Division 01. Ensure data sheets provide required information including detailed instructions for installing as well as maintaining, preserving and keeping materials in clean and safe conditions. Provide adequate warning of maintenance practices or cleaning agents detrimental to specified materials.

.2 Submit data and details for construction of the stainless steel casework as well as information regarding the name, quantity, type and construction of materials (such as hardware, gauges, etc), that will be used to complete the project.

.3 Safety Data Sheets (SDS): Submit SDS for inclusion in Operation and Maintenance Manual specified in Division 01, for adhesives, sealants and any other material designated by Consultant.

.2 *Shop Drawings*:

.1 Submit *Shop Drawings* in accordance with Division 01 for fabricated items and assemblies of stainless steel casework with a detailed description, clearly indicated methods of construction, gauges, assembly, fastenings, services and similar items.

.2 Identify and explain any variation in *Shop Drawings* which do not adhere to original details and *Specification* requirements. Advise *Consultant* in writing of any conditions that would limit or adversely effect design intent.

.3 Ensure component parts and assemblies of each piece of equipment will support the loads anticipated without deflection detrimental to function, safety or appearance.

.4 Prepare fully dimensioned "Roughing-In" and final connection point *Drawings* for mechanical and electrical services. Separate mechanical and electrical, or combined *Drawings*, may be submitted. Include walk-in and fire suppression schematics and any pertinent installation diagrams including dimensioned "sleeving" drawing.

.5 Verify power and location requirements for any piece of equipment that is being supplied by *Owner* or is existing and being reused. Incorporate this information into the *Shop Drawings*, "Rough-in" and connection point *Drawings*.

.3 Samples:

.1 Submit sample in accordance with Division 01. Submit a sample of components or fabrication method, material or finish, for review and approval before proceeding with that aspect of work. Where necessary, request a shop inspection of an assembly which cannot be submitted for approval.

.2 Submit the following:

.1 One (1) 24” (600mm) wide, full-height base cabinet: Construction to consist of one (1) drawer, one (1) door, one (1) cupboard with adjustable half/full depth shelf and related hardware (pulls, hinges, drawer slides, etc.), complete with finish.
.2 One 36” (900mm) wide x 36” (900mm) high wall cabinet: Construction to consist of two adjustable shelves as well as related hardware and doors, complete with finish.
.3 One complete set of color chips representing the manufacturer’s full range of available colors.
.4 Minimum sample size 2 inches by 3 inches (50mm x 76mm).
.5 One Countertop backsplash and finished edge.

.3 Samples shall be precise articles proposed to be supplied.

.4 Reviewed samples will become standard of workmanship and material against which installed work will be reviewed.

.4 Test and Evaluation Reports: Submit test data and design criteria which are in compliance with the project specifications.

.5 Maintenance Manuals: Submit maintenance instructions in accordance with Division 01, bound and labeled.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers: Provide Products for Work of this Section by manufacturer with minimum 10 years’ experience in the manufacture of such materials.

.2 Installers: Provide work of this Section executed by competent installers with minimum 5 years’ experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

.2 Licensed Professionals: Employ a full time professional structural engineer registered in the Province of Prince Edward Island, carrying minimum $2,000,000.00 professional liability insurance to:

.1 design the components of the work of this Section requiring structural performance in accordance with applicable codes and regulations, review design documents, and provide site administration and inspection of this part of the *Work*.

.3 Submit certificate validating seismic assessment and field review of this part of the *Work*

.4 Single Source Responsibility: Ensure primary materials provided in this Section are obtained from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.

.5 *Mock-up*s: *Provide Mock-ups* in locations designated by *Consultant* and as required to demonstrate quality of workmanship. Maintain *Mock-ups* during construction in an undisturbed condition as a standard for judging the completed work. Do not proceed with remaining work until installation is approved by Consultant.

.1 Install base cabinet with specified hardware.

.2 Install wall cabinet with specified hardware.

.3 Install countertops complete with side and backsplashes.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Co-ordinate deliveries of stainless steel casework in conjunction with millwork and other construction activity and progress at site and as designated by *Owner*.

.2 Deliver, unpack and set in place all component in designated position, ready for final connection of services, for units with electrical or mechanical connections where applicable.

.3 *Supply* to *Owner*, in sufficient time, any information or items of service, articles, components or equipment which requires building in or which may overlap or impede work of others.

.4 *Provide* all necessary information within adequate time and in proper sequence regarding exact location of openings, chases and any attachments or other fittings required for stainless steel casework.

.5 *Supply* and deliver to site in sufficient time all inserts, anchors, bolts, sleeves, ferrules and similar items for attaching to, or building into, masonry, concrete and other work for proper anchorage and fixing of equipment. Include necessary templates, instructions, directions and/or assistance in location and installation of all items by others.

.6 Identify each casework cabinet with temporary labels showing location and item number for ease of installation.

.7 After installation has been completed and all items checked and adjusted where necessary for satisfactory operation, arrange for inspection of stainless steel casework. If items are found unsatisfactory, make necessary corrections and adjustments.

1.7 PROJECT SITE CONDITIONS

.1 Building must be enclosed (windows and doors sealed and weather-tight);

.2 An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place;

.3 Adjacent and related work shall be complete;

.4 Ceiling, overhead ductwork and lighting must be installed;

.5 Site must be free of any further construction such as “wet work”;

.6 Required backing and reinforcements must be installed accurately and the project must be ready for casework installation.

1.8 WARRANTY

.1 Warrant work of this Section for period of 5 years from Substantial Performance of the Work against defects and/or deficiencies in accordance with General Conditions of the *Contract.* Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of *Consultant* and at no expense to *Owner*. Defects include, but are not limited to: ruptured, cracked, or stained coating; discoloration or lack of finish integrity; cracking or peeling of finish; slippage, shift, or failure of attachment to wall, floor, or ceiling; weld or structural failure; warping or unloaded deflection of components; failure of hardware

2 - PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers may be acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 CSI Lab Casework: https://canadianscientific.ca/lab-furniture/

.2 Lab Design/United *Supply* Corp.; www.lab-design.com

.3 MAC Medical: www.macmedical.com

.4 Mott Manufacturing Ltd.; www.mott.ca

.5 SML Stainless: www.smlstainless.com

.2 Substitution Limitations: This Specification is based on *Products* by Mott Manufacturing.

.3 Comparable Products from manufacturers listed herein offering functionally and aesthetically equivalent products in Consultant’s opinion, and subject to Consultant’s review, will be considered provided they meet the requirements of this Specification.

2.2 DESCRIPTION

.1 Regulatory Requirements:

.1 All electrical components shall conform to Canadian Hydro Electrical Code, Electrical Inspection Department Bulletins, Local Hydro Electric Safety Code and Canadian Standards Association. All components shall have CSA approval label.

.2 Any plumbing or drainage systems shall conform to Plumbing Code and Local Water Resources Act except as modified by regulations and bylaws of authorities having jurisdiction.

.2 Sustainable Characteristics:

.1 VOC Content Requirements for Paints and Coatings: Paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113. Methylene chloride and perchloroethylene must not be intentionally added in paints, coatings, adhesives, or sealants.

.2 VOC Content Requirements for Adhesives and Sealants: Adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168. Methylene chloride and perchloroethylene must not be intentionally added in paints, coatings, adhesives, or sealants. Do not use adhesives that contain urea formaldehyde.

.3 Design and Performance Requirements:

.1 Seismic Performance: Design work of this Section to withstand seismic motions determined in accordance with requirements of National Building Code of Canada of Canada and CAN/CSA S832

.2 As a minimum countertops to be designed as follows:

.1 Countertops to support all deadloads.
.2 Concentrated Live load bearing capacity: 2.67 KN (600 lb-f)
.3 Distributed Live load bearing capacity: 200 lb/ft (0.89 kN/m) without deformation or deflection.
.4 Maximum Deflection at Midspan: L/1000 or 3 mm (1/8") whichever is less.

.3 Installation of stainless steel countertops and work surfaces shall comply with requirements of Scientific Equipment & Furniture Association (SEFA 3-2010). Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection

2.3 MATERIALS

.1 Sheet Steel:

.1 Mild steel, cold rolled furniture grade to requirements of ASTM A1008/A1008M, Grade C or higher, with smooth surfaces to furniture quality.

.2 Galvanized Sheet Steel:

.1 Commercial quality galvanized sheet steel to ASTM 653/A653M, Designation Z275 (G90).

.3 Stainless Steel:

.1 *Provide* highest architectural quality in various forms, straight and true. Ensure there are no scratches, scars, creases, buckles, ripples or chatter marks. *Provide* finish surfaces suitable for polishing where required. Ensure finished surfaces exposed to view are free of pitting, seam marks, roller marks, oil-canning, stains, discolourations or other imperfections.

.2 Sheet: ASTM A240, type 304 or 316 alloy.

.3 Finish: Unless otherwise indicated, AISI No. 4 brushed Finish

.4 Sealant: Conforming to requirements of Section 07 92 00.

.1 One component, RTV silicone sealant. Color to suit application.

.5 Sheet Metal Thickness:

.1 Use the following minimum steel thicknesses for furniture manufacturing:

.1 0.3mm (11 Ga) leveling bolt gusset plates.
.2 1.9mm (14 Ga) drawer slides and side suspension channels.
.3 1.5mm (16 Ga) for tubular rails, legs for tables, gusset plates, cabinet top and intermediate horizontal rails.
.4 1.2mm (18 Ga) for door and drawer fronts, cabinet floor, cabinet sides, vertical front members, cabinet toe kick, service cover panels, table and kneehole frames, front rails, gable legs and dust caps, false panels, furring and filler panels.

.5 0.9mm (20 Ga) for drawer backs, door backs, vertical closure channel, removable back panels, shelves, drawer bodies, drawer dividers, bin bodies, and pull-out shelves.

2.4 MANUFACUTURED UNITS

.1 Cabinet Frame:

.1 Provide one-piece die-formed cabinet bottom construction with return side flanges turned down. Spot weld flanges to cabinet sides. Provide sink cabinets with galvanized bottom painted to match cabinet.

.2 Cabinet bottoms shall be turned down at front to form 32mm (1-1/4") "U" channel to accept toe kick and turn down 133mm (5-1/4") at back with 16mm (5/8") return to form the back lower member of cabinet base. Provide punched 19mm (3/4") dia. corner holes for access to levelers and to accept PVC press plugs. It shall be possible to access levelers from above cabinet without removing drawers or drawer supports.

.3 Provide additional vertical 75mm (3") "HAT" shaped channels, spot-welded to or formed with the rear vertical corner. Channel shall be provided with pre-punched holes to receive shelf clips, and slotted holes to receive drawer suspension tracks. Cabinets 762mm (30") wide and larger shall be provided with intermediate 117mm (4-5/8") "HAT" channels to brace cabinet and accept shelf clips and drawer tracks

.4 Where applicable, the front corner posts shall be pre-punched and slotted to accept drawer suspension systems and suspension pull-out shelves. Front vertical posts shall form inboard flush front construction for doors and drawers acting as the cabinet main member side gable tying the cabinet bottom and horizontal member together to form a rigid case. Front post rear closure channels shall be "J" shaped 9mm (11/32") x 33mm (1-5/16") x 49mm (1-15/16"). Provide channel with pre-punched holes to receive shelf clips.

.5 Doors and drawers shall overlay top intermediates and floor horizontal members.

.6 Top horizontal front framing member shall form a "J" shaped section 75mm (3") wide, 10mm

.7 (3/8") return by 25mm (1") deep with 16mm (5/8") return.

.8 Intermediate horizontal framing members shall form a "U" 32mm (1-1/4") high with a 25mm (1") return on top and 16mm (5/8") return on bottom.

.9 Top rear horizontal framing member shall be 50mm (2") x 32mm (1-1/4") angle section welded to back corner lapped post and side gables with welded corner gusset plates acting as cabinet bracing and counter top material fixing member.

.10 Enclose cabinetry toe space shall be 75mm (3") deep x 100mm (4") high and shall act as a total enclosure to bottom of cabinet. Toe space section shall key up into "U" shaped front floor member and act as reinforcement. Toe space, front floor of cabinet and corner post sections shall be spot welded together forming one structural member.

.11 The toe space members, side gable returns, and back lower member shall form all welded structural corner to accept leveller gussets and 10mm (3/8") levelling bolts.

.12 Cabinet construction shall be electro spot-welded to form a strong well-fitted, one-piece unit.

.13 Exposed horizontal structural cabinet members between doors and drawers shall be unacceptable.

.2 Cabinet Hardware:

.1 Provide all hardware and standard accessories normally part of stainless casework whether shown and/or specified or not, such as locks for cabinets, locks for sliding doors, drawers and hinged door bumpers, drawer stops , shelf clips, sliding door tracks, catches, handles, hinges and similar components.

.2 Pulls: Provide handles for drawers and hinged doors in 100mm (4") satin finish aluminium.

.3 Door Hinges: Provide five knuckle-type barrel door hinges of 1.9mm (14 Ga) steel screwed into door and fastened to cabinet side stile with two counter sunk #8-32 zinc plated machine screws & captive serrated tooth washer nuts. Standard hinge finish shall be bright chrome.

.4 Locks:

.1 Removable core, 5 disc tumbler with 229 key changes on a single cut key complete with master key. Unless specifically indicated otherwise, provide locks on every door, drawer and cabinet.

.3 Base Cabinet Components:

.1 Provide removable back panels for cupboard base cabinets. Provide partial back panels

.2 229mm (9") in height to accommodate plumbing at sink units. When requested, provide back panels and security panels on cabinets requiring locks.

.3 Shelving edges; turned down on all four sides 25mm (1"), and returned under on front and back 25mm (1"). Shelves 914mm (36") and longer shall be provided with "HAT' channel reinforcement at front edge.

.4 Doors:

.1 Fabricate doors of two telescoping metal panels, 19mm (3/4") thick, painted internally with a sound-deadening material extending continuously full-width, and top to bottom.

.2 Reinforce hinged side of door adequately with hinge machine screws to prevent sagging. Secure recessed hinges to cabinet posts with machine screws and concealed self-locking nuts. Provide nylon roller friction catches, mounted on horizontal top or intermediate members pull side of doors. Provide each hinged door with two rubber bumpers.

.3 Doors, drawers, tracks and back panels shall be replaceable in the field without requiring special tools.

.4 All standard double door cabinets shall be designed without center stiles to maximize access to the cabinet.

.5 Drawers:

.1 Fabricate drawer fronts of two telescoping metal panels painted internally, and totally filled with sound-deadening material to eliminate possible drumming effect. The exterior drawer front shall have a channel formation on the top edge with fully finished return edges telescoping together to form fully sounded-deadened drawer front. Removable outside panel with lip to fit over inside panel on top edge, and to lock into position at bottom with rivets to form a rigid, one-piece 19mm (3/4") thick drawer front.

.2 Conventional drawer track systems shall be designed to eliminate metal surface-to- surface contact and reduce side play, while incorporating a self-closing action for 150mm (6") of drawer travel. Made up of custom manufactured components. Each drawer track assembly shall incorporate two nylon rimmed, plated steel ball bearing rollers.

.3 Provide drawer operation on full extension drawer slides, load capacity 45kg (100 pounds).

.4 Drawer body shall consist of one piece construction including the bottom, two sides, back and inner front flanged end which shall be welded to the interior drawer front head. Drawer bodies shall have a reinforcing bend on top edges.

.5 Provide built-in stops to prevent inadvertent removal of drawers, with allowance for drawer to be removed by lifting front of drawers and pulling out.

.6 Provide drawer pulls in central location of drawer face. Two handles shall be provided on units 762mm (30") and larger.

.6 Dust Cap:

.1 Dust caps shall be fabricated from 1.2mm (18 Ga) steel, and shall mount flush with the front edge of the cabinet and extend back at an angle of 30 degrees to a point perpendicular to the rear of the cabinet. Ends shall be finished and flanged so as to allow attachment to the cabinet below.

.7 Stainless Steel Countertops

.1 All factory welds shall be made using the TIG process. Filler rod shall be of the same composition as the base material.

.2 Countertops without sinks: Form tops with 32mm (1.25") high edges with 12mm (0.5") return flange. Reinforce with veneer core plywood or metal hat channels as required or indicated on *Drawings*. Form edges, flanges, side and backsplashes integrally from one sheet of steel. Intersections between side and backsplashes and work surface shall be radiused a minimum of 9mm (0.375"). Where indicated on *Drawings*, *Provide* marine edges. Marine edges shall be 25mm (1") wide and 6mm (0.25") high.

.3 Countertops with sinks: Form tops with 32mm (1.25") high edges with 12mm (0.5") return flange. *Provide* marine edges at all locations. Marine edges shall integrally be formed on all edges. Marine edges shall be 25mm (1") wide and 6mm (0.25") high. Work surface shall be reinforced with wood core or metal hat channels as required or indicated on *Drawings*. Form edges, flanges, side and backsplashes integrally from one sheet of steel. Intersections between sidesplashes,backsplashes and work surface shall be radiused a minimum of 9mm (0.375").

.4 Sink Bowls: Sink bowls shall be made of the same material as the work surface and shall be of equal or greater thickness. Sinks bowls shall be formed from one piece of steel with all inside corners radiused. Welds shall be hammered, ground and polished to produce a smooth, invisible joint. Sinks shall be welded into the work surface and welds shall be ground and polished to produce a smooth, invisible joint.

.5 Joints: Factory welds shall be ground and polished to provide an invisible joint. Field connections shall be mechanical "tongue and groove" interlocking design with concealed bolts to provide a hairline seam.

.6 Sound Deadener: Countertops and sinks shall have sound deadening material applied as required to the underside. Nominal thickness shall be 1.5mm (0.062"). Sound deadener shall be waterborne, non flammable and shall contain no volatile organic compounds.

2.5 FINISH

.1 All steel furniture in this section shall be constructed of stainless steel with a #4 brushed finish. Grain direction shall be horizontal except where cabinet dimensions do not permit.

3 - EXECUTION

3.1 EXAMINATION

.1 Site Verification of Conditions:

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

.2 Casework will not be delivered or installed until the following conditions have been met:

.1 Building must be enclosed (windows and doors sealed and weather-tight);
.2 An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place;
.3 Ceiling, overhead ductwork and lighting must be installed;
.4 Site must be free of any further construction such as “wet work.”
.5 Required backing and reinforcements must be installed accurately and the project must be ready for casework installation.

3.2 INSTALLATION

.1 Casework Installation:

.1 Casework shall be set with components plumb, straight and square, securely anchored to building structure with no distortion. Concealed shims shall be used as required.

.2 Cabinets in continuous runs shall be fastened together with joints flush, uniform and tight with misalignment of adjacent units not to exceed 1/16 of an inch.

.3 Wall casework shall be secured to solid material, not lath, plastic or gypsum board.

.4 Top edge surfaces shall be abutted in one true plane. Joints are to be flush and gap shall not exceed 1/8 of an inch between tops.

.5 Casework and hardware shall be adjusted and aligned to allow for accurate connection of contact points and efficient operation of doors and drawers without any warping or binding.

.2 Countertop Installation:

.1 Countertops are to have been fabricated in lengths according to drawings, with ends abutting tightly and sealed with corrosion resistant sealant.

.2 Tops will be anchored to base casework in a single true plane with ends abutting at hairline joints with no raised edges at joints.

.3 Joints shall be factory prepared having no need for in-field processing of top and edge surfaces.

.4 Joints shall be dressed smoothly, surface scratches removed and entire surface cleaned thoroughly.

3.3 CLEANING

.1 Ensure all products are unsoiled and match factory finish. Remove or repair damaged or defective units.

.2 Clean all finished surfaces, including drawers and cabinet shelves, and touch up as necessary.

.3 Counter tops shall be cleaned and free of grease or streaks.

3.4 PROTECTION

.1 Counter tops and ledges shall be protected with 1/4 inch ribbed cardboard for the remainder of the construction process.

.2 Examine casework for damaged or soiled areas; replace, repair, and touch-up as required.

.3 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

APPENDIX 'A'

Subsurface Investigation Report

This page intentionally left blank

071069

REPORT

SUBSURFACE INVESTIGATION PROPOSED ADDITIONS, QEH EMERGENCY DEPARTMENT AND SUPPORT SERVICES, CHARLOTTETOWN, PEI

PEI TRANSPORTATION AND PUBLIC WORKS

JOB NO. 1033387/FILE NO. 2681

Jacques Whitford

Environmental
Engineering
Scientific
Management
Consultants

590 North River Road
Charlottetown PE
Canada C1E 1K1

Bus 902 566 2866
Fax 902 566 2004

www.jacqueswhitford.com

Job No. 1033387 - File No. 2681

January 14, 2008

Ms. Holly Hinds
PEI Transportation and Public Works
3rd Floor Jones Building
PO Box 2000
Charlottetown PE C1A 7N8

Dear Ms. Hinds:

Re: Subsurface Investigation - Proposed Additions
QEH Emergency Department and Support Services, Charlottetown

This letter reports the results of the subsurface investigation carried out at the above noted site, in accordance with your request. The purpose of the investigation was to establish the subsurface conditions at the site, and based on these conditions, to provide geotechnical engineering recommendations pertaining to site preparation and foundation design.

PROCEDURE

The field work for this investigation was carried out on December 17, 2007, and consisted of excavating seven (7) test pits at the site with a rubber-tired backhoe. The test pits were advanced to depths ranging from 0.6 to 2.4 m below ground surface at the locations shown on the appended Drawing No. 2681-1.

Representative samples of the soils encountered at the test locations were recovered for classification and laboratory testing. The relative density of the strata encountered at the test pits was estimated based on observation of backhoe performance.

Detailed logs of the subsurface conditions encountered at the site, and of the sampling and testing carried out, are shown on the appended Test Pit Records. The Test Pit Records for two previous test pits excavated at the site (i.e., TP-1 and TP-02) are also included in the Appendix for ease of reference.

The test pit locations were established in the field by our personnel relative to the existing building. Ground surface elevations at the test pits were determined with respect to Geodetic Datum based on the provided basement floor level of el. 5.62 m within the existing building.

SUBSURFACE CONDITIONS

The subsurface conditions encountered at the site during the present investigation are shown in detail on the appended Test Pit Records and are described below.

Fill Materials

Fill materials were encountered at the surface of TP 1 to TP 6 and found to extend to depths ranging from 0.3 to 1.1 m below ground surface. As depicted on the Test Pit Records, the fill typically consists of a loose brown silt and sand topsoil layer, 0.2 to 0.3 m in thickness, that overlies a loose to compact reddish brown silt and sand layer (encountered at TP 2, TP 3, TP 5, and TP 6).

A grain size analysis (curve appended) carried out on a representative sample of the fill shows it to contain 12 percent gravel, 42 percent sand, and 46 percent fines (silt and clay sizes). Selected fill samples were found to have a moisture content range of 16 to 18 percent.

Topsoil

A layer of naturally occurring topsoil, 0.2 m in thickness, was encountered at the surface of TP 7. The topsoil is comprised of a loose brown silt and sand containing trace to some gravel and roots.

Till

The principal natural overburden soil encountered at the site consists of a compact reddish brown silt and sand (glacial till) that contains some gravel and occasional sandstone cobbles/layers. The till stratum was encountered directly below the fill materials at TP 4, TP 5, and TP 6, and below the surficial topsoil layer at TP 07. The elevation of the till surface (where encountered) was found to range from a low of el. 8.77 m at TP 6 to a high of el. 10.62 m at TP 7.

Grain size analyses (curves appended) carried out on representative samples of the till shows it to contain an average of 19 percent gravel, 42 percent sand, and 39 percent fines. The natural moisture content of selected till samples was found to range from 13 to 20 percent with an average of 15 percent.

Bedrock

Sandstone bedrock was inferred, based on backhoe resistance, at TP 1, TP 2, TP 3, and TP 4, at depths below grade ranging from 0.3 to 1.8 m. The upper 0.3 m of the bedrock at TP 1 and the upper 1.7 m at TP 2 was found to be in a weathered state, consisting of a very weak to weak, layered sandstone. The backhoe met practical refusal on more intact sandstone below the weathered zone at TP 1 and TP 2, and at the inferred bedrock surface at TP 3 and TP 4. Bedrock was not encountered within the depth excavated at TP 5 to TP 7 (i.e., test pits terminated within the till stratum).

Groundwater

The groundwater table was encountered at a depth of 2.13 m (el. 6.63 m) below ground surface at TP 2, based on observation of groundwater inflow. No evidence of groundwater inflow was noted during excavation of the other test pits. It should be noted that fluctuations of the groundwater table can occur as a result of seasonal variations and/or in response to significant weather events.

DISCUSSION AND RECOMMENDATIONS

It is understood that two additions, consisting of a larger north addition (emergency department) in the vicinity of TP 1 to TP 4 and a smaller south addition (cancer center) in the vicinity of TP 5 and TP 6, are proposed. The south addition is to consist of slab-on-grade structure with no basement whereas the north addition will include a half, or possibly full, basement level. The floor levels of the additions are to match the existing floor levels. It is further understood that the existing ring road is to be shifted to the north and that some additional parking is to be added along the north side of the staff parking area.

The effects of the subsurface conditions encountered on the design and construction of the proposed project are discussed in the following sections.

Site Preparation

Site preparation to permit the use of conventional spread footing foundations and slab-on-grade construction will require the removal of all existing fill materials from within the proposed building areas. The existing fill, due to its loose and random nature, is not considered to be suitable for support of foundation or floor slab loads.

It should be noted that several underground services are present at the site. Provisions should be made for the protection, removal, and or/relocation of these services in conjunction with site preparation activities.

Groundwater in the foundation excavation should be kept to a minimum to prevent disturbance of the native till which is susceptible to water softening. Control of groundwater inflow may require pumping from a temporary sump(s) installed below the founding level. Surface water should be directed away from excavated areas.

The excavation for the removal of the existing fill should extend downward to the till stratum and outward from the proposed footing perimeter, a horizontal distance at least equal to the depth of structural fill to be placed below founding level (i.e., 1 horizontal to 1 vertical splay).

Excavation carried out near the existing building must be undertaken with care so as to prevent disturbance of the existing foundations. The test pit data indicate that some excavation into the sandstone bedrock will likely be required to establish the basement subgrade level for the north addition. Excavation of the weathered bedrock zone (where present) should be possible with a backhoe. Some limited excavation (eg., 0.5 m) into the stronger intact sandstone may be possible with a large excavator. More extensive excavation into the intact sandstone will likely require some means of pre-fracturing to facilitate rock removal. Pre-fracturing could be carried out through the use of a hydraulic rock breaker or with a ripper tooth mounted on an excavator bucket.

Upon removal of all unsuitable fill materials, any low areas should be brought up to the required subgrade levels using structural fill. Structural fill should consist of an approved soil (preferably granular) which is free of organics and deleterious material such as a pit run sandstone or other approved inorganic soil. Fill material meeting the current Prince Edward Island Transportation and Public Works (PEITPW) Select Borrow specification (ie. maximum of 30 percent fines based on the minus 4.75 mm sieve fraction) would be acceptable for use.

It is expected that elevated moisture contents within the native till would prevent the reuse of this material as structural fill. Excavated sandstone is typically well suited for reuse as structural fill provided that any large fragments (250 mm or larger) are either broken up or removed.

All structural fill placed within the building area should be placed and compacted in lifts to 100 percent of Standard Proctor maximum dry density. Lift thicknesses must be compatible with the compaction equipment used, and the fill material selected, in order to achieve the required density throughout.

If construction is carried out during the winter, it should be noted that all earthworks performed during freezing conditions are potentially suspect, and special measures are required. Structural fill should not be placed over frozen material; any soil that becomes frozen after placement must be removed, or allowed to thaw prior to the placement of subsequent lifts.

It is recommended that site preparation be monitored by experienced geotechnical personnel to ensure that all unsuitable materials are removed, that only suitable replacement fills are used, and that the required degree of compaction is attained.

Foundations

An allowable bearing pressure of 150 kPa may be used for design of footings placed on the undisturbed native till, weathered sandstone bedrock, or on structural fill (prepared as outlined above). If necessary, bearing pressures of up

to 500 kPa, could be achieved by founding directly on intact sandstone bedrock. Associated total and differential settlements would be within tolerable limits for a conventional structure. All footings subjected to freezing conditions should have a minimum soil cover of 1.3 m (or equivalent insulation) for frost protection.

Structural fill used as a bearing stratum must extend outward beyond the exterior footing base perimeter a distance at least equal to the depth of fill placed below the footing to include the full stress zone of influence.

It is recommended that final excavation for footings be carried out with a ditching type bucket (i.e., no teeth) so as to minimize disturbance of the bearing surface. Any soil that becomes disturbed as a result of construction activity and/or water should be removed from the bearing surface prior to footing placement. If softening persists, consideration could be given to the over-excavation of the bearing surface (e.g. by 300 mm) to allow the placement/compaction of a clean gravel layer. The gravel would stabilize the bearing surface and facilitate dewatering of the footing excavation. Alternatively, the use of a lean concrete layer (i.e., mud slab) could be considered to stabilize the bearing surface.

If winter construction is anticipated, all bearing surfaces, footings, foundation walls and floor slabs must be protected against freezing.

Slab-on-Grade

A slab-on-grade may be cast over undisturbed till, weathered sandstone bedrock, or structural fill. A layer of compacted, free-draining granular material should be used under the floor slab area.

The test pit data indicate that the groundwater table, within some areas of the site, may be located above the proposed basement floor level. The following design elements should therefore be provided as a minimum:

- perimeter footing drains with a positive discharge in any area where the floor slab is to be located below final exterior grade;
- a heavy duty under-slab vapour barrier; and,
- damp-proofing of basement walls to final exterior grade.

In addition to the above, consideration could also be given to the use of an under-slab drainage system and/or a water-proofing system (e.g., impervious membrane) depending on the final design of the basement, the intended use of the basement level, and on the conditions encountered during site excavation.

Basement Walls

Basement walls should be backfilled with a well-graded, free-draining, granular material such as a clean, coarse gravel with a maximum size of 50 mm. It would be necessary to fill the zone above a line drawn upward at 55 degrees to the horizontal from the back of the footing with this material to allow wall design to be based on the granular backfill. If a lesser wedge of granular backfill is utilized, the properties of the existing fill/native till must be used. In any case, all backfill placed within 500 mm of the wall, and to within 500 mm of finished grade, should consist of free draining granular material for drainage purposes. The use of a non-woven geotextile is recommended to encapsulate the granular backfill and to prevent the migration of fines into this material.

The following geotechnical design parameters are recommended for basement wall design:

Backfill Type	Total Unit Weight, kN/m^3	Submerged Unit Weight kN/m^3	Effective Internal Friction Angle, degrees	Earth Pressure Coefficients		
				K_a	K_o	K_p
Granular Fill (clean crushed gravel)	20.5	10.7	34	0.28	0.44	3.54
Structural Fill (Sandstone Borrow)	19.0	9.2	34	0.28	0.44	3.54
Native Till	21.0	11.2	30	0.33	0.50	3.00

Note: K_a would apply to walls that are free to rotate, whereas K_o would be applicable for a wall that is fixed at the top. The earth pressure coefficients given above are based on a vertical wall and a horizontal backfill surface; effects of wall friction are not considered.

The wall backfill should be compacted to 95 percent of Standard Proctor density. Near the wall, compaction should be carried out with light equipment to prevent over stressing of the wall.

Roadway/Parking Area

Site preparation within the proposed road and parking parking areas should consist of the removal of all vegetation and rootmat/topsoil (where present) and cutting (where required) to the required subgrade level to facilitate placement of the recommended pavement structures given below. The subgrade surface (existing fill or native till) should then be proof rolled with a loaded tandem truck. Any soft or deformable materials revealed by the rolling should be removed.

Low areas may then be brought up to the required subgrade level (ie. underside of sub-base) with an approved structural fill (e.g., Select Borrow), compacted to at least 95 percent of Standard Proctor density.

The following pavement structure designs are recommended for this project based on the conditions encountered and on the expected traffic loading:

Light Duty (vehicle parking, driveways):	
asphalt concrete (B-seal)	40 mm
asphalt concrete (A-base)	60 mm
granular base (Class A gravel)	150 mm
Premium Borrow sub-base	300 mm

Heavy Duty (roadway, truck areas):	
asphalt concrete (B-seal)	50 mm
asphalt concrete (A-base)	75 mm
granular base (Class A gravel)	250 mm
Premium Borrow sub-base	300 mm

The above materials should comply with present PEITPW specifications. The sub-base and base layers should be compacted to 98 percent and 100 percent of Standard Proctor density, respectively.

CLOSING COMMENTS

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of PEI Transportation and Public Works, who are identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Jacques Whitford Limited should any of these not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report
- Basis of the report
- Standard of care
- Interpretation of site conditions

- Varying or unexpected site conditions
- Planning, design or construction

We trust that this report contains all of the information required at this time. Should you have any questions or if we can be of further service, please contact us at your convenience.

Sincerely,

JACQUES WHITFORD LIMITED

George W. Zafiris, P.Eng.

GWZ/lk
cc: Howard Coles (Coles Associates Ltd.)

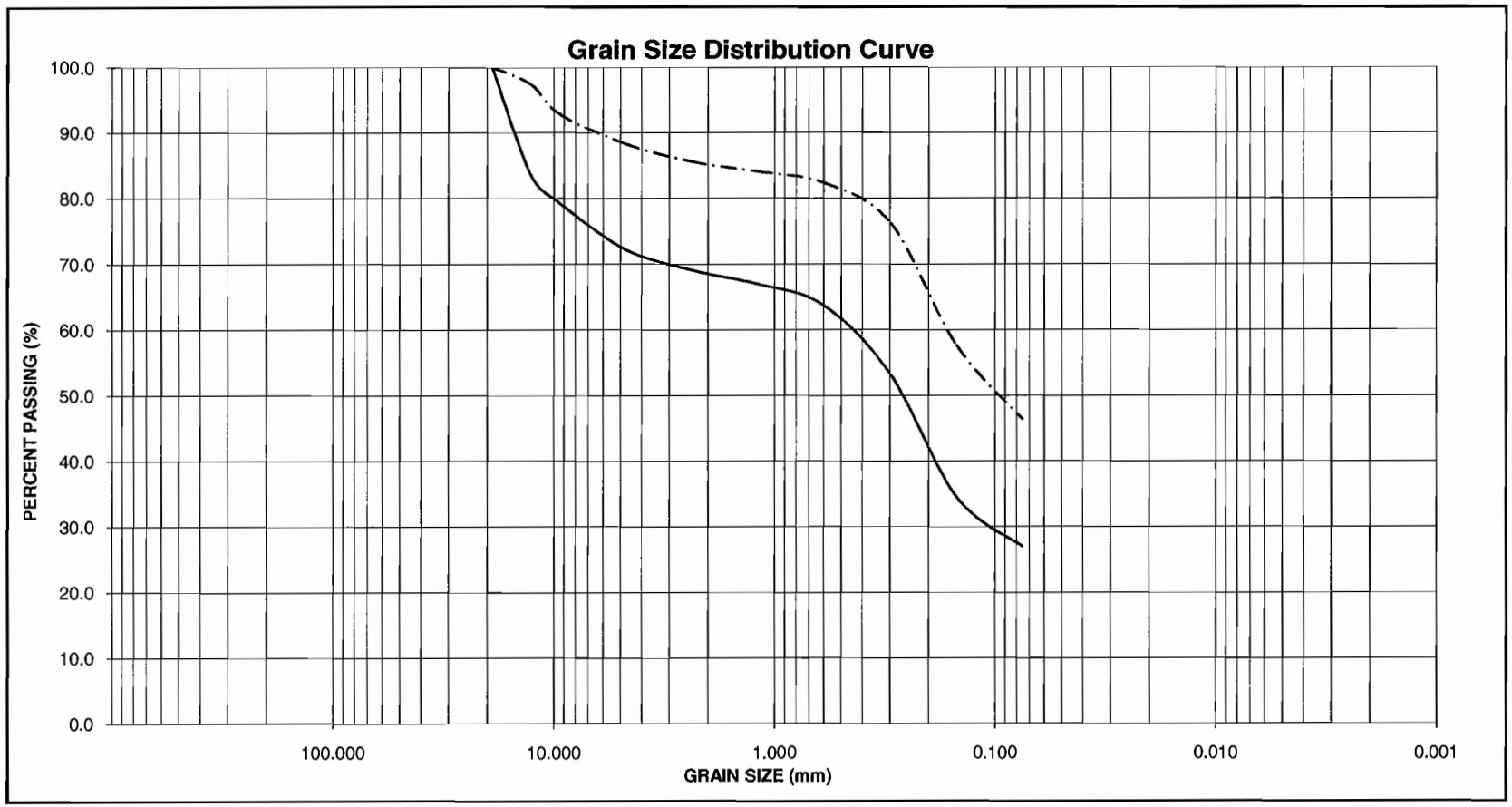
APPENDIX

Table 1 - Test Pit Summary (QE Hospital, Emergency Department Additions)

	Test Pit Number								
	TP 1	TP 2	TP 3	TP 4	TP 5	TP 6	TP 7	TP-01	TP-02
Ground Surface el., m	6.06	8.76	7.51	10.15	9.47	9.89	10.82	13.50	11.50
Rootmat /Topsoil, m	-	-	-	-	-	-	0.20	0.30	0.46
Fill Thickness, m	0.30	0.61	0.91	0.30	0.61	1.12	-	-	-
Depth to Till Surface, m	-	-	-	0.30	0.61	1.12	0.20	0.30	0.46
Till Surface el., m	-	-	-	9.85	8.86	8.77	10.62	13.20	11.04
Depth to Bedrock, m	0.30	0.61	0.91	1.83	> 2.44	> 2.44	> 1.83	> 2.44	> 1.98
Bedrock Surface el., m	5.76	8.15	6.60	8.32	-	-	-	-	-
Depth to GWT, m	> 0.61	2.13	> 0.91	> 1.83	> 2.44	> 2.44	> 1.83	> 2.44	> 1.98
GWT el., m	-	6.63	-	-	-	-	-	-	-
Depth of Test Pit, m	0.61	2.29	0.91	1.83	2.44	2.44	1.83	2.44	1.98

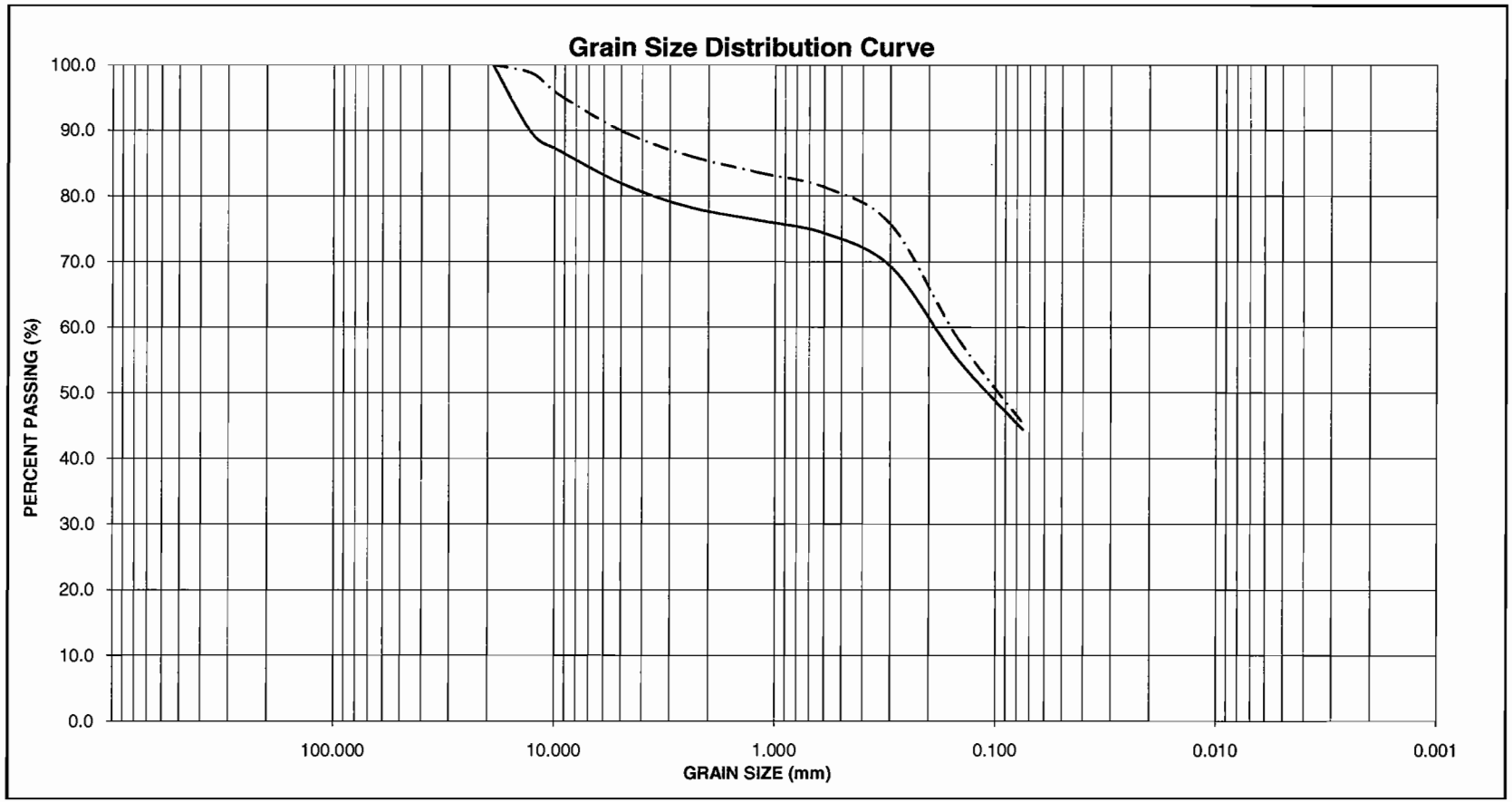
NOTES:
- TP 1 to TP 7 were excavated at the site on December 17, 2007 with a rubber-tired backhoe
- TP-01 and TP-02 were excavated at the site on July 13, 2007 with a rubber-tired backhoe
- ground surface elevations were determined with respect to Geodetic Datum
- sandstone bedrock inferred at TP 1 to TP 4 based on backhoe resistance
- GWT denotes groundwater table

Jacques Whitford



Test Location	Sample No.	Sample Depth	Description
TP 4	1	0.6 m	Gravelly silt and sand: **Till**
TP 5	1	0.6 m	Silt and sand, some gravel: **Fill**

Jacques Whitford



Test Location	Sample No.	Sample Depth	Description
TP 6	2	1.8 m	Silt and sand, some gravel: **Till**
TP 7	1	0.6 m	Silt and sand, some gravel: **Till**

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Topsoil	- mixture of soil and humus capable of supporting vegetative growth
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

Desiccated	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	- having cracks, and hence a blocky structure
Varved	- composed of regular alternating layers of silt and clay
Stratified	- composed of alternating successions of different soil types, e.g. silt and sand
Layer	- > 75 mm in thickness
Seam	- 2 mm to 75 mm in thickness
Parting	- < 2 mm in thickness

Terminology describing soil types:
The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488). The classification excludes particles larger than 76 mm (3 inches). The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):
Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils:
The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test N-Value (also known as N-Index). A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

Terminology describing consistency of cohesive soils:
The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests.

Consistency	Undrained Shear Strength	
	kips/sq.ft.	kPa
Very Soft	<0.25	<12.5
Soft	0.25 - 0.5	12.5 - 25
Firm	0.5 - 1.0	25 - 50
Stiff	1.0 - 2.0	50 – 100
Very Stiff	2.0 - 4.0	100 - 200
Hard	>4.0	>200

ROCK DESCRIPTION

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	*Very Poor*
25-50	*Poor*
50-75	*Fair*
75-90	*Good*
90-100	*Excellent*

Rock quality classification is based on a modified core recovery percentage (RQD) in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on NW core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures. The terminology describing rock mass quality based on RQD is subjective and is underlain by the presumption that sound strong rock is of higher engineering value than fractured weak rock.

Terminology describing rock mass:

Spacing (mm)	Joint Classification	Bedding, Laminations, Bands
> 6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

Terminology describing rock strength:

Strength Classification	Unconfined Compressive Strength (MPa)
Extremely Weak	< 1
Very Weak	1 – 5
Weak	5 – 25
Medium Strong	25 – 50
Strong	50 – 100
Very Strong	100 – 250
Extremely Strong	> 250

Terminology describing rock weathering:

Term	Description
Fresh	No visible signs of rock weathering. Slight discolouration along major discontinuities
Slightly Weathered	Discolouration indicates weathering of rock on discontinuity surfaces. All the rock material may be discoloured.
Moderately Weathered	Less than half the rock is decomposed and/or disintegrated into soil.
Highly Weathered	More than half the rock is decomposed and/or disintegrated into soil.
Completely Weathered	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.

Boulders, Cobbles, Gravel | Sand | Silt | Clay | Organics | Asphalt | Concrete | Fill | Igneous Bedrock | Meta-morphic Bedrock | Sedi-mentary Bedrock

SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
PS	Piston sample
BS	Bulk sample
WS	Wash sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT

measured in standpipe, piezometer, or well

inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE / RQD

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration was achieved and N-values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N value corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log. RQD is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to A size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (305 mm) into the soil. The DCPT is used as a probe to assess soil variability. Soil type may be inferred from adjacent boreholes and test pits.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

TEST PIT RECORD

TEST PIT No.: TP 1

PROJECT No.: 2681

CLIENT: PEI Transportation and Public Works

LOCATION: Proposed Expansion, QEH Emergency Department and Support Services

DATES: DUG: December 17, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	6.06	Ground Surface						
	0.00	Loose brown silt and sand topsoil, trace to some gravel, roots: **Fill**						
1	5.76							
	0.30	Layered sandstone: **Weathered Bedrock**						
2	5.45							
	0.61	End of Test Pit Practical bedrock refual on intact sandstone bedrock Note: copper pipe (not in use) encountered at 0.3 m depth						
3 / 1								
4								
5								
6 / 2								
7								
8								
9								

TEST PIT RECORD

TEST PIT No.: TP 2

PROJECT No.: 2681

CLIENT: PEI Transportation and Public Works

LOCATION: Proposed Expansion, QEH Emergency Department and Support Services

DATES: DUG: December 17, 2007 **WATER LEVEL:** December 17, 2007 (2.13 m) **DATUM:** Geodetic

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	8.76	Ground Surface						
	0.00	Loose brown silt and sand topsoil, trace to some gravel, roots: **Fill**						
1	8.46							
	0.30	Loose reddish brown silt and sand, some gravel, pavement fragments: **Fill**						
2	8.15							
	0.61	Layered sandstone: **Weathered Bedrock**						
3 / 1								
4								
5								
6								
7 / 2	6.63							
	2.13	Layer of stiff to hard reddish brown mudstone			1	GS		•
	6.47							
	2.29	End of Test Pit						
8		Practical bedrock refual on intact sandstone bedrock						
9								

TEST PIT RECORD

TEST PIT No.: TP 3

PROJECT No.: 2681

CLIENT: PEI Transportation and Public Works

LOCATION: Proposed Expansion, QEH Emergency Department and Support Services

DATES: DUG: December 17, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	7.51	Ground Surface						
	0.00	Loose brown silt and sand topsoil, trace to some gravel, roots: **Fill**						
1	7.21							
	0.30	Loose reddish brown silt and sand, some gravel: **Fill**			1	GS		•
3 / 1	6.60							
	0.91	End of Test Pit Practical bedrock refual on intact sandstone bedrock Note: apparent pipe trench encountered within bedrock along south side of test pit. Bedding sand encountered at a depth of 1.7 m below grade within trench; excavation terminated so as to avoid pipe.						
6 / 2								
9								

TEST PIT RECORD

TEST PIT No.: TP 4

PROJECT No.: 2681

CLIENT: PEI Transportation and Public Works

LOCATION: Proposed Expansion, QEH Emergency Department and Support Services

DATES: DUG: December 17, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic

Depth (ft)	Depth (m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0	0	10.15	Ground Surface						
		0.00	Loose brown silt and sand topsoil, trace to some gravel, roots: **Fill**						
1		9.85							
		0.30							
2						1	GS	Sieve	•
3	1		Compact reddish brown gravelly silt and sand some sandstone cobbles/layers: **Till**						
4									
5									
						2	GS		
6		8.32							
		1.83	End of Test Pit						
	2		Practical bedrock refual on intact sandstone bedrock						
7									
8									
9									

TEST PIT RECORD

TEST PIT No.: TP 5

PROJECT No.: 2681

CLIENT: PEI Transportation and Public Works

LOCATION: Proposed Expansion, QEH Emergency Department and Support Services

DATES: DUG: December 17, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	9.47	Ground Surface						
	0.00	Loose brown silt and sand topsoil, trace to some gravel, roots: **Fill**						
	9.22							
1	0.25	Loose to compact reddish brown sand and gravel, some silt: **Fill**						
	8.96							
	0.51	Loose reddish brown silt and sand, some gravel: **Fill**			1	GS	Sieve	•
2	8.86							
	0.61							
3 / 1		Note: intact electrical wire (10 mm) encountered at a depth of 0.8 m; wire was not disturbed			2	GS		•
4								
5		Compact reddish brown silt and sand some gravel, trace sandstone cobbles/layers: **Till**						
6 / 2								
7								
	7.03							
8	2.44	End of Test Pit						
9								

TEST PIT RECORD

TEST PIT No.: TP 6

PROJECT No.: 2681

CLIENT: PEI Transportation and Public Works

LOCATION: Proposed Expansion, QEH Emergency Department and Support Services

DATES: DUG: December 17, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	9.89	Ground Surface						
	0.00	Loose brown silt and sand topsoil, trace to some gravel, roots: **Fill**						
	9.69							
1	0.20	Compact reddish brown silt and sand some gravel: **Fill**						
2								
3								
1	8.88							
	1.01	Compact reddish brown sand and gravel, some silt: **Fill**			1	GS		
	8.77							
4	1.12	Note: thin electrical wire encountered at a depth of 1.4 m; wire was severed by backhoe but appeared to be inactive						
5								
6		Compact reddish brown silt and sand some gravel, trace sandstone cobbles/layers: **Till**			2	GS	Sieve	•
2								
7								
	7.45							
8	2.44	End of Test Pit						
9								

TEST PIT RECORD

TEST PIT No.: TP 7

PROJECT No.: 2681

CLIENT: PEI Transportation and Public Works

LOCATION: Proposed Expansion, QEH Emergency Department and Support Services

DATES: DUG: December 17, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	10.82	Ground Surface						
	0.00	Loose brown silt and sand, trace to some gravel, roots: **Topsoil**						
	10.62							
	0.20							
1								
2					1	GS	Sieve	●
3 / 1		Compact reddish brown silt and sand some gravel, trace sandstone cobbles/layers: **Till**						
4								
5								
6	8.99							
	1.83	End of Test Pit						
2 / 7								
8								
9								

TEST PIT RECORD

TEST PIT No.: TP-01

PROJECT No.: 2590

CLIENT: PEI Transportation and Public Works

LOCATION: QE Hospital, Addition to Staff Parking Lot, Charlottetown

DATES: DUG: July 13, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic (approx.)

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	13.50	Ground Surface						
	0.00	**Rootmat/Topsoil**; loose brown silt and sand, trace to some gravel, roots						
1	13.20							
	0.30							
2								
3 / 1					1	GS	Sieve	•
4		Compact reddish brown silt and sand, some gravel: **Till**						
5					2	GS		•
6								
7 / 2								
8	11.06							
	2.44	End of Test Pit						
9								
10 / 3								

TEST PIT RECORD

TEST PIT No.: TP-02

PROJECT No.: 2590

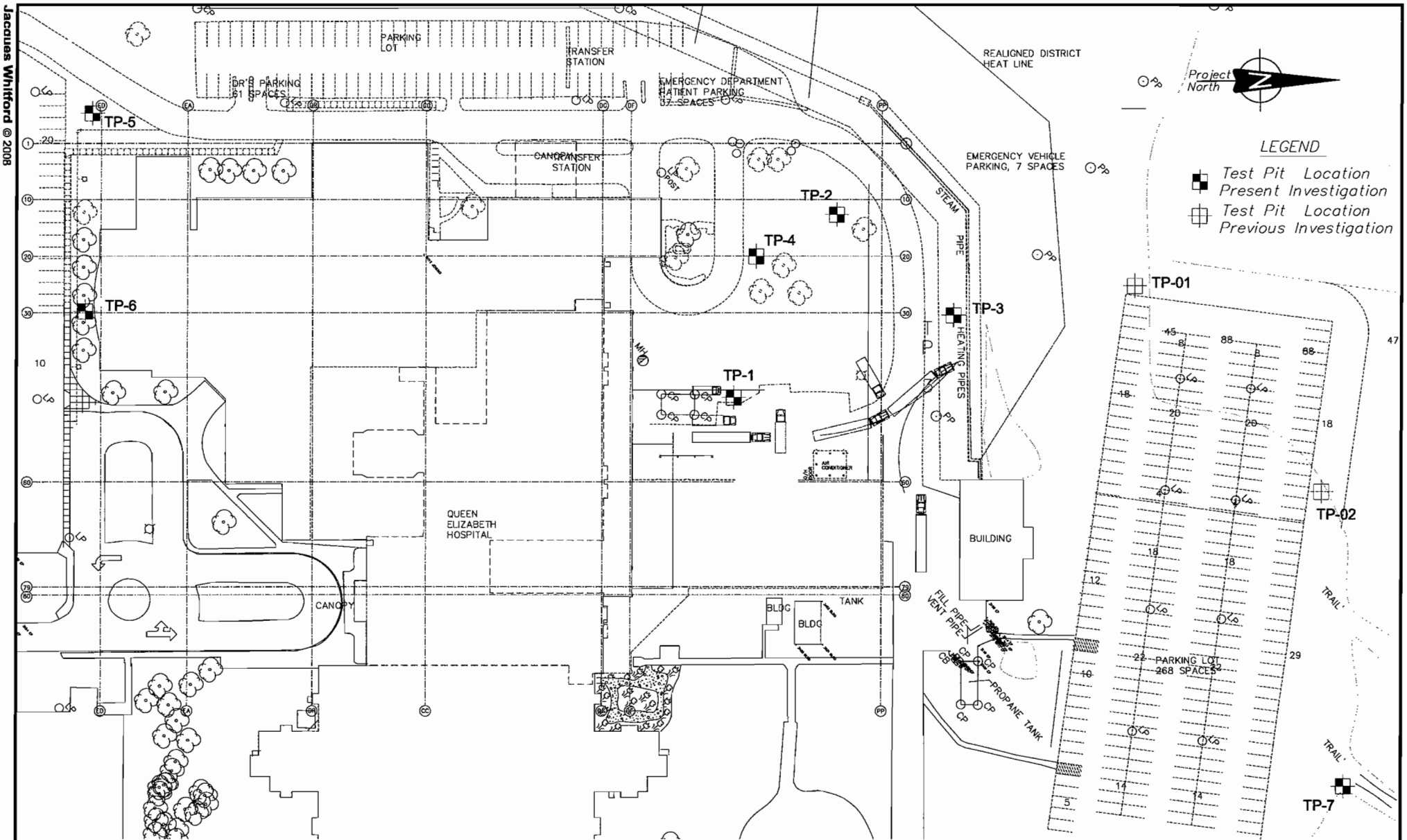
CLIENT: PEI Transportation and Public Works

LOCATION: QE Hospital, Addition to Staff Parking Lot, Charlottetown

DATES: DUG: July 13, 2007 **WATER LEVEL:** no inflow observed **DATUM:** Geodetic (approx.)

Depth (ft / m)	Elevation, m	Soil Description	Strata Plot	Water Level	Sample Number	Sample Type	Other Tests	Moisture Content, % (10 20 30 40 50 60 70 80 90)
0 / 0	11.50	Ground Surface						
	0.00	**Rootmat/Topsoil**; loose brown silt and sand, trace to some gravel, roots						
1	11.04							
	0.46	Compact reddish brown silt and sand, some gravel: **Till**			1	GS		•
2 / 1	9.52							
	1.98	End of Test Pit						
3								
4								
5								
6								
7 / 2								
8								
9								
10 / 3								

D:\CADD\7XXXX\2681-1.dwg PRINTED: Jan 11, 2008



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A JACQUES WHITFORD LIMITED REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

TEST PIT LOCATION PLAN

PROPOSED ADDITIONS - QEH EMERGENCY DEPARTMENT AND SUPPORT SERVICES

CHARLOTTETOWN, QUEENS COUNTY, PEI

Client: PEI TRANSPORTATION AND PUBLIC WORKS

Job No.:	2681
Scale:	1 : 1250 (approx.)
Date:	2008/01/07
Dwn. By:	D.RIMMER
App'd By:	SLe

Dwg. No.: 2681-1

Jacques Whitford

APPENDIX 'B'

Government of Prince Edward Island
Structured Cabling Standards

This page intentionally left blank

Government of Prince Edward Island
Structured Cabling Feb 26, 2016

Emerging technologies dictate that it is no longer allowable to simply integrate various manufacturers' components into a building's structured cabling. In order to guarantee network performance, a single manufacturer's "system" of matched components is required. Our standard is Belden IBDN System 4800, Data Twist Category 6.

It is also paramount that all new or renovated construction utilizes the latest available technology, eliminating the need and costly process of network infrastructure replacement, in the future.

The following standards apply to all network cabling installations:

1. All installers shall be familiar with and follow these industry standard documents:

   ANSI/TIA/EIA-569-A (CSA T530)
   ANSI/TIA/EIA-607 (CSA T527)
   ANSI/TIA/EIA-568-B.1, B.2, B.2-1 & B.3
   ANSI/TIA/EIA-606A
   ANSI/TIA/EIA-862
   TSB-155, IEEE 802.3an

2. The entire system shall meet or exceed the current day **Category 6** standard specifications, which includes four-pair, 23 gauge, copper cabling performance of 300 MHz. Only matched components from one manufacture`s system shall be used to provide an end -to-end solution. Provide complete system consisting of outlet boxes, cover plates, patch panels, patch cords, and cable, etc. The contractor shall verify that all system parts received meet specification, prior to installation.

3. 4-port angled face plates shall be for MDVO style jacks, with 3 ports used in each instance (2 data, 1 telephone). The upper ports are to be used for data terminations and the lower for voice, unless otherwise stated. The MDVO jacks in angled face plates are to be installed as designed by the manufacturer, which in this case has the printing inverted. This allows the release tab on the data cable to be facing upwards, making it easier to remove from the jack.

4. Each horizontal cable, data outlet, and patch panel port shall bear the same identifying number. The numbering scheme for the building data outlets shall be assigned in a logical, sequential manner. Numbering on the plates shall be *viewable from both in front and above*. A contractor must assign these jack numbers on the floor plans, prior to pulling in any cable.

5. Patch panels shall be Belden Category 6 Flex, for GigaFlex MDVO style jacks, for mounting in 19 inch floor mounted rack. Panels to be a matched components of the cabling system being installed; 24-port one rack unit high; 48-port two rack units high. Allow for 25% spares.

6. Patch cords shall be Category 6 Belden GigaFlex. Two patch cords required for each data line. Cable jacket and boots to match system color code:
   "Green" jacket and boots for Belden/CDT GigaFlex System
   "Blue or Grey" jacket and boots for Standard Cat5 UTP cable

7. Contractor to supply patch cords at both the main data rack and in the individual rooms. Number of patch cords required shall be determined by the number of data outlets shown on the Drawings. Patch cord length required in these amounts:
   - 4 feet, 70% of total count.
   - 7 feet, 20% of total count
   -10 feet, 10% of total count.

8. The installer shall be responsible for providing to IT Shared Services:
   - a map of the data outlet numbering and cable pathways on a copy of the building floor plan(s)
   - test results Perment Link with a Level IV meter, using the standard specifications for Category 6.

9. All cable terminations shall be installed and tested to the T-568A wiring standard.

10. The contractor shall guarantee that all aspects of their installation shall be free from defects, and shall warranty workmanship and materials for a period of one (1) year from the date of inspection and acceptance by the representative of Provincial Treasury, IT Shared Services. The contractor shall assume all costs associated with repair or replacement; any form of cable trauma will be considered a defect and shall require replacement.

11. Category 6 data cabling shall meet or exceed specifications for Category 6, be 4 pair, 23 AWG, with FT4 rated insulation. Accepted systems are color-coded to uniquely identify the individual system horizontal cabling. For cabling:
   Green Belden/CDT (Nordx) System (4812LX)
   Blue Standard Cat5 UTP cable
   White All telephone copper cable
   Cabling for telephone shall be of Category 6 type (Belden 2412)

12. If an installed base of a manufacturer's Category 5E or 6 system is already installed, consult with the IT Shared Services representative for the specification of product to be installed. If there are any deficiencies, anomalies, link length issues, design flaws, fit up problems regarding to the structured cabling system, the Contractor shall contact the IT Shared Services representative for clarification and/or resolution, before proceeding.

13. All Cat6 T-568A MDVO's shall bear the following colors for ease of identification, in the event of their usage:

Green	Belden/CDT (Nordx) Cat6 GigaFlex Data jacks
Blue	Regular Cat5 data jacks
White	Voice cable termination jacks GigaFlex
Black	Fax cable termination jacks GigaFlex

14. Patch panels shall only be mounted in IT Shared Services approved equipment racking device(s). This shall be in accordance with the attached Rack or Cabinet Package Documents. No substitutions.

15. Attachment of panels and devices to specified racks and cabinets shall use only 10-32 Robertson rack mounting screws; accepted - Middle Atlantic part # HS.

16. The Installer shall leave a minimum of 12" of excess UTP cable on the data outlet termination to facilitate future re-termination. The excess cable is to be stored in a sweeping "S" pattern; coils are <u>not</u> permitted.

17. The Installer shall leave a minimum of 3 meters of excess UTP cable on the patch panel end to facilitate future repositioning of panels on the rack unit. The excess cable is to be stored in a sweeping "S" pattern; coils are <u>not</u> permitted.

18. Where applicable, the rear outside of vertical cable management troughs shall be used to control cables attaching to the racking unit. This shall be in accordance with a document supplied to the installer, detailing the type and configuration of such device.

19. Where physical security is of concern, all network cables shall be enclosed in continuous conduit from the workstation outlet to the secure telecommunications room. The conduit shall be of sufficient size to meet the maximum forty (40) percent fill ratio and turn radius specifications.

20. Horizontal cabling shall be installed to the manufacturer's specifications, including but not limited to, the minimum bend radius. The contractor shall be responsible for proper bundling (with velcro wraps) and handing of all cables (with cable trays, Caddy Fasteners and/or "J" hooks) between the telecommunication closets and the workstation MDVOs, in common pathways (above corridors); the "home run" method is not permitted. Cable bundles should be supported at 2 foot intervals.

21. Each workstation outlet plate shall be configured with a minimum of 2 data drops plus telephone service if required. Data drops shall only be used to deliver data services and shall not be used for any other service to the workstation.

22. **Installer shall be trained by the manufacturer of the cabling system being installed, following methods demonstrated in that training, and shall pocess a valid Certificate of Completion from the manufacturer, for the courses taken. Training must have been taken within the previous three (3) years, to be considered valid. Certificates must be made available to the IT Shared Services representative for review, upon re uest.**

23. Before deviating from these methods, contact the Department of Provincial Treasury IT Shared Services representative.

24.

Belden IBDN System 4800 components include:

NP296	Data Twist 4812, 4-pair, 23 AWG, CMR, Cat 6, Green,
AX101070	CAT6+ Modular Jacks, for Data
AX101065	CAT6+ Modular Jacks, for Voice
AX101066	CAT6+ Modular Jacks, for Fax
AX350056	Belden GigaFlex PS6+ patch cables 4 feet, green
AX350057	Belden GigaFlex PS6+ patch cables 7 feet, green
AX350058	Belden GigaFlex PS6+ patch cables 10 feet, green
AX101456	Flex Patch Panel, 1U , 24-port, black
AX101458	Flex Patch Panel, 2U, 48-port, black
A0645269	MDVO Angled Entry Faceplate
AX101437	Interface Plate, Flush, 4-port, White

25.

Relay Rack Package Components

PART: Description	Product Code/Ordering #	Manufacturer	Quantity per pkg
Relay Rack Package - no substitutions			
Relay rack with 2 vertical cable management, black	DRR-44 + 2 DRCC-44CAN	Middle Atlantic	1
Power strip for rack	PB-12-IS/6FTCRD	Electron Metal	1
Organizer Ring Panel Horizontal Cable Management	AO403977	Belden IBDN	6
Horizontal Cable Manager, 1U, Black	HCM-1D	Middle Atlantic	4
Rack Drawer, 3U	UD3	Middle Atlantic	1
Universal Rackshelf, 1U, frontmount	U1	Middle Atlantic	1
Vented Center mount shelf, 2U	U2MS	Middle Atlantic	2
Formed blank panel 1U, black	EB1	Middle Atlantic	4
Formed blank panel 2U, black	EB2	Middle Atlantic	6
Heavy Duty Sliding Shelf	SS	Middle Atlantic	1
10-32 Pan Head Rack mounting screws and washers	HS	Middle Atlantic	100
IEC Power Cord, 12 inch, 4 per pkg	IEC-12X4	Middle Atlantic	1
IEC Power Cord, 18 inch, 4 per pkg	IEC-18X4	Middle Atlantic	1
IEC Power Cord, 24 inch, 4 per pkg	IEC-24X4	Middle Atlantic	1
Velcro Roll, 75 feet	99-050-QT-1	Polygon	1
Cable Ties, 7 inch, bag of 100	TY-525-MX	Thomas & Betts	1
Homaco 1U Horizontal Cable Fiber Manager	FCM-19-1SRC	Ortronics	1

26. Acceptable Conduit Runs
    - Achieve the best direct route (e.g., usually parallel to building lines) with no bend greater than 90 degrees or an aggregate of bends in excess of 180 degrees between pull points or pull boxes.
    - No continuous sections longer than 30.5 m (100 ft).
    - Be bonded to ground on one or both ends in accordance with national or local requirements.
    - Withstand the environment to which they will be exposed.
    - For runs that total more than 30.5 m (100 ft) in length, pull points or pull boxes should be inserted so that no segment between points/boxes exceeds the 30.5 m (100 ft) limit.
    - Total conduit runs should be kept to 45.8 m (150 ft) or less (including the sections through pull boxes).

27. Conduit Capacity
    - cable capacity of horizontal pathway conduits that have no more than two 90 degree bends (180 degrees total) and are no longer than 30.5 m (100 ft).

    The table shows the conduit fill ratio guidelines for horizontal cables; however, the number of cables that can be installed is actually limited by the allowed maximum

		Cable Outside Diameter mm (in)							
Inside Diameter (mm)	Trade Size	3.3 (0.13)	4.6 (0.18)	5.6 (0.22)	6.1 (0.24)	7.4 (0.29)	7.9 (0.31)	9.4 (0.37)	13.5 (0.53)
16	1/2	1	1	0	0	0	0	0	0
21	3/4	6	5	4	3	2	2	1	0
27	1	8	8	7	6	3	3	2	1
35	1-1/4	16	14	12	10	6	4	3	1
41	1-1/2	20	18	16	15	7	6	4	2
50	2	30	26	22	20	14	12	7	4
63	2-1/2	45	40	36	30	17	14	12	6
78	3	70	60	50	40	20	20	17	7
91	3-1/2	—	—	—	—	—	—	22	12
100	4	—	—	—	—	—	—	30	14

    pulling tensions of the cables. Maximum conduit fill ratio is 40%.

28. Maximum Category 6 cable lengths apply to all horizontal distribution cables; from the Horizontal Cross-connect (patch panel) to the telecommunications outlet (workstation end), maximum cable length is 90 meters, (295 feet) including slack requirements. BAS horizontal link lengths are also limited to 90 meters, independent of the media type.

29. Maximum fiber optic cable lengths are as follows:

Subsystem	Backbone lengths up to:	Data rates up to:
Campus backbones (OM1 fiber)	2 km (1.2 mi)	155 Mb/s
Campus backbones (OM2 fiber)	550 m (1804 ft)	1 Gb/s
Building backbones (OM2 fiber)	300 m (984 ft)	1 Gb/s
Building backbones (OM3 fiber)	300 m (984 ft)	10 Gb/s
Campus/building backbones (OS1 fiber)	2000 m (6560 ft)	10 Gb/s

As a general guideline in premises applications for backbone cabling, OM1, 62.5/125 µm; OM2, 50/125 µm; or OM3, laser optimized 50/125 µm optical multimode fiber is recommended for applications supported for these lengths and data rates. Single mode fiber may also be required for premises applications.

30. Fiber optic backbone requirements shall be supplied on a separate design document.

APPENDIX 'C'

Preliminary Commissioning Plan

This page intentionally left blank

PRELIMINARY COMMISSIONING PLAN

MARITECH
COMMISSIONING WORKS

77 VAUGHAN HARVEY BLVD., SUITE 210
MONCTON, NEW BRUNSWICK
E1C 0K2

Prince Edward Island
Department of Health and Wellness

Queen Elizabeth Hospital Mental Health and Addictions Assessment & Short Stay Addition

March 2022

TABLE OF CONTENTS

APPENDICES

1. OVERVIEW

This Commissioning Plan has been specifically developed for this project to aid the building design, construction and operations team in verifying that the project will meet the Owner's Project Requirements. It sets out the process and methodology for the successful commissioning of the project during the design and construction phases. The Commissioning Plan also acts as a communication tool to facilitate each team member's understanding of their roles and responsibilities in the commissioning process.

It is important to understand that the Commissioning Plan is a living document in that information is added and modified to it as the project progresses.

The Commissioning Plan does not relieve the project team from contractual requirements outlined in the project documents. The project specifications may include special testing requirements for equipment. These tests are mutually exclusive of the verification and functional procedures outlined in the Commissioning Plan.

2. COMMISSIONING OBJECTIVES

Commissioning (Cx) is a systematic and quality focused process for verifying and documenting that all building systems perform interactively according to the design intent in order to meet the Owner's Project Requirements. This is achieved through a complete commissioning process; beginning at the design phase with documented design and operating intent and continuing through construction and acceptance phases, with actual verification of performance.

Commissioning activities during the design and pre-construction phases are intended to achieve the following specific objectives:

- Ensure that the Owner's Project Requirements are documented and clearly understood by the Design Team.
- Ensure that the Basis of Design and construction documents reflect the Owner's Project Requirements.
- Provide a plan for the implementation of the commissioning process, including the initial scope of systems to be commissioned for the project.
- Ensure that commissioning for the construction phase is adequately reflected in the bid documents.

Commissioning activities during the construction phase are intended to achieve the following specific objectives:

- Clearly communicate to the various members of the commissioning team their roles and responsibilities in the commissioning process.
- Verify that the design and operational intent are adhered to during the construction phase.
- Verify the applicable equipment and systems are installed properly and receive adequate pre-operational checkout.
- Verify and document proper performance of mechanical an electrical equipment and systems.
- Review the operation and maintenance documentation provided for the continued management of the facility to ensure completeness.
- Document the proper training of Owner's building management personnel.
- Develop documentation which will guide the operations staff in proper operation, maintenance and ongoing commissioning of the facility.

3. GENERAL BUILDING INFORMATION

Project: Mental Health and Addictions Assessment & Short Stay Addition

Location: Queen Elizabeth Hospital, Charlottetown, Prince Edward Island

Description: The Queen Elizabeth Hospital (QEH) is a-233 bed acute care facility that is the primary referral hospital in Prince Edward Island. As part of the provincial Mental Health & Addictions (MHA) services re-development project, a Mental Health & Addictions Emergency Department / Short-Stay Unit (EDSSU) will be built adjacent to the existing Emergency Department. This project will include:

- A 738 square meter addition located on a new suspended deck/floor above the QEH's loading bay with direct access into the Emergency Department on the west side and access to the staff corridor immediately south.
- The proposed expansion will rely on supports from the existing QEH plant including:
    - Central Utility Plant for heating and cooling, hot water, domestic water service and main electrical feeds
    - Data and communication services
    - Fire alarm
    - Shipping and receiving
    - Food services
    - Housekeeping
    - Linen
    - Pharmacy services supply
- The existing building is organized on three levels with the main entrance at Level 2, entering into a public zone leading to an interconnected floor space linking all floors together. This project will be seamlessly linked with Level 2 and integrated operationally into the Emergency Department. There will be some coordination with the Level 3 where mechanical and electrical elements will reside and there will also be some minor renovations on Level 1 to accommodate the relocation of the trash compactor below the addition. Project coordination will also encompass connections to the rooftop mechanical penthouses and equipment. The main electrical service for the building is located on Level 1, to the east of the loading dock area.

4. ABBREVIATIONS AND DEFINITIONS

The following are common abbreviations used in this document.

ABBREVIATIONS	DEFINITIONS
A/E	Design Team Consultants
BOD	Basis of Design
CC	Controls Contractor
Cx	Commissioning
CxA	Commissioning Agent / Authority
EC	Electrical Contractor
FAC	Fire Alarm Contractor
FPT	Functional Performance Test / Testing
FPTF	Functional Performance Test Form
GC	General Contractor / Construction Manager
MC	Mechanical Contractor
Mfr	Manufacturer
OPR	Owner's Project Requirements
PC	Plumbing Contractor
PF/SU	Pre-Functional/Start-Up Verification
RFI	Request for Information
SC	Sprinkler System Contractor
SUF	Start-Up Form
SV	Static Verification
SVF	Static Verification Form
TAB	Test and Balance Contractor

5. COMMISSIONED EQUIPMENT AND SYSTEMS

Commissioning and training of the following systems and equipment will be verified in this project. Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using the sampling strategy outlined below.

Please note: This is an example only and will be modified in the Final Commissioning Plan.

SYSTEMS AND EQUIPMENT	SV	PF / SU	FPT
Mechanical Systems			
Wet and dry pipe sprinkler system	-	100%	100%
Fire extinguishers	100%	-	100%
Domestic hot water piping and pumps	100%	100%	100%
Plumbing fixtures	100%	-	50%
Washroom fixtures	100%	-	50%
Trap primers	-	-	100%
Hydronic loops and pumps	100%	100%	100%
Radiant floor heating	100%	100%	50%
Exhaust fans	100%	100%	100%
Air handling unit and cooling coil	100%	100%	100%
Relocated condensing unit	-	-	100%
Constant volume boxes	100%	100%	50%
Fire and fire/smoke dampers	-	-	100%
HVAC zones	-	-	50%
TAB work	-	-	20%
EMCS (points and sequences)	-	100%	50 - 100%
Electrical Systems			
Panelboards	100%	100%	100%
Wiring	-	100%	-
Interior and exterior lighting and controls	100%	100%	50%
Exit Lighting	100%	100%	100%
Emergency Lighting	100%	100%	100%
Fire alarm system	-	100%	50%

SYSTEMS AND EQUIPMENT	SV	PF / SU	FPT
Fire alarm system integrated systems testing	-	100%	100%
Access control system	-	100%	50%
CCTV system	-	100%	50%
Public address system	-	100%	50%

6. COMMISSIONING TEAM

In order to ensure a successful commissioning process, lines of communication must be defined between all parties involved in the project. To aid in improved communication, each contractor must assign one person the responsibility of being their representative on the commissioning team. This individual will be accountable to the team for his or her assigned role and activities as it relates to the commissioning process.

TEAM MEMBER	COMPANY & CONTACT NAME	TELEPHONE AND E-MAIL
Owner	Department of Health and Wellness	Tel: E-mail:
Owner Representative	Colliers Project Managers	Tel: E-mail:
User Group	Queen Elizabeth Hospital	Tel: E-mail:
Commissioning Authority	Maritech Commissioning Works Moncton, NB Luc Dugas	Tel: 506-852-7520 E-mail: ldugas@maritechcx.com
Architect	Coles Associates Charlottetown, PEI	Tel: 902-368-2300 E-mail:
Mechanical Engineering	Coles Associates Charlottetown, PEI	Tel: 902-368-2300 E-mail:
Electrical Engineering	Coles Associates Charlottetown, PEI	Tel: 902-368-2300 E-mail:
Construction Manager	TBD	Tel: E-mail:
Mechanical Contractor	TBD	Tel: E-mail:
Electrical Contractor	TBD	Tel: E-mail:
Controls Contractor	TBD	Tel: E-mail:
Fire Protection Systems Contractor	TBD	Tel: E-mail:

TEAM MEMBER	COMPANY & CONTACT NAME	TELEPHONE AND E-MAIL
Fire Alarm Systems Contractor	TBD	Tel: E-mail:
TAB Contractor	TBD	Tel: E-mail:

7. ROLES AND RESPONSIBILITIES

7.1 TEAM MEMBERS

The members of the Commissioning Team consist of the Owner, Owner's Representative, A/E, CxA, GC, MC, EC, PC, CC, TAB, FAC and SC. Other participants may include User Representatives and other installing subcontractors or equipment manufacturers, as required.

7.2 GENERAL MANAGEMENT PLAN

In general, the CxA coordinates the commissioning activities and reports to the Owner's Representative. The CxA responsibilities, along with all other Contractors' commissioning responsibilities are detailed in the project specifications. All members work together to fulfill their respective roles, as summarized in the section below.

7.3 GENERAL DESCRIPTIONS OF ROLES

A general description of the commissioning roles is as follows

CxA:

- Reviews the OPR, BOD and design documents
- Develops and updates the Commissioning Plan.
- Coordinates the Commissioning Process.
- Reviews commissioning documentation and other test reports for compliance with the Contract Documents. Commissioning documentation includes, but is not limited to SVF, SUF and FPTF forms.
- Prepares, oversees and documents Functional Performance Tests.
- Verifies that the systems are performing in accordance with Contract Documents.
- Reviews General Training Plan
- Prepares a final Commissioning Report, with the assistance of the Commissioning Team.

GC:

- Facilitates and supports the Commissioning Process.
- Coordinates the response to RFIs throughout the commissioning process.
- Ensures that all subcontractors fulfill their commissioning responsibilities.
- Integrates Commissioning into the Construction Process and Schedule.
- Coordinates and provides Training.
- Includes the CxA on the distribution lists for project documents such as shop drawings and start-up reports.

Subcontractors (MC, EC, PC, CC, TAB, FAC, SC and others):

- Completes all required start-up and testing activities, as outlined in the project specifications, prior to commencement of the FPT by the CxA.
- Demonstrates proper system performance and perform the actual testing as designated by the Commissioning Team.
- Coordinates with manufacturers and suppliers to provide documentation requested by the Commissioning Team.
- Completes commissioning documentation as outlined in the Commissioning Plan.
- Participates in all commissioning activities related to equipment and systems associated with their scope of work and as directed by the CxA.
- Conducts training and coordinates with Manufacturers.

A/E:

- Develops Basis of Design document, project specifications and drawings.
- Provides clarification on the design intent to the Cx Team, as required.
- Responds to RFIs relating to the commissioning process.
- Reviews or inspects installed equipment and systems for compliance with the project specifications prior to commencement of the FPT by the CxA.
- Participates in the training process, as required.

Owner and Owner's Representative:

- Develops the Owner's Project Requirements.
- Gives final approval of the Commissioning work.
- Coordinates the involvement of user representatives in the commissioning and training process.

8. COMMUNICATIONS MANAGEMENT PROTOCOLS

The following communications management protocols will apply to this project:

ITEM	PROTOCOL
Commissioning related documentation	CxA will forward to GC who will distribute to subcontractors. Subcontractors will send all documentation to GC who will forward to CxA.
Minor or verbal information and clarifications	CxA will communicate directly with appropriate party.
Formal RFI or documentation requests	CxA will communicate directly with Owner's Rep., A/E or GC, as appropriate.
Scheduling of Cx meetings	CxA will communicate with Owner's Rep. and GC
Scheduling of Functional Performance Testing and Re-Testing	CxA will communicate with the GC. Direct communication with subcontractor if acceptable to GC.
Notification of Issues through Issues Log	CxA will forward to GC who will distribute to subcontractors. Subcontractors will confirm resolution by returning signed Issues Log to GC who will forward to CxA.
Request for changes	CxA, GC, subcontractors to request with A/E. CxA has no authority to issue change orders or to direct GC or sub-contractors.
Disagreements	Parties to try and resolve directly at lowest possible level. Owner's Rep. will have final decision.

9. COMMISSIONING PROCESS

This section sequentially details the Commissioning Process by task or activity.

9.1 COMMISSIONING PROCESS SUMMARY

TASK / ACTIVITY	PROJECT MILESTONE
OPR Review	
BOD Review	
Design documents review during the design phase	
Back-check of design document review	
Incorporate Cx documentation into construction documents (specifications and preliminary Commissioning Plan)	
Review mechanical and electrical contractor submittals and shop drawings	
Development of Final Commissioning Plan	
Static Verification Forms	
Start-Up Forms	
Functional Performance Test Forms	
Commissioning Meetings	
Introduce Issues Log	
Mechanical and Electrical Site Observations	
Execution of Functional Performance Tests	
Test Failure and Re-testing	
Deferred, Phased or Seasonal Testing	
Facility Staff Participation	
Operations & Maintenance Manuals	
Training and Orientation of Owner Personnel	
10 - month post occupancy review	
Prepare final commissioning report	

9.2 OPR REVIEW

The CxA reviewed the OPR document provided by the Owner for clarity and completeness.

9.3 BOD REVIEW

The CxA reviewed the BOD document prepared by the A/E team for clarity, completeness and conformance with the OPR.

9.4 DESIGN DOCUMENT REVIEW

The CxA reviewed a mid-construction documents submission for clarity, completeness and conformance with the OPR and BOD.

9.5 COMMISSIONING DOCUMENTATION

The CxA develops commissioning specifications and a Preliminary Commissioning Plan for inclusion into the Construction Documents. The commissioning specifications describe the commissioning process and activities as part of the project. The Commissioning Plan is a supporting document which outlines the organization, schedule, resources and documentation requirements of the commissioning process.

9.6 SUBMITTALS AND SHOP DRAWINGS

The CxA requests from the GC all the documentation required for the systems, assemblies and equipment being commissioned. The GC will coordinate appropriately with the subcontractors. This data request typically coincides with the normal A/E submittal process. At minimum, this equipment data includes shop drawings, installation and start-up procedures, O & M data, performance data, material data sheets and control drawings. The CxA reviews the submissions relative to commissioning issues as expressed in the contract documents, not for general contract compliance, which is the A/E's responsibility.

The A/E and GC will notify the CxA of any new design intent or operating parameter changes, added control strategies and sequences of operation or other contractual changes (Request for Information, Change Orders, Site Instructions, etc.) that may affect commissioned systems. As the phases of the TAB activities are completed, the draft TAB report is provided to the CxA with full explanations of approach, methods, results, data table legends, etc. The final TAB report is provided to the CxA upon completion.

These submittals to the CxA do not constitute compliance for submittals for the O & M Manuals.

9.7 DEVELOPMENT OF FINAL COMMISSIONING PLAN

Upon receipt of the required submittals, shop drawings and other documentation, the CxA will finalize the Commissioning Plan. This consists of the development of Static Verification Forms, Start-Up Forms and Functional Performance Test Forms as they relate to this specific project. These forms will form the basis of the Final Commissioning Report.

9.8 STATIC VERIFICATION FORMS

The Static Verification Forms are intended to verify that the equipment received on site is consistent with the design documents and submitted shop drawings. The CxA is responsible for developing these forms. The GC and subcontractors are responsible for the timely execution of the activities required to complete the forms.

It is highly recommended that these forms be completed as the equipment arrives on site. This will allow the subcontractors sufficient time to address any issues related to non-conformance such as: missing equipment, incorrect voltage, capacity, orientation, etc.

These documents are to be completed and submitted to the CxA for review before installation and start-up.

9.9 START-UP FORMS

Upon completion and review of the Static Verification Forms, the Subcontractors and Mfr can proceed with the start-up of equipment and systems. The Subcontractors and Mfr schedule the start-up and initial checkout with the GC and CxA. The start-up and initial checkout are directed and executed by the Subcontractors and/or Mfr. During the start-up process, the Subcontractors and Mfr will complete the Start-Up Forms provided and all other required documentation for warranty purposes. Only individuals having direct knowledge of the equipment and its operation shall complete the forms.

The Start-Up Form will consist of documentation provided by the Mfr. If this documentation is not available, the Subcontractors will request a form be developed by the CxA. The Subcontractors must clearly list any outstanding items of the initial start-up and pre-functional procedures that were not completed successfully at the bottom of the procedure form or on an attached sheet. The installing Subcontractors and/or Mfr correct all areas that are deficient or incomplete according to the checklists and tests.

The Start-Up Forms are to be completed and submitted to the CxA for review before the functional performance testing can begin.

9.10 FUNCTIONAL PERFORMANCE TEST FORMS

Upon receipt of the required submittals, shop drawings and other documentation, the CxA will develop the Functional Performance Tests based on the sequence of operations outlined in the design documents. These forms are intended to ensure that the equipment and system installation meet the design intent and the Owner's Project Requirements.

Prior to execution, the CxA will provide the Functional Performance Tests to the installing Subcontractor (via the GC) who will review the tests for feasibility, safety, warranty and equipment protection. Blank copies of the forms are included in the Commissioning Report and System Manual for later use by Operations Staff.

The CxA oversees, witnesses and documents the functional performance testing of all equipment and systems according to the requirement of the Commissioning Plan.

9.11 COMMISSIONING MEETINGS

Early on in the construction process, the CxA will plan and conduct a commissioning meeting to present and review the Commissioning Plan. The respective representatives of the commissioning team, as defined above, shall all be in attendance. The following items will be discussed at the meeting: reporting lines, flow of documents, project schedule and a primary contacts / contact information for each company represented. The outcome of the meeting is an increased understanding of the commissioning process and the respective responsibilities of each team member. During the meeting, the CxA will request any additional information required to finalize the Commissioning Plan. The CxA is responsible for producing meeting minutes.

The CxA will schedule regular commissioning coordination meetings throughout the construction process. The commissioning representative from each company will attend these meetings. The frequency of meetings will vary, with meetings occurring more frequently as construction progresses. During the meetings, the CxA will review the Issues Log. The CxA may attend construction meetings to stay abreast of construction issues.

9.12 ISSUES LOG

The Issues Log will document any discrepancies, non-conformance or test failures that are identified during the commissioning process. The Log will be used to manage the resolution of all issues and will be included in the Final Commissioning Report.

9.13 SITE OBSERVATIONS

The CxA may make periodic visits to the site, as necessary, to witness equipment and system installation during construction. The GC is to facilitate this process.

9.14 EXECUTION OF FUNCTIONAL PERFORMANCE TESTS

Functional performance testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as maximum/minimum cooling and heating loads, component failures, scheduled events, varying outside air temperatures, fire alarm, power failure, etc. The systems are operated through all of the sequences of operation and component functionality is verified. The CxA develops the Functional Performance Tests in a sequential, written form, and coordinates, oversees and documents the actual testing, which is performed by the appropriate commissioning team member.

These Functional Performance Tests do not relieve the project team from contractual requirements outlined in the project documents. The project specifications may include special testing requirements for equipment. These tests are mutually exclusive of the verification and functional procedures outlined in the Commissioning Plan.

Once the Static Verification and Start-Up Forms are submitted and reviewed, the CxA schedules functional tests through the GC, A/E and affected Subcontractors. Functional testing will not begin until the systems have been inspected by the A/E and that the GC and subcontractors confirm that they are ready for Functional Testing. The CxA may require written confirmation of a systems readiness for Functional Testing. The subcontractors will execute the tests. Air balancing and water balancing must be completed and debugged before functional performance testing of air or water-related equipment or systems. The EMCS must be operational and debugged before functional performance testing is conducted on components or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between systems.

Functional Testing and Verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The CxA follows the specifications, when provided, and uses judgment where needed to determine which method is most appropriate. According to the specifications, identical piece of equipment may undergo random sampling for functional testing, as outlined in Section 5. The CxA reviews Owner-contracted, factory or required Owner acceptance tests and determines what further testing may be required.

Once testing of the various life safety systems has been completed, an integrated systems test will be conducted following the procedure outlined in *CAN/ULC S1001-11 Integrated Systems Testing of Fire Protection and Life Safety Systems*. This testing will verify the interconnection between systems provided for fire protection and life safety functions are installed and operating in conformance with their design criteria.

Testing of emergency power systems will be tested in accordance with the requirements of *CSA 282 Emergency Electrical Power Supply for Buildings* as required.

9.15 TEST FAILURE AND RE-TESTING

The CxA documents the results of the Functional Performance Tests. Corrections for minor test failures can be made during the tests at the CxA's discretion. A failure of more than 10% of the selected equipment in the functional test shall be considered a failure of the particular test item. In this case, the equipment failure shall be corrected and retested and an additional number of items of equipment shall be tested. This shall continue until the particular functional test is successful i.e. less than 10% failure.

Failures are noted in the Issues Log and reported to the GC. The CxA schedules re-testing through the GC. Decisions regarding failures and corrections are made between the Owner, GC, CxA, A/E and the Subcontractor. For areas in dispute, final authority resides with the A/E and the Owner. The CxA recommends acceptance of each test.

9.16 DEFERRED, PHASED OR SEASONAL TESTING

Deferred, phased or seasonal testing is performing Functional Performance Tests after substantial completion. Systems performance testing should occur prior to the owner accepting the systems from the contractors, however, there are some instances where testing at the end of construction is either impractical or not meaningful due to

uncontrollable factors. If any check or functional test cannot be completed during the scheduled commissioning timeline, execution of checklists and functional performance testing may be delayed upon approval of the A/E. These tests will be conducted in the same manner and as soon as possible.

9.17 FACILITY STAFF PARTICIPATION

The Owner's facilities operating staff are recommended to attend and participate in the testing process. The CxA will notify the GC who will then notify the Facility Staff when the commissioning events will occur.

9.18 OPERATIONS & MAINTENANCE MANUALS

The CxA receives from A/E, for review, the O & M Manuals for systems that were commissioned. The CxA reviews approval of these sections of the O & M Manuals and provides comments to the A/E and the Owner.

9.19 SYSTEMS MANUAL

The CxA is responsible for compiling a systems manual. The document will assist the Owner's operations and maintenance team to ensure that they have the tools necessary to maintain a high level of performance from the building systems included in the commissioning plan. The design team, contractor and sub-contractors will assist in the development process by providing the required submittals and documentation.

9.20 TRAINING AND ORIENTATION OF OWNER PERSONNEL

Owner training and orientation on equipment and systems is the responsibility of the GC. The CxA, A/E and Owner will review the training outlines for completeness. The GC will provide a list of participant's and a location for the training as required. The training agendas and attendance reports will be incorporated into the final commissioning report by the CxA.

The GC will coordinate all training activities in accordance with this document and the specifications. The GC will provide the CxA with a training schedule in accordance with Commissioning Training Plan. The schedule is to include training location, equipment and systems to be covered, material to be covered and a timeline for each session. Information on the trainer shall also be provided including qualifications.

The person providing training for each piece of equipment shall be factory trained and fully knowledgeable on the operation and maintenance of the equipment.

9.21 10-MONTH POST OCCUPANCY REVIEW

The CxA will review the operation of the building with the General Contractor, Owner, Owner's Representative and User Representatives after 10 months of occupancy. A plan for resolving any outstanding commissioning related issues will be developed. The plan will be included in the Final Commissioning Report.

9.22 FINAL COMMISSIONING REPORT

The CxA will provide a Final Commissioning Report to the Owner and Owner's Representative. The Report shall include:

- Executive Summary
- Summary of commissioning activities
- Completed version of the final commissioning plan, including all Static Verification, Start-up and Functional Performance Test forms
- Issues Log itemizing all issues identified during the process, those resolved and those outstanding
- Copies of Meeting Minutes
- Copies of Site Reports
- Training and orientation documentation, if applicable.

10. TESTING EQUIPMENT

All standard testing equipment required to perform start-up and installation verification and required functional performance testing shall be provided by the division Contractor for the equipment being tested. The same equipment shall be used for the duration of the project.

Special test equipment, tools or instruments required by the Contract documents shall be provided for commissioning and shall be left on site.

All testing equipment shall have had a certified calibration, traceable to a national standard, performed within the past year. If not otherwise noted, temperature sensors and digital thermometers shall have an accuracy of ± 0.1°F, pressure sensors shall have an accuracy of ± 1.0% for each range available on the instrument (not the full range of the meter). All equipment shall be re-calibrated when dropped or damaged.

Appendix A

Mechanical Static Verification Forms

Samples are provided for reference only.

Final commissioning plan will include all required forms.

Note: Final list of Static Verification Forms will be provided in the Final Commissioning Plan

DHW RECIRCULATION PUMPS

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	
SERVICE	DHW SYSTEM	LOCATION	

DHW RECIRCULATION PUMP	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL NO.			
SERIAL NO.			
PUMP CAPACITY			
PUMP HEAD			
PUMP RPM			
MOTOR CAPACITY			
VOLTAGE / PHASE / FREQUENCY			

GENERAL COMMENTS:

POSITION/TITLE	**SIGNATURE**	**DATE**

PLUMBING FIXTURES

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	AS INDICATED BELOW
SERVICE	PLUMBING SYSTEM	LOCATION	N/A

WATER CLOSET	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
FIXTURE MANUFACTURER			
FIXTURE MODEL NO.			
TRIM MANUFACTURER			
TRIM MODEL NO.			
FLUSH RANGE			

URINAL	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
FIXTURE MANUFACTURER			
FIXTURE MODEL NO.			
TRIM MANUFACTURER			
TRIM MODEL NO.			
FLUSH RANGE			

LAVATORY	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
FIXTURE MANUFACTURER			
FIXTURE MODEL NO.			
TRIM MANUFACTURER			
TRIM MODEL NO.			
FLOW RATE			
MIXING VALVE MANUFACTURER			
MIXING VALVE MODEL NO.			

JANITOR MOP SINK	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
FIXTURE MANUFACTURER			
FIXTURE MODEL NO.			
TRIM MANUFACTURER			
TRIM MODEL NO.			
FLOW RATE			
MIXING VALVE MANUFACTURER			
MIXING VALVE MODEL NO.			

PLUMBING FIXTURES

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

SINK	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
FIXTURE MANUFACTURER			
FIXTURE MODEL NO.			
TRIM MANUFACTURER			
TRIM MODEL NO.			
FLOW RATE			
MIXING VALVE MANUFACTURER			
MIXING VALVE MODEL NO.			

SHOWER	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
FIXTURE MANUFACTURER			
FIXTURE MODEL NO.			
TRIM MANUFACTURER			
TRIM MODEL NO.			
FLOW RATE			
MIXING VALVE MANUFACTURER			
MIXING VALVE MODEL NO.			

EMERGENCY EYEWASH	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL NO.			
FLOW RATE			
MIXING VALVE MANUFACTURER			
MIXING VALVE MODEL NO.			

DRINKING FOUNTAIN P-12	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL NO.			
FLOW RATE			
REFRIGERANT			

LAUNDRY TUB	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
FIXTURE MANUFACTURER			
FIXTURE MODEL NO.			
TRIM MANUFACTURER			
TRIM MODEL NO.			
FLOW RATE			
MIXING VALVE MANUFACTURER			
MIXING VALVE MODEL NO.			

PLUMBING FIXTURES

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

HYDRONIC PUMPS

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	
SERVICE		LOCATION	

HYDRONIC PUMP	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL NO.			
SERIAL NO.			
PUMP CAPACITY			
PUMP HEAD			
PUMP RPM			
MOTOR CAPACITY			
VOLTAGE / PHASE / FREQUENCY			

GENERAL COMMENTS:

POSITION/TITLE	**SIGNATURE**	**DATE**

RADIANT FLOOR HEATING

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	
SERVICE		LOCATION	

SHOP DRAWING DATA	**MANIFOLD 1**	**MANIFOLD 2**	**MANIFOLD 3**
MANUFACTURER			
AREA SERVED			
LOOPS PER MANIFOLD			
FLOWRATE PER MANIFOLD			
PIPE SIZE			
PIPE SPACING			
CONFIRMATION ABOVE IS INSTALLED			

SHOP DRAWING DATA			
MANUFACTURER			
AREA SERVED			
LOOPS PER MANIFOLD			
FLOWRATE PER MANIFOLD			
PIPE SIZE			
PIPE SPACING			
CONFIRMATION ABOVE IS INSTALLED			

GENERAL COMMENTS:

POSITION/TITLE	**SIGNATURE**	**DATE**

EXHAUST FANS

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	
SERVICE		LOCATION	

EXHAUST FAN	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL NO.			
SERIAL NO.			
AIR VOLUME			
STATIC PRESSURE			
MOTOR SIZE			
VOLTAGE / PHASE / FREQUENCY			
FAN RPM			

GENERAL COMMENTS:

POSITION/TITLE	**SIGNATURE**	**DATE**

CAV BOXES
Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	AS INDICATED BELOW
SERVICE	VENTILATION SYSTEM	LOCATION	AS INDICATED BELOW

VERIFY THAT SHOP DRAWING INFORMATION BELOW MATCHES THE DATA FROM THE INSTALLED EQUIPMENT.

LEVEL 1 CAV BOXES							
CAV BOX #							
SERVING ROOM #							
MANUFACTURER							
MODEL NO.							
SIZE							
AIR FLOW							
HEATING COIL CAPACITY							
EQUIPMENT INFO. MATCHES							

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

Appendix B

Mechanical Start-Up Forms

Samples are provided for reference only.

Final commissioning plan will include all required forms.

Note: Final list of Start-Up Forms will be provided in the Final Commissioning Plan

DHW RECIRCULATION PUMP

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

EQUIPMENT IDENTIFICATION (1 per piece of equipment)	
EQUIPMENT TAG:	LOCATION:

This checklist is not a substitute for following the installation requirements and safety precautions as outlined in the Installation, Operation and Maintenance Manuals for the piece of equipment. The Manuals should be read and thoroughly understood before starting any piece of equipment.

CHECKLIST	**VERIFY ON SITE**		
Electrical:			
- Motor leads connected per electrical code	☐ Yes	☐ No	☐ N/A
- Motor starter leads connected	☐ Yes	☐ No	☐ N/A
- Motor rotation and phase check and correct	☐ Yes	☐ No	☐ N/A
- Pump Controller is operational	☐ Yes	☐ No	☐ N/A
- Short circuit protection	☐ Yes	☐ No	☐ N/A
- Do protection devices comply with pump and motor amp rating?	☐ Yes	☐ No	☐ N/A
- Are all electrical and panel entry connections tight?	☐ Yes	☐ No	☐ N/A
- Is the interior of the panel dry?	☐ Yes	☐ No	☐ N/A
- Grounding installed for components and unit.	☐ Yes	☐ No	☐ N/A
- All control devices and wiring complete	☐ Yes	☐ No	☐ N/A
- Operation of HOA switches checked in all positions.	☐ Yes	☐ No	☐ N/A
Piping:			
- Piping specialties installed as per contract docs - i.e. Suction diffuser, triple duty valve, etc.	☐ Yes	☐ No	☐ N/A
- No pipe spring evidence	☐ Yes	☐ No	☐ N/A
- Proper pipe anchors installed at change of direction	☐ Yes	☐ No	☐ N/A
- Suction pipe support installed	☐ Yes	☐ No	☐ N/A
- Suction and discharge flex connectors installed	☐ Yes	☐ No	☐ N/A
- Suction and discharge isolation valves installed	☐ Yes	☐ No	☐ N/A
- Vibration isolation devices installed and functional	☐ Yes	☐ No	☐ N/A
Installation:			
- Pump located with sufficient space for maintenance	☐ Yes	☐ No	☐ N/A
- Pump base shimmed and leveled	☐ Yes	☐ No	☐ N/A
- Pump base grouted	☐ Yes	☐ No	☐ N/A
- System primed, air removed from pump casing	☐ Yes	☐ No	☐ N/A
- Grease cup/oil reservoir level checked	☐ Yes	☐ No	☐ N/A
- Coupling alignment verified per I&O Manual	☐ Yes	☐ No	☐ N/A

DHW RECIRCULATION PUMP

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

CHECKLIST	VERIFY ON SITE		
Operational Checks:			
- Is there noise or vibration present?	☐ Yes	☐ No	☐ N/A
- Does check valve operate properly?	☐ Yes	☐ No	☐ N/A
- Is system free of leaks?	☐ Yes	☐ No	☐ N/A
- Does system appear to operate at design flow rate:	☐ Yes	☐ No	☐ N/A
- Voltage and amperage have been verified and are within manufacturer recommended range	☐ Yes	☐ No	☐ N/A
Follow up/Corrective Action Required	☐ **Yes**	☐ **No**	☐ **N/A**

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

HYDRONIC PUMP

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

EQUIPMENT IDENTIFICATION (1 per piece of equipment)	
EQUIPMENT TAG:	LOCATION:

This checklist is not a substitute for following the installation requirements and safety precautions as outlined in the Installation, Operation and Maintenance Manuals for the piece of equipment. The Manuals should be read and thoroughly understood before starting any piece of equipment.

CHECKLIST	**VERIFY ON SITE**		
Electrical:			
- Motor leads connected per electrical code	☐ Yes	☐ No	☐ N/A
- Motor starter leads connected	☐ Yes	☐ No	☐ N/A
- Motor rotation and phase check and correct	☐ Yes	☐ No	☐ N/A
- Pump Controller is operational	☐ Yes	☐ No	☐ N/A
- Short circuit protection	☐ Yes	☐ No	☐ N/A
- Do protection devices comply with pump and motor amp rating?	☐ Yes	☐ No	☐ N/A
- Are all electrical and panel entry connections tight?	☐ Yes	☐ No	☐ N/A
- Is the interior of the panel dry?	☐ Yes	☐ No	☐ N/A
- Grounding installed for components and unit.	☐ Yes	☐ No	☐ N/A
- All control devices and wiring complete	☐ Yes	☐ No	☐ N/A
- Operation of HOA switches checked in all positions.	☐ Yes	☐ No	☐ N/A
Piping:			
- Piping specialties installed as per contract docs - i.e. Suction diffuser, triple duty valve, etc.	☐ Yes	☐ No	☐ N/A
- No pipe spring evidence	☐ Yes	☐ No	☐ N/A
- Proper pipe anchors installed at change of direction	☐ Yes	☐ No	☐ N/A
- Suction pipe support installed	☐ Yes	☐ No	☐ N/A
- Suction and discharge flex connectors installed	☐ Yes	☐ No	☐ N/A
- Suction and discharge isolation valves installed	☐ Yes	☐ No	☐ N/A
- Vibration isolation devices installed and functional	☐ Yes	☐ No	☐ N/A
Installation:			
- Pump located with sufficient space for maintenance	☐ Yes	☐ No	☐ N/A
- Pump base shimmed and leveled	☐ Yes	☐ No	☐ N/A
- Pump base grouted	☐ Yes	☐ No	☐ N/A
- System primed, air removed from pump casing	☐ Yes	☐ No	☐ N/A
- Grease cup/oil reservoir level checked	☐ Yes	☐ No	☐ N/A
- Coupling alignment verified per I&O Manual	☐ Yes	☐ No	☐ N/A
- Floats installed and move freely	☐ Yes	☐ No	☐ N/A

HYDRONIC PUMP

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

CHECKLIST	VERIFY ON SITE		
Operational Checks:			
- Is there noise or vibration present?	☐ Yes	☐ No	☐ N/A
- Does check valve operate properly?	☐ Yes	☐ No	☐ N/A
- Is system free of leaks?	☐ Yes	☐ No	☐ N/A
- Does system appear to operate at design flow rate:	☐ Yes	☐ No	☐ N/A
- Voltage and amperage have been verified and are within manufacturer recommended range	☐ Yes	☐ No	☐ N/A
- Alarms operating when activated by floats	☐ Yes	☐ No	☐ N/A
Follow up/Corrective Action Required	☐ **Yes**	☐ **No**	☐ **N/A**

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

EXHAUST FAN

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

EQUIPMENT IDENTIFICATION (1 per piece of equipment)	
EQUIPMENT TAG:	LOCATION:

This checklist is not a substitute for following the installation requirements and safety precautions as outlined in the Installation, Operation and Maintenance Manuals for the piece of equipment. The Manuals should be read and thoroughly understood before starting any piece of equipment.

CHECKLIST	**VERIFY ON SITE**		
Electrical:			
- Motor leads connected per electrical code	☐ Yes	☐ No	☐ N/A
- Motor starter leads connected	☐ Yes	☐ No	☐ N/A
- Motor rotation and phase check and correct	☐ Yes	☐ No	☐ N/A
- Short circuit protection in place	☐ Yes	☐ No	☐ N/A
- Do protection devices comply with fan and motor amp rating?	☐ Yes	☐ No	☐ N/A
- Are all electrical and panel entry connections tight?	☐ Yes	☐ No	☐ N/A
- Is the interior of the panel dry?	☐ Yes	☐ No	☐ N/A
- Grounding installed for components and unit.	☐ Yes	☐ No	☐ N/A
- All control devices and wiring complete	☐ Yes	☐ No	☐ N/A
- Operation of HOA switches checked in all positions.	☐ Yes	☐ No	☐ N/A
Installation:			
- Installation is as per Manufacturer's Instructions	☐ Yes	☐ No	☐ N/A
- Installation is as per Drawings and Specifications	☐ Yes	☐ No	☐ N/A
- Ductwork system is complete	☐ Yes	☐ No	☐ N/A
- Fire and balancing dampers are installed and operation verified	☐ Yes	☐ No	☐ N/A
- Damper actuators are installed and operating properly	☐ Yes	☐ No	☐ N/A
- Backdraft dampers are installed and operate verified	☐ Yes	☐ No	☐ N/A
- Belt tension is correct	☐ Yes	☐ No	☐ N/A
- Sufficient space for maintenance around fan	☐ Yes	☐ No	☐ N/A
- Pulleys are aligned	☐ Yes	☐ No	☐ N/A
- Fan rotates freely	☐ Yes	☐ No	☐ N/A
- Fan bearings lubricated	☐ Yes	☐ No	☐ N/A
- Fan is properly supported	☐ Yes	☐ No	☐ N/A
- Vibration isolation is installed	☐ Yes	☐ No	☐ N/A
- Filters have been installed	☐ Yes	☐ No	☐ N/A

EXHAUST FAN

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

CHECKLIST	VERIFY ON SITE		
Operational Checks:			
- Fan rotation is correct	☐ Yes	☐ No	☐ N/A
- Are there abnormal noises or vibrations during operation?	☐ Yes	☐ No	☐ N/A
- Equipment guards are installed	☐ Yes	☐ No	☐ N/A
- Controls and safetylocks are installed and verified	☐ Yes	☐ No	☐ N/A
- Does system appear to operate at design flow rate?	☐ Yes	☐ No	☐ N/A
- Voltage and amperage have been verified and are within manufacturer's acceptable range	☐ Yes	☐ No	☐ N/A
Follow up/Corrective Action Required	☐ **Yes**	☐ **No**	☐ **N/A**

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

CAV BOX

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

EQUIPMENT IDENTIFICATION (1 per piece of equipment)	
EQUIPMENT TAG:	LOCATION:

This checklist is not a substitute for following the installation requirements and safety precautions as outlined in the Installation, Operation and Maintenance Manuals for the piece of equipment. The Manuals should be read and thoroughly understood before starting any piece of equipment.

CHECKLIST	**VERIFY ON SITE**		
General Installation			
- Installation is as per Manufacturer's Instructions	☐ Yes	☐ No	☐ N/A
- Installation is as per Drawings and Specifications	☐ Yes	☐ No	☐ N/A
- Cabinet is in good condition with no visible damage	☐ Yes	☐ No	☐ N/A
- Ductwork is connected tightly with no leaks	☐ Yes	☐ No	☐ N/A
- Sufficient space for maintenance around unit	☐ Yes	☐ No	☐ N/A
- Vibration isolation is installed	☐ Yes	☐ No	☐ N/A
- Insulation is installed and in good condition	☐ Yes	☐ No	☐ N/A
- Duct length before and after unit is as per Manufacturer's Instructions	☐ Yes	☐ No	☐ N/A
- Unit is properly supported	☐ Yes	☐ No	☐ N/A
- Damper operates properly with full range of movement	☐ Yes	☐ No	☐ N/A
- Fan operates freely and is turning in right direction	☐ Yes	☐ No	☐ N/A
- Filters have been installed	☐ Yes	☐ No	☐ N/A
Coils (Hydronic and Electric)			
- Piping and near unit accessories are installed as per Drawings and Specifications	☐ Yes	☐ No	☐ N/A
- No visible leaks	☐ Yes	☐ No	☐ N/A
- Piping has been cleaned and flushed	☐ Yes	☐ No	☐ N/A
- Piping insulation is installed and in good condition	☐ Yes	☐ No	☐ N/A
- Coils and fins are clean and in good condition	☐ Yes	☐ No	☐ N/A
- Control valve installed in proper direction and operates with full range of movement	☐ Yes	☐ No	☐ N/A
- Isolation valves are installed and operational	☐ Yes	☐ No	☐ N/A
- Electrical conduit installed tight to unit	☐ Yes	☐ No	☐ N/A
Electrical (Box and Electric Coil)			
- Electrical disconnects installed and operational	☐ Yes	☐ No	☐ N/A
- Electrical disconnects are installed in proximity to the unit	☐ Yes	☐ No	☐ N/A
- All electricals connections are tight	☐ Yes	☐ No	☐ N/A
- All safeties and overloads are installed and sized correctly	☐ Yes	☐ No	☐ N/A

CAV BOX

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

Appendix C

Mechanical Functional Performance Test Forms

Note: Mechanical Functional Performance Tests will be provided in final commissioning plan and will be based on the sequence of operations provided by the designer.

Appendix D

Electrical Static Verification Forms

Samples are provided for reference only.

Final commissioning plan will include all required forms.

Note: Final list of Static Verification Forms will be provided in the Final Commissioning Plan

PANELBOARD

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	
SERVICE		LOCATION	

PANELBOARD	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL / PART NO.			
ENCLOSURE TYPE			
VOLTAGE/PHASES/WIRES			
AMPERAGE RATING			
BUS MINIMUM INTERRUPTING CAPACITY			
BUS MATERIAL			
MOUNTING TYPE			
PANEL CIRCUIT CAPACITY			
BONDING BUS MATERIAL			
BONDING CONDUCTOR SIZE			
MAIN BREAKER TYPE			
MAIN BREAKER RATING			
MAIN FEEDER CONDUCTOR SIZE			

GENERAL COMMENTS:

POSITION/TITLE	**SIGNATURE**	**DATE**

INTERIOR LIGHTING

Static Verification

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL			
MANUFACTURER	AS INDICATED BELOW	EQUIPMENT NO.	AS INDICATED BELOW
SERVICE	INTERIOR LIGHTING	LOCATION	INTERIOR SPACES

INTERIOR LIGHTING	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL NO.			
VOLTAGE			
WATTAGE			
LAMP TYPE			
LUMENS			

INTERIOR LIGHTING	**SPECIFIED**	**SHOP DRAWINGS**	**VERIFY ON SITE**
MANUFACTURER			
MODEL NO.			
VOLTAGE			
WATTAGE			
LAMP TYPE			
LUMENS			

GENERAL COMMENTS:

POSITION/TITLE	**SIGNATURE**	**DATE**

Appendix E

Electrical Start-Up Forms

Samples are provided for reference only.

Final commissioning plan will include all required forms.

Note: Final list of Start-Up Forms will be provided in the Final Commissioning Plan

PANELBOARD

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

EQUIPMENT IDENTIFICATION (1 per piece of equipment)	
EQUIPMENT TAG:	LOCATION:

This checklist is not a substitute for following the installation requirements and safety precautions as outlined in the Installation, Operation and Maintenance Manuals for the piece of equipment. The Manuals should be read and thoroughly understood before starting any piece of equipment.

CHECKLIST	**VERIFY ON SITE**		
General Installation			
Is panel installed as per manufacturer's instructions?	☐ Yes	☐ No	☐ N/A
Is panel installed as per drawings and specifications?	☐ Yes	☐ No	☐ N/A
Panel is mounted securely and level.	☐ Yes	☐ No	☐ N/A
Hinged door is aligned, closed tightly and lock is operational.	☐ Yes	☐ No	☐ N/A
Ground bus is properly bonded to enclosure and enclosure is grounded.	☐ Yes	☐ No	☐ N/A
Breaker locks are installed on circuits which require one (ex. Fire Alarm).	☐ Yes	☐ No	☐ N/A
Panel base is clean and vacuumed.	☐ Yes	☐ No	☐ N/A
Proper breakers sizes are installed and operational.	☐ Yes	☐ No	☐ N/A
Breaker trip setting adjusted to coordination study.	☐ Yes	☐ No	☐ N/A
Cable lugs torqued to minimum require torque? Enter MRT value:	_____		
Bus lugs torqued to minimum require torque? Enter MRT value:	_____		

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

INTERIOR LIGHTING

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

EQUIPMENT IDENTIFICATION (1 Form per Room / Floor / Area)
ROOM / FLOOR / AREA:

This checklist is not a substitute for following the installation requirements and safety precautions as outlined in the Installation, Operation and Maintenance Manuals for the piece of equipment. The Manuals should be read and thoroughly understood before starting any piece of equipment.

CHECKLIST	**VERIFY ON SITE**		
Fixtures & Lamps			
Are fixtures installed as per manufacturer instructions?	☐ Yes	☐ No	☐ N/A
Are fixtures installed as per drawings and specifications?	☐ Yes	☐ No	☐ N/A
Fixture location and lighting layout is as indicated on the drawings?	☐ Yes	☐ No	☐ N/A
All lamps installed in fixtures?	☐ Yes	☐ No	☐ N/A
Are the fixtures clean of construction dust?	☐ Yes	☐ No	☐ N/A
Is the protective wrap removed from fixtures?	☐ Yes	☐ No	☐ N/A
Are fixtures adequately installed in or on suspended ceilings / wall?	☐ Yes	☐ No	☐ N/A
Are fixtures accurately and carefully aligned complete with all mounting hardware?	☐ Yes	☐ No	☐ N/A
All fixtures have been tested and are fully operational?	☐ Yes	☐ No	☐ N/A
Have noisy ballasts been replaced?	☐ Yes	☐ No	☐ N/A
Any lamps found to be burnt out have been replaced.	☐ Yes	☐ No	☐ N/A
Control Devices			
Switches are installed with toggle in "UP" position when switched closed.	☐ Yes	☐ No	☐ N/A
Multiple switches are installed in gang type outlet box and grouped under one wall plate.	☐ Yes	☐ No	☐ N/A
Operation of all single pole, 3-way and 4-way switches have been verified and operating correctly.	☐ Yes	☐ No	☐ N/A
Operation of dimmer switches has been verified and operating correctly?	☐ Yes	☐ No	☐ N/A
Do occupancy sensors activate immediately upon entering the area being served.	☐ Yes	☐ No	☐ N/A
Is occupancy sensor sensitivity set to prevent false turn on by movement outside of the controlled area?	☐ Yes	☐ No	☐ N/A
Have photoelectric sensors been tested and operating properly?	☐ Yes	☐ No	☐ N/A
Have lighting scenes or sequence of operation been progammed and tested?	☐ Yes	☐ No	☐ N/A
Are night lights and lights on emergency circuits wired to appropriate panel and operating properly?	☐ Yes	☐ No	☐ N/A

INTERIOR LIGHTING

Start-Up Checklist

REVISION #: _____

NAME:	Garth Nason	CLIENT:	
COMPANY:	Maritech Commissioning Works Ltd.	PROJECT:	
ADDRESS:	77 Vaughan Harvey Blvd., Suite 210	MARITECH NO.:	
	Moncton, NB, E1C 0K2	DATE:	

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

Appendix F

Electrical Functional Performance Test Forms

Note: Electrical Functional Performance Tests will be provided in final commissioning plan.

Appendix G
Training Plan

COMMISSIONING TRAINING PLAN OUTLINE

1. INTRODUCTION

Successful completion of the commissioning process depends on the training and education of the facility's operations and maintenance staff. The General Contractor is responsible for training coordination and scheduling and ultimately to ensure that training is completed to the satisfaction of the Commissioning Authority and the Owner. The General Contractor is to prepare a training plan based on the following outline for review by the Commissioning Authority and the Owner. This document to be reviewed in conjunction with Specification Section 01 79 00.13 Demonstration and Training for Building Commissioning.

2. TRAINING OBJECTIVES

Training to be detailed and of duration to ensure:

1. Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
2. Effective on-going inspection, measurements of system performance.
3. Proper preventive maintenance, diagnosis and trouble-shooting.
4. Ability to update documentation.
5. Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

3. SCHEDULING

1. Include in the Commissioning Schedule or Construction Schedule time for training.
2. Training should include both classroom and on-site training sessions.
3. Provide sufficient notice (minimum 21 days) to Owner and Commissioning Authority to ensure that appropriate attendees can participate.
4. Deliver training during regular working hours, training sessions to be 3 hours in length. Schedule sufficient sessions to cover all topics.

4. TRAINING PROCESS AND MATERIALS

1. The General Contractor and Sub-Contractors are responsible for the training materials' content and quality.
2. Instructors are to be certified and factory trained by the manufacturer to provide instruction on the systems and equipment.
3. Controls Contractor to attend all sessions other than the controls training, as requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.
4. Owner will provide number of attendees in order for General Contractor to prepare sufficient materials. Commissioning Authority will be in attendance as well.

5. Training materials to include the following, at a minimum, for each session:
    a. Training agenda
    b. Training handouts (training documentation, copies of slides, etc.)
    c. "As-Built" Contract Documents.
    d. Operating & Maintenance Manuals.
    e. Sequences of Operation
6. Training materials are to be submitted to Commissioning Authority and Owner 21 days prior to training to ensure sufficient time for review and modifications.
7. Training materials shall be sufficient to provide one hardcopy to all attendees and one electronic copy to Owner.
8. Instructors are to use training materials during the training sessions and illustrate the use of the O&M Manuals for reference.
9. Training materials to be in a format which allows use for future training to the same degree of detail.
10. Should training materials include multimedia presentations or training videos, copies of same are to be provided to Owner for future training.
11. Videotaping or recording of training sessions is required and logistics are to be discussed with the Owner prior to commencement.
12. General Contractor is responsible for securing training classrooms, projectors, laptops, screens and other devices to deliver the training.
13. Training to include demonstrations by Instructors using the installed equipment and systems.
14. Trainees may be subject to testing at the discretion of the Owner. Testing requirements to be discussed with Owner prior to commencement of training.
15. For each session, General Contractor is to provide an attendance form outlining:
    a. Time, date, location of training session
    b. Name of instructor
    c. agenda of the training session
    d. List of all attendees.

5. TRAINING CONTENT

1. It is the General Contractor's responsibility for ensuring that the content of the training is of sufficient detail to properly train the operations staff to the satisfaction of the Owner.

2. Training topics to include:
    a. Review of facility, occupancy profile and functional requirements.
    b. System philosophy, limitations and interaction of systems.
    c. Review of system layout, equipment, components and controls.
    d. Equipment and system start-up, operation, monitoring, servicing, maintenance, emergency and shut-down procedures.
    e. In depth review of EMCS or BAS sequences of operation.
    f. Trouble-shooting diagnosis.

g. Interaction among systems during integrated operation.
h. Review of O & M documentation emphasizing safe and proper operating requirements, preventative maintenance, special tools needed, spare parts inventory suggestions.
i. Discussion on relative health and safety issues and solutions.
j. Information concerning the warranties and their use and the location of all guarantees.
k. Description of spare parts in stock and their service.
l. Service contracts and protocols.

6. EQUIPMENT AND SYSTEMS SCOPE

1. Training will be provided on the commissioned systems and equipment, as outlined in Section 5 of the Commissioning Plan and other equipment as indicated throughout the project documents.

Appendix K

Systems Manual – Preliminary Table of Contents

SYSTEMS MANUAL
TABLE OF CONTENTS

MARITECH
COMMISSIONING WORKS

77 VAUGHAN HARVEY BLVD., SUITE 210
MONCTON, NEW BRUNSWICK
E1C 0K2

This page intentionally left blank