

Project Manual for:

**GOVERNMENT OF CANADA
COALDALE GOVERNMENT BUILDING**

PROJECT NO: 9031

**VOLUME 1 OF 2
DIVISIONS 00-12
and Appendix A**

**Issued for Tender
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1. GENERAL

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END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Information Documents means information of any type and in any form, related to the Project and identified in this Section as such.

1.2 STATUS OF INFORMATION DOCUMENTS

- .1 Information Documents, or any part thereof, are not part of the Contract unless specifically incorporated into Contract Documents by means of copying, transcribing or referencing.
- .2 Documents can be found in Appendix A at the end of Specification Volume 1.

1.3 USE OF AND RELIANCE UPON INFORMATION DOCUMENTS

- .1 Information Documents are made available to Bidder by Owner for the purpose of providing Bidder with access to information available to Owner.
- .2 Information Documents shall not be considered a representation or warranty that information contained therein is accurate, complete or appropriate.
- .3 Bidder shall interpret and draw its own conclusions about Information Documents and is encouraged to obtain specialist advice with respect thereto. Owner assumes no responsibility for such interpretations and conclusions.
- .4 Information contained in Information Documents may be time sensitive and dates shall be considered when interpreting Information Documents.
- .5 Bidder may rely upon the data contained in Information Documents, or parts thereof, which are specifically incorporated into Contract Documents by means of copying, transcribing or referencing, but shall draw his own conclusions from such data and shall not rely on opinions or interpretations contained therein.

1.4 INFORMATION DOCUMENTS INCORPORATED INTO CONTRACT DOCUMENTS

- .1 Information Documents incorporated into Contract Documents, in whole or in part, consist of the following:
 - .1 Geotechnical Report entitled “GEOTECHNICAL INVESTIGATION REPORT RCMP BUILDING, LOT 93, BLOCK 1, PLAN 151 0788, COALDALE, ALBERTA” dated July 14, 2017, prepared by PARKLAND GEOTECHNICAL CONSULTING LTD., and consisting of 66 PAGES. This Information Document is hereby incorporated into the Contract Documents in its entirety. This document is issued with the Bid Documents.
 - .2 Survey Drawing entitled “TOPOGRAPHIC MAP WITH SURFACE AND UTILITY FEATURES” dated May 30th, 2017, prepared by CICON ENGINEERING. And consisting of 1 Page. This Information Document is hereby incorporated into the Contract Documents in its entirety. This document is issued with the Bid Documents.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REVISION TO APPROVAL REQUIREMENTS THROUGHOUT THE SPECIFICATIONS

- .1 Any reference to the Consultant approving, accepting, giving written consent, or any other similar approval terminology used throughout the specifications is hereby revised to the Departmental Representative approving, accepting, giving written consent, or giving any other type of approval required during the course of the Agreement.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises, but is not limited to, general construction of a single-storey building, out-buildings and related site work located in the Town of Coaldale.
- .2 Work includes construction of an approximately 2,403 m² main building and two out buildings approximately 84 m² and 122 m². The 84 m² building is to be unheated with a stub in for future heating and the 122 m² building is to be heated. Site work includes stripping the topsoil, grading, access routes, concrete walks, paving, out-buildings, metal fencing, garbage and recycling enclosure, parking signs and finishes, and landscaping.

1.3 CONTRACT METHOD

- .1 Construct Work under Stipulated Price Contract.
- .2 Relations and responsibilities between Contractor and subcontractors and suppliers assigned by Owner are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:
 - .1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations there under when Contractor is required to furnish such bonds to Owner.
 - .2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide to Owner.

1.4 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from them.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Owner, in writing, any defects which may interfere with proper execution of Work.

1.5 CONTRACTOR USE OF PREMISES

- .1 Contractor and sub-trades have unrestricted use of the project until Interim Acceptance/Substantial Performance.
- .2 After the building is turned over to the Owner, not after Substantial Performance of the Work, the construction site is considered a secure work site. Contractor, subtrades, and

all personnel requiring access to the secure worksite must arrange access to the building with the Detachment Commander at least 48 hours in advance; and have valid Facilities Access under escort, FA-2 clearance.

1.6 EXISTING SERVICES

- .1 Where Work involves connecting to existing services, carry out work at times as directed by governing authorities with minimum disturbance to pedestrian and vehicular traffic.
- .2 Provide alternative routes for personnel pedestrian and vehicular traffic.
- .3 Establish location and extent of service lines in area of work before starting Work.
- .4 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .5 Where unknown services are encountered, immediately advise Owner and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.
- .8 Construct barriers in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

1.7 DOCUMENTS REQUIRED

- .1 Maintain at jobsite one (1) copy of each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Building and Work Permits required to complete the Work.
 - .12 Other documents as specified.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

 .1 Not used.

END OF SECTION

Part 1 General

1.1 CASH ALLOWANCES

- .1 Include in Contract Price specified Cash Allowances.
- .2 Cash Allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage installation, and other authorized expenses incurred in performing Work.
- .3 Contract Price, and not Cash Allowance, includes Contractor's overhead and profit in connection with such Cash allowance.
- .4 Contract Price will be adjusted by written order to provide for excess or deficit to each cash allowance.
- .5 Where costs under a cash allowance exceed amount of allowance, Contractor will be compensated for excess incurred and substantiated plus allowance for overhead and profit as set out in Contract Documents.
- .6 The allowance fund is to be used for the following:
 - .1 **Structural Steel Third Party Inspection** including; shop inspection and site inspections, as outlined in Sections 05 12 23, 05 12 23.1, 05 21 00, and 05 31 00.
 - .2 **Materials Third Party Testing** including; testing for each 60 m3 or fraction thereof, each type of concrete placed each day, mortar and grout bearing masonry, pile monitoring, compaction testing. Refer to: Sections 03 30 00 and 31 63 23 for testing each 60 m3 or fraction thereof, each type of concrete each day; Section 04 05 12 for testing mortar and grout bearing masonry; Section 31 63 23 for pile monitoring; Section 31 23 20 for compaction testing.
 - .3 **Geotechnical Sitework Testing** including; All testing required to sitework specifications outlined in Section 31 00 10 – Geotechnical Sitework Testing and related sections. The typical tests include the following;
 - .1 Sitework compaction testing for trench backfill and road construction, for all onsite and offsite construction.
 - .2 Sitework concrete material and strength tests for thrust blocks, sidewalks, curbs & gutters and sitework slabs, excluding structural slabs and structural stoops.
 - .3 Asphalt mix analysis and core analysis for all onsite and offsite construction.
 - .4 Material analysis for suitability analysis, proctor analysis and sieve analysis.
 - .5 Geotechnical engineer recommendations as requested by the Engineer and the Contractor, such as a proof roll or inspection of unforeseen conditions.
 - .4 **Utility Service Connections (Mechanical and Electrical):** including; gas, power, phone, and cable connections by utility company. Work to be completed by the Contractor to be included in the Contract Price.

- .5 **Miscellaneous Independent Testing and Inspections** including but not limited to; roofing inspections by ARCA certified inspector for warranty as noted in Section 07 52 00 Modified Bitumous Membrane Roofing; painting as noted in Section 09 91 23, high build coating as noted in Section 09 96 00, high build glazed coating as noted in Section 09 96 59, to MPI and APCA certification standards; and acoustic testing for STC rated spaces as noted in sections 07 92 00, 08 38 50, and 09 21 16.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1. GENERAL

1.1 INTENT

- .1 The intent of the Delegated Engineering Submittals required by this Section is to provide a format for documenting professional engineering responsibilities for design, review and acceptance of components of the work in accordance with the Building Code, which are assigned to a design entity **other than** the Consultant or Sub-consultants, including, but not limited to, the following:
 - .1 Designs requiring structural analysis of load bearing components and connections;
 - .2 Designs requiring compliance with fire safety regulations;
 - .3 Designs requiring compliance with life or health safety regulations.
- .2 This Section provides standard forms for submittal (Letter of Commitment and Letter of Compliance) required to record compliance with requirements of the Building Code and design delegated to a professional engineer, within the technical specification sections.
- .3 It shall be the responsibility of the Delegated Engineer to schedule all formal site inspections and tours prior to the covering or concealing, with finishing or other materials, the components and assemblies that he provided professional design services for. This is to allow for revisions, adjustment, or replacement of same prior to installation of adjacent or concealing materials. Notify the Consultant and the Contractor at least 72 hours prior to planned site inspections.

1.2 RELATED WORK

- .1 General Requirements: Division 1
- .2 Electrical: Electrical Divisions
- .3 Mechanical: Mechanical Divisions
- .4 Other Sections Requiring Delegated Engineer Design Submittals.

1.3 DELEGATED DESIGN

- .1 Performance and Design Criteria: Provide products and systems complying with specific performance and design criteria indicated where professional design services or certifications by a design professional are specifically required by the Contract Documents.
- .2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to the consultant.

2. PRODUCTS

2.1 LETTER OF COMMITMENT

- .1 Submit Letter of Commitment, signed and sealed by the retained professional engineer required by the Work of the applicable Technical Section, in compliance with (this) Section 01 29 00 – Delegated Engineering Submittals. Design engineer to define applicable responsibilities in the completed Letter of Commitment in compliance with the intent of the Building Code. Submit with the shop drawing submittals.
- .2 Prior to starting work requiring design and the seal of a professional engineer, submit Letter of Commitment on company letterhead, addressed to the Consultant, in accordance with the format in Appendix A attached to the end of the Section.

2.2 LETTER OF COMPLIANCE

- .1 Prior to declaration of Substantial Performance, Contractor's design engineer to certify substantial compliance with the design by submitting a Letter of Compliance, signed and sealed by the retained professional engineer required for the Work of that Section in compliance with this Section 01 29 00 – Delegated Engineering Submittals.
- .2 Submit Letter of Compliance on company letter head addressed to the Consultant in accordance with the format in Appendix B attached to the end of this Section on completion of the work requiring design and seal of a professional engineer.

3. EXECUTION

3.1 IMPLEMENTATION

- .1 Include the summary of the work described in the technical specification section as a part of the required Letter of Commitment.
- .2 Prepare required submittals and present to the Consultant within sufficient time to allow for the Consultant's detailed review and acceptance.

4. ATTACHMENTS

4.1 APPENDICES

- .1 Appendix 'A': Letter of Commitment (1 page).
- .2 Appendix 'B': Letter of Compliance (1 page).

END OF SECTION

APPENDIX A
LETTER OF COMMITMENT

Submit a signed and sealed letter of commitment on company letterhead in the form as follows:

[Date]

Stephens Kozak - ACI Architects and Planners.
17225 102 Avenue NW
Edmonton, Alberta, T5S 1J8

Attention: [Consultant's Registered Professional of Record]

Re: Letter of Commitment for Delegated Design of [System of Component of Work]
[Name of Project]
[Project Number]
[City, Province]

As the retained registered professional engineer for the design and field review of the above named component of the work and project, I hereby give assurance that I am qualified to perform the following work as required by the Contract Documents:

1. [List appropriate design services for System or Component of the Work];
2. preparation of shop and erection documents;
3. review the fabrication of [structural] [fire rated] [life and health safety] components;
4. and review of the erection of [structural] [fire rated] [life and health safety] components.
5. [Modify list to suit System or Component of the Work.]

I hereby give assurance that I will be responsible for the above noted work.

I also undertake to be responsible for field review of the fabrication and erection of [structural] [fire rated] [life and health safety] components as required to ascertain substantial compliance with the Building Code and Contract Documents.

I will notify you in writing if my responsibility is terminated at any time during the course of the work covered by this Letter of Commitment.

Retained Professional Engineer [Name of]

Signature

Date
(Apply seal)

APPENDIX B

LETTER OF COMPLIANCE

[Date]

Stephens Kozak - ACI Architects and Planners.
17225 102 Avenue NW
Edmonton, Alberta, T5S 1J8

Attention: [Consultant's Registered Professional of Record]

Re: Letter of Compliance for Delegated Design of [System or Component of Work]
[Name of Project]
[Project Number]
[City, Province]

I hereby give assurance that I have fulfilled my obligations for field review as outlined by the previously submitted Letter of Commitment.

I hereby give assurance that the aspects of the [structural] [life and health safety] work as defined by the previously submitted Letter of Commitment substantially complies with the Contract Documents and the Building Code.

Retained Professional Engineer [Name of]

Signature

Date

(Apply Seal)

Part 1 General

1.1 APPOINTMENT AND PAYMENT

- .1 Owner will appoint and pay for services of testing laboratory except as follows:
 - .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 All required soil tests as per contract documents during the construction and maintenance and warranty period, unless noted otherwise.
 - .6 Tests specified to be carried out by Contractor under the supervision of Contract Manager.
 - .7 Tests specified to be carried out by Contractor in various Specification Sections.
 - .8 Additional tests required as follows:
 - .1 Where tests or inspections by designated testing laboratory reveal Work not in accordance with Contract requirements, costs for additional tests or inspections as required to verify acceptability of corrected work will be paid for by the Contractor.

1.2 CONTRACTOR'S RESPONSIBILITIES

- .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 reviewed by Consultant and inspection agency.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 1 General

1.1 ADMINISTRATIVE

- .1 Contractor will schedule and administer project meetings on a bi-weekly basis throughout the progress of the work. Additional meetings may be required, at the discretion of the Owner.
- .2 Contractor will prepare agenda for meetings.
- .3 Contractor will provide notice to sub-consultants of meeting dates. Contractor will provide notice to subtrades of meeting dates.
- .4 Contractor to provide physical space and make arrangements for meetings.
- .5 Contractor will preside at meetings.
- .6 Contractor will record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Contractor will reproduce and distribute copies of minutes within three (3) days after meetings and transmit to Consultant and Owner. Contractor will distribute meeting minutes to all subtrades.
- .8 Representative of Contractor, Subcontractor, and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within fifteen (15) days after award of Contract, request a meeting of parties in Contract to discuss and clarify administrative procedures and responsibilities.
- .2 Senior representatives of Owner, Prime Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07 – Construction Progress Schedules – Bar (GAN TT) Chart.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
 - .5 Delivery schedule of specified equipment in accordance with Section 01 32 16.07 - Construction Progress Schedules – Bar (GAN TT) Chart.
 - .6 Site security in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

- .7 Proposed Notices of Change, Change Orders, procedures, approvals and reviews required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Owner-provided products.
- .9 Record drawings in accordance with Section 01 78 00 – Closeout Submittals.
- .10 Maintenance manuals in accordance with Section 01 78 00 – Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .12 Monthly progress claims, administrative procedures, photographs, holdbacks.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.
- .15 Waste Management Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.3 PROGRESS MEETINGS

- .1 During course of Work and two (2) weeks prior to project completion, schedule biweekly progress meetings. Additional progress meetings may be required, at the discretion of the Owner.
- .2 Owner, Prime Consultant, Sub-consultants, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance. Attendance of Subcontractors and Sub-consultants will be requested based on stages of construction requiring respective representation.
- .3 Prime Consultant will record minutes of meetings and circulate to Contractor and Owner within three (3) business days after meeting. Contractor to distribute meeting minutes to subcontractors.
- .4 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Other business.

1.4 PRE-INSTALLATION MEETINGS

- .1 During course of Work meetings are to be coordinated between Consultants, Contractors and Sub-contractors for materials and equipment prior to installation. Technical Sections will state when and what is required for the pre-installation meeting.

1.5 WARRANTY MEETINGS

- .1 Warranty meetings will be held on as 'as needed' basis between Substantial Performance of the Work and Total Performance of the Work to bring to Contractor's attention Deficiencies identified during warranty period, determine action required for their correction, monitor progress of Contract Deficiency correction.
- .2 Contractor will record minutes of meetings and circulate to Consultant and Owner within four (4) days after meeting. Contractor to distribute meeting minutes to subcontractors.
- .3 The location of these meetings will be as agreed between the Owner, Prime Consultant and the Contractor.
- .4 Contractor, major Subcontractors involved in Work and Owner and Consultants are to be in attendance.
 - .1 Owner and Prime Consultant representatives as determined by Owner and Prime Consultant.
- .5 Agenda to include the following:
 - .1 Review of progress of Deficiency correction.
 - .2 Identification of problems impeding Deficiency correction.
 - .3 Review of outstanding Deficiencies.
 - .4 Review of building, assemblies, and systems for warranty repairs and corrections.
 - .5 Other business.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): 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 accepted scope changes.
- .4 Construction Work Week: Monday to Friday inclusive, will provide five (5) 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 activity, or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. 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 Contractor to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

- .1 Ensure Master Plan and 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 (10) 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 Acceptance and Substantial Performance as defined times of completion are of essence of this Contract.

1.3 CONTRACTOR SCHEDULING

- .1 The Contractor is to refer to the Contract Documents when compiling the Bar (GANTT) Chart.
- .2 The Construction Milestones to be incorporated into the schedule provided by the Contractor. Time durations listed for work to be performed by the Contractor are approximate and are subject to change. Appropriate durations for all milestones listed must be included in the Contractor's Schedule as a minimum.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit to Owner within ten (10) working days of Award of Contract, Bar (GANTT) Chart as Master Plan for planning, monitoring, and reporting of project progress.
- .3 Submit Project Schedule to Owner within five (5) working days of receipt of acceptance of Master Plan.

1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Owner will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within five (5) working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 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 Plumbing.
 - .13 Lighting.
 - .14 Electrical.

- .15 Piping.
- .16 Controls.
- .17 Heating, Ventilating, and Air Conditioning.
- .18 Millwork.
- .19 Fire Systems.
- .20 Testing and Commissioning.
- .21 Paving.
- .22 Supplied equipment long delivery items.
- .23 Engineer-supplied equipment required dates.
- .24 Operation and Maintenance Manuals.
- .25 Construction As-Built Drawings.

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on a monthly basis reflecting activity changes and completions, as well as activities in progress.
- .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.

1.8 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site 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 accepted dates shown on baseline schedule.

Part 2 Products

- .1

2.2 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 78 00 – Closeout Submittals
- .2 Section 01 79 00 – Demonstration and Training

1.2 ADMINISTRATIVE

- .1 Submit to Owner and Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to 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 reviewed and considered rejected.
- .6 Notify Consultant in writing at time of submission, identifying deviations from requirements of Contract Documents, stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .10 Keep one (1) reviewed copy of each submission on site.

1.3 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 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta, Canada. Flag poles shop drawings to be stamped and signed by professional engineer registered and licensed in Ontario, Canada.
- .3 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.
- .4 Allow sufficient time, ten (10) business days minimum, for review of each submission by Consultant.
 - .5 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.
 - .6 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.
 - .7 Accompany submissions with transmittal letter, electronically, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .8 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.
 - .9 After Consultant's review, distribute electronic copies.

- .10 Submit electronic copies of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
- .11 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.
- .12 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 accordance with specified requirements.
 - .2 Testing must have been within three (3) years of date of Contract Award for Project.
- .13 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.
- .14 Submit electronic copies of manufacturer's 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 (MSDS) concerning impedances, hazards, and safety precautions.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in Specification Sections and as requested by Consultant.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit electronic copies of Operation and Maintenance Data for requirements requested in Specification Sections and as requested by Consultant.
- .18 Delete information not applicable to Project.
- .19 Supplement standard information to provide details applicable to Project.
- .20 If, upon review by Consultant, no errors or omissions are discovered, or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.4 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 business address of Consultant.

- .3 Notify Consultant in writing at time of submission, of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern, or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by 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.

1.5 MOCK-UPS

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

1.6 DELEGATED DESIGN

- .1 Performance and design criteria: provide products and systems complying with specific performance and design criteria indicated where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents.
- .2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Consultant.
- .3 Delegated design will be required for elements designed by a specialty professional, which may include the following:
 - .1 Elements normally fabricated off-site.
 - .2 Elements that require specialized fabrication equipment or a proprietary fabrication process not usually available at the job site (*i.e.* open web steel joists).
 - .3 Elements requiring civil engineering, not normally a part of the scope of services performed by architectural, structural, mechanical, electrical, or geotechnical disciplines of Consultant.

1.7 LETTER OF COMMITMENT

- .1 Submit a signed and sealed Letter of Commitment on company letterhead addressed to Consultant in accordance with the format in Appendix A that is attached to this Section prior to starting work requiring design and seal of a professional engineer.

1.8 LETTER OF COMPLIANCE

- .1 Submit a signed and sealed Letter of Compliance on company letterhead addressed to the Consultant in accordance with the format in Appendix B that is attached to this Section on completion of the work requiring design and seal of a professional engineer.

1.9 IMPLEMENTATION

- .1 Include the summary of the work described in the Specification Section as a part of the required Letter of Commitment.
- .2 Prepare required submittals and present to the Consultant within sufficient time to allow for the Consultant's detailed review and acceptance.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities, Chapter 3.
 - .2 EPA General Construction Permit (GCP) 2012.

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .3 Waste Management Plan: Contractor's written comprehensive overview the Contractor and the subcontractors will follow to reduce the production of waste through processes, planning, scheduling of subcontractors and materials, reducing contamination of work materials, and other methods the Contractor can derive from the Work.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for
 - .1 Sediment control materials.
 - .2 Submit electronic copies of WHMIS MSDS in accordance with this Section.
 - .3 Submit Volatile Organic Compound (VOC) content information in accordance with South Coast Air Quality Management District (SCAQMD) Rules 1113 and 1168 for paints, coatings, sealants, and adhesives.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and acceptance by Consultant.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

- .3 Names and qualifications of persons responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
- .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .13 Waste Water Management Plan identifying methods and procedures for management discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources, and wetlands.
- .15 Pesticide treatment plan to be included and updated, as required.

1.4 FIRES

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

1.5 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations EPA 832/R-92-005, Chapter 3.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Consultant.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 NOTIFICATION

- .1 Contractor will be notified in writing of observed noncompliance with Federal, Provincial, or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Owner and Consultant of proposed corrective action.
 - .1 Take action only after receipt of written approval by Authority having Jurisdiction.
- .3 Owner has the authority to issue a stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted, or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Do not bury rubbish and waste materials on site.
- .3 Ensure public waterways, storm, and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.
- .5 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with the National Building Code of Canada (NBC), including amendments up to Bid 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 AUTHORITY HAVING JURISDICTION

- .1 For this Project, the Authority having Jurisdiction is the Fire Protection Engineer of Canada.

1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal bylaws.
- .2 No smoking is to take place within the building once the installation of exterior sheathing and roof deck has started.
- .3 Designate one (1) smoking area on site, provided outside of the building at least 10 m away from the building footprint.
- .4 Provide temporary signage indicating smoking area.

1.4 BUILDING PERMITS

- .1 The Contractor shall, within one (1) month from the date of the Contract, provide Building Permit Application to the municipal authority, including required fees associated to construction value of the Work. All fees and charges associated with processing the Building Permit are the responsibility of the Contractor.
- .2 The Contractor shall notify the Owner within ten (10) days of the application review whether or not the municipal authority approved the Building Permit.
- .3 If the municipal authority did not approve the Building Permit, the Contractor will provide the Owner with the fees required for the Owner to apply for the building permit.
- .4 For the purposes of this Section, "municipal authority" means the authority which would have jurisdiction respecting permission to contract the Work if the Owner of the Work were not Canada.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTIONS

- .1 Allow inspectors hired by the Owner 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 acceptance by inspectors, or 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, at no additional cost to the Owner.
- .4 Consultant may order 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.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection / Testing Agencies will be engaged by Owner for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Owner except as noted otherwise within individual specifications sections, and as noted in Section 01 29 83 – Payment Procedures: Testing Laboratory Services.
- .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 will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant. Pay costs for additional testing, retesting and re-inspection.

1.3 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

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 orderly sequence to not cause delays 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 Immediately 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 and Owner it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.6 REPORTS

- .1 Submit inspection and test reports to Consultant. Where hard copies are submitted to the General Contractor, the General Contractor will scan them and submit them electronically to the Consultant via CAIS.
- .2 Provide copies to subcontractor of work being inspected or tested and/or manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs to Consultant.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work may be authorized by Consultant. Costs for such additional tests will be authorized as recoverable upon permission and agreement of Owner and Consultant.

1.8 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in Specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Consultant as specified in specific Section.
- .3 Prepare mock-ups for Consultant 's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Specification Section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.9 MILL TESTS

- .1 Submit mill test certificates as required of Specification Sections.

1.10 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical, and building equipment systems.
- .2 Refer to Section 01 91 13 – General Commissioning Requirements for definitive requirements.

1.11 THERMO-SCAN

- .1 A thermo-scan of the building may be conducted by Owner. Arrange sequencing of work to allow thermo-scan of entire building to be conducted prior to application of cladding.
- .2 If thermo-scan reveals failure to achieve a satisfactory building envelope seal, the cost of the remedial work and of re-testing to verify the effectiveness of the remedial work will be borne by the Contractor.

1.12 ACOUSTIC

- .1 Acoustic testing of the STC-rated assemblies to be conducted as part of the Cash Allowances.
- .2 If acoustic testing reveals failure to achieve the specified minimum STC rating, the cost of the remedial work and of re-testing to verify the effectiveness of the remedial work will be borne by the contractor.

1.13 FIRE STOPPING

- .1 Fire-rated separations as noted in documents will be reviewed by Consultant.
- .2 If fire ratings are suspected to not be continuous the Consultant can request an assembly be disassembled to review Work is in accordance to the Contract Documents or to hire an independent examination. 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.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities and controls 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.

1.3 WATER SUPPLY

- .1 Provide and pay for temporary water required during construction. Arrange for connection with appropriate utility company and pay costs for installation, maintenance, and removal.

1.4 TEMPORARY HEATING AND VENTILATION

- .1 Provide and pay for temporary heating required during construction period, including attendance, maintenance, and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-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°C in enclosed areas where construction is in progress.
- .5 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.
- .6 Subject to prior approval from Consultant, the permanent heating system of building may be used when available, provided guarantees are not affected. Be responsible for damage to heating system if use is permitted.
- .7 On completion of Work for which permanent heating system was permitted, clean entire system and replace all filters immediately prior to Interim Acceptance inspection. Cleaning the system and replacing filters is a prerequisite of Interim Acceptance.
- .8 Ensure warranties for heating system do not commence until Date of Interim Acceptance.
- .9 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.
 - .5 Vent direct-fired combustion units to outside.
- .10 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.5 TEMPORARY POWER AND LIGHT

- .1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools.
- .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance, and removal.
- .3 Power for electric cranes and other equipment in excess of above is responsibility of Contractor.
- .4 Provide and maintain temporary lighting throughout Project. Ensure level of illumination in all areas is not less than 162 lx.
- .5 Subject to prior approval of Consultant, electrical power and lighting systems installed under this Contract may be used for construction requirements provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace all lamps prior to Interim Acceptance.

1.6 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax and data hook up, lines. and equipment necessary for own use and use of Consultant.

1.7 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations, and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.8 ELECTRONIC COMMUNICATION

- .1 The CAISnet Communications Server (Caisnet) will be the means of electronic communication between the Owner, Consultant, and Contractor on this Project.
- .2 CAISnet will be the method of distribution of all documentation (e.g. minutes of meetings, contemplated change notices, etc.) except original documents requiring seals.
- .3 The General Contractor shall pay for and have an active account on CAISnet for the duration of the Contract, including the warranty period.
- .4 The General Contractor and the designated Sub-Contractors will require a computer with highspeed internet capability both in their office and on site, and shall arrange for installation of, and pay for, access to CAISnet for the duration of the Project until Final Acceptance.
- .5 All parties shall be responsible for checking CAISnet on a daily basis to ensure that they are familiar with all current communications.
- .6 Failure to check CAISnet on a daily basis to ensure all parties are in receipt of, and familiar with the content of, current communications shall not be valid cause for a claim against the Owner or Consultant.
- .7 Subcontractors not designated to participate in the electronic communications method are encouraged to participate in the programme. Contact Rendek Communications Inc., for information and costs pertaining to a CAISnet account for the duration of the Project and the warranty period. TEL: 780 452 0025 or toll free at 888 288 0025.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

- Part 1 General**
- 1.1 RELATED REQUIREMENTS**
- .1 Section 01 31 19 – Project Meetings
- 1.2 REFERENCE STANDARDS**
- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
- .1 EPA 832R92005, Storm Water Management for Construction Activities:
 Developing Pollution Prevention Plans and Best Management Practices.
- 1.3 ACTION AND INFORMATIONAL SUBMITTALS**
- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- 1.4 INSTALLATION AND REMOVAL**
- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area, temporary site sign, and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.
- 1.5 SCAFFOLDING**
- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, swing staging, platforms, ladders, and temporary stairs.
- 1.6 HOISTING**
- .1 Provide, operate, and maintain hoist cranes required for moving of materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoist cranes to be operated by qualified operator.
- 1.7 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 weight or force that will endanger Work.

1.8 CONSTRUCTION PARKING

- .1 On street parking along the north property line, service road 19A Avenue, is the anticipated construction parking area for the site.
- .2 No parking is permitted along the west property line, 8 Street.
- .3 Parking will be permitted on site provided it does not disrupt performance of Work.
- .4 Provide and maintain adequate access to project site.

1.9 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.10 OFFICES

- .1 Provide office heated, lighted to 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 Site Office:
 - .1 Provide temporary office for use by Contractor and by team as necessary.
 - .2 Insulate building and provide heating system to maintain 22°C inside temperature at -20°C outside temperature.
 - .3 Finish inside walls and ceiling with plywood, hardboard, or wallboard; and paint in selected colours. Finish floor with 19 mm thick plywood.
 - .4 Provide private washroom facilities adjacent to office, complete with chemical type toilet, lavatory, and mirror; maintain supply of paper towels and toilet tissue.
 - .5 Equip office with table, chairs, shelving, filing cabinet, plan rack, and coat rack and shelf.
 - .6 Maintain in clean condition.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain in 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 manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

- .3 When permanent water and drain connections are completed, permanent facilities are not to be used.

1.13 CONSTRUCTION SIGNAGE

- .1 Construction signs provided by Contractor, Subcontractors and Consultants may be fastened to temporary construction fencing.
- .2 No other signs or advertisements other than warning signs, are permitted on site.
- .3 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .4 Maintain approved signs and notices in good condition for duration of project; dispose of off site on completion of Project or earlier if directed by Owner.

1.14 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.
- .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 travelling public from damage to person and property.
- .5 Contractor's 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.

1.15 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.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 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 sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of Authorities having Jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

- .1 Provide temporary barriers and enclosures in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.2 HOARDING

- .1 Erect temporary site enclosures using panelized chain link or weld-mesh fence to a minimum height of 2100mm around the perimeter of the entire site.
- .2 Provide one (1) lockable truck entrance gate and at least one (1) pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .3 Maintain public side of enclosure in clean condition.
- .4 Maintain fence in good repair.

1.3 GUARDRAILS AND BARRICADES

- .1 Provide secure, rigid, guardrails and barricades around deep excavations, open shafts, open stairwells, open edges of floors, roofs, and steep slopes.
- .2 Provide as required by governing authorities.

1.4 WEATHER ENCLOSURES

- .1 Provide weathertight 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.

1.5 DUST TIGHT SCREENS

- .1 Provide dust-tight screens or insulated partitions to localize dust-generating activities, and for protection of workers, finished areas of Work, and public.
- .2 Maintain and relocate protection as required until such work is complete.

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, ramps, and construction runways as may be required for access to Work.

1.7 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.

1.8 FIRE ROUTES

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

1.9 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.

1.10 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 Be responsible for damage incurred due to lack of or improper protection.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste material in accordance with all regulations and local bylaws, and in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Conform to sustainability requirements as stipulated in Section 01 35 43 – Environmental Procedures.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 QUALITY

- .1 Products, materials, equipment, and articles incorporated in Work shall be new, not damaged or defective, and of best quality (consistent with Specifications) for purposes 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 site reviews. Site reviews do not relieve Contractor of responsibility but are a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Acceptable Products/Materials means those items named and specified by manufacturer's reference, meet the Specifications in all respects and are acceptable to the Consultant.
- .4 No Substitutions: all products listed as "no substitutions" in various Sections shall be supplied as specified.
- .5 Should disputes arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .6 Unless otherwise indicated in Specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .7 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.
- .8 Only security and detention equipment approved by Protective Services is to be used. No exceptions allowed. Written confirmation of Protective Services approval of product or material is to be provided with respective shop drawings and upon the request of the Consultant.
- .9 Conflicting product/material information in the Drawings and Specifications is to be brought to the Consultant 's attention for clarification during the Tender period, otherwise the most stringent product/material requirements as determined by the Consultant, will apply.

1.2 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for 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.

1.3 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, lumber and gypsum board 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 nameplates.

1.4 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Unload, handle and store such products.

1.5 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 will 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.

1.6 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 the required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.

- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.7 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.

1.8 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and conduit in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Consultant if there is interference. Install as directed by Consultant.

1.9 REMEDIAL WORK

- .1 Immediately 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.

1.10 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.

1.11 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour, and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot-dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected Specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.
- .7 All exposed fasteners in Rooms 114 to 130 to be Protective Services-approved Torx Head Security Fasteners.

1.12 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. Use resilient washers with stainless steel.
- .5 Supply two (2) compatible tools complete for Protective Services approved Torx Head Security Fasteners in accordance with Section 01 78 00 – Closeout Submittals.

1.13 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill, or sleeve load-bearing structural member unless specifically indicated, without written approval of Engineer of Record.

1.14 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum disturbance to Work, and pedestrian and vehicular traffic.
- .2 Protect, relocate, or maintain existing active services. When services are encountered, cap off in manner approved by Authority having Jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Substitutions During Bidding Period: Instructions to Bidders.

1.2 DEFINITIONS

- .1 Proprietary Specification means a Specification which includes one (1) or more proprietary names of products or manufacturers, or both, and may also include descriptive, reference standard, or performance requirements, or any combination thereof.
- .2 Non-Proprietary Specification means a Specification which includes descriptive, reference standard or performance requirements, or any combination thereof, but does not include proprietary names of products or manufacturers.
- .3 Substitution means a product or manufacturer not specified by proprietary name which may be acceptable in place of a product or manufacturer which is specified by proprietary name.

1.3 PRODUCT OPTIONS

- .1 For products specified by non-proprietary specification:
 - .1 Select any product by any manufacturer, which meets requirements of Contract Documents.
- .2 For products specified by proprietary specification:
 - .1 Select any product or manufacturer named, or
 - .2 Substitute an unnamed product or manufacturer in accordance with Article 1.4 of this Section.
- .3 For products specified by proprietary specification and accompanied by words indicating that substitutions will not be accepted; select product or manufacturer named; substitutions are not permitted.

1.4 SUBSTITUTIONS

- .1 Products and manufacturers specified in these documents for use in performance of Work of Contract shall not be changed without Departmental Representative's written consent. Where substitute manufacturers are permitted, unnamed manufacturers will be accepted by the Consultant, subject to the following:
 - .1 Requests for acceptance shall contain sufficient data to establish the merits of the proposed materials and equipment.
- .2 Substitute Products: Where substitute products are permitted, unnamed products will be accepted by the Departmental Representative, subject to the following:
 - .1 Substitute products shall be the same type as, be capable of performing the same functions as, and meet or exceed the standards of quality and performance of the named product(s). Substitutions shall not require revisions to Contract Documents nor to work of the Contractor and Subcontractors.

- .3 Substitute Manufacturers: Where substitute manufacturers are permitted, unnamed manufacturers will be accepted by the Departmental Representative, subject to the following:
 - .1 Substitute manufacturers shall have capabilities comparable to those of the named manufacturer(s). Substitutions shall not require revisions to Contract Documents nor to work of the Contractor and Subcontractors.
- .4 In making a substitution Contractor represents that:
 - .1 He has investigated substitute product or manufacturer, or both, and has determined that it meets the criteria specified in 1.4.1 or 1.4.2, or both, and
 - .2 He will make any changes to the Work necessitated by the substitution as required for the Work to be complete in all respects, and
 - .3 He waives claims for additional costs and time caused by substitution which may subsequently become apparent.
- .5 Substitutions shall not be ordered nor installed without the Departmental Representative's acceptance.
- .6 If, in the Departmental Representative's opinion, a substitution does not meet requirements of the Contract Documents, the Contractor shall, at no extra cost to the Owner; provide a product which, in the Consultant's opinion, does meet requirements of the Contract Documents.

1.5 PROPRIETARY SPECIFICATIONS

- .1 Notwithstanding specified proprietary names of either or both products or manufacturers, products provided shall meet other applicable requirements of Contract Documents. Modify products if necessary to ensure compliance with all requirements of Contract Documents.

1.6 CHANGES TO ACCEPTED PRODUCTS AND MANUFACTURERS

- .1 Products and manufacturers accepted by the Departmental Representative for use in performance of Work of Contract shall not be changed without the Consultant's written consent.
- .2 Submit requests to change accepted products and manufacturers to the Consultant in writing, including product data indicated in Article 1.7.

1.7 PRODUCT DATA

- .1 When requested by Departmental Representative, submit complete data substantiating compliance of a product with requirements of Contract Documents. Include the following:
 - .1 Product identification, including manufacturer's name and address.
 - .2 Manufacturer's literature providing product description, applicable reference standards, and performance and test data.
 - .3 Samples, as applicable.
 - .4 Name and address of projects on which product has been used and date of each installation.
 - .5 For substitutions and requests for changes to accepted products, include in addition to the above, the following:
 - .1 Itemized comparison of substitution with named product(s). List significant variations.

- .2 Designation of availability of maintenance services and sources of replacement materials.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

1.2 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on Drawings.
- .2 Establish, 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.

1.3 SURVEY REQUIREMENTS

- .1 Establish two (2) permanent benchmarks on site, referenced to established benchmarks 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.
- .9 Immediately upon completion of the setting-out of the building and major site work, provide a survey prepared by licensed Land Surveyor verifying that the building location has been accurately set out and conforms to the Contract Documents.

1.4 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.

1.5 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 approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.6 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site services, prepare a certified survey showing dimensions, locations, angles, and elevations of Work.
- .3 Record locations of maintained, re-routed, and abandoned service lines.

1.7 SUBMITTALS

- .1 Submit name and address of Surveyor to Consultant.
- .2 Submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

1.8 SUBSURFACE CONDITIONS

- .1 If subsurface conditions at Place of Work differ materially from those indicated in the Geotechnical Investigation Report, or a reasonable assumption of probable conditions based thereon, immediately cease work and promptly notify Consultant in writing.
- .2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submittals: In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate Contractor.
- .3 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: Only specified products and materials, or products and materials accepted by the Consultant during the Bid period will be accepted on this Project.

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 are to 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 if directed by Consultant.
- .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 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior acceptance.
- .10 Restore Work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 – Fire Stopping; full thickness of the construction element.
- .13 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .14 Conceal pipes, ducts, and wiring in floor, wall, and ceiling construction of finished areas except where indicated otherwise.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste material in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including other than that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only or remove from site.
- .4 Make arrangements with and obtain permits from Authorities Having Jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Refer to Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .7 Remove waste materials and debris from site and deposit in waste container at end of each working day.
- .8 Clean interior areas prior to start of finishing 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 building 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.

1.2 FINAL CLEANING

- .1 Prior to Interim Acceptance, 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 Owner or other Contractors.
- .5 Remove waste materials from site.
- .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, and floors and ceilings.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, and behind grilles, louvres, and screens.
- .11 Prepare floor 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, culverts, areaways, and swales.
- .16 Sweep and wash clean paved areas.
- .17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .18 Clean roofs, downspouts, overflow drains, and drainage systems.
- .19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .20 Remove snow and ice from access to building.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This Section includes general requirements and procedures for compliance with Construction Waste Management:
 - .1 Waste Management Plan (WMP).
 - .2 Implementation of Construction Waste Management.

1.2 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work, conduct a meeting to discuss how the Contractor will generate the least amount of waste possible and the processes to be used to avoid waste caused by error, poor planning, breakage, mishandling, contamination, or other factors not listed.
- .2 Prior to start of Work, conduct a meeting with the Owner to review and discuss the Project Waste Management Plan.
- .3 Provide waste management, recycling, and reuses of recyclable and reusable materials where applicable.
- .4 Develop a Waste Management Plan for the Project and submit to the Consultant for review, in accordance with Section 01 33 00 – Submittal Procedures.
- .5 Accomplish maximum control of solid construction waste.
- .6 Preserve environment and prevent pollution and environment damage on and off site.
- .7 Minimize waste disposal in landfills.
- .8 Specific material for consideration for diversion from landfill.
 - .1 Masonry and pavement.
 - .2 Metals.
 - .3 Wood, cardboard and paper.
 - .4 Electrical - wiring/conduits/boxes.
 - .5 Packaging, plastics.
- .9 Minimize amount of non-hazardous solid waste generated by Project and accomplish maximum source reduction, reuse, and recycling of solid waste.
- .10 Protect environment and prevent environmental pollution damage.

1.3 REFERENCE STANDARDS

- .1 Canadian Construction Association (CCA)
- .2 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.
- .3 Public Works and Government Services Canada (PSPC)
 - .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.

- .2 CRD Waste Management Market Research Report (available from PSPC's Environmental Services).

1.4 DEFINITIONS

- .1 Definitions as written below are supplementary to all laws, statutes, and regulations effective in Alberta. Where definitions conflict, laws, statutes, and regulations take precedence over the definitions below.
- .2 Approved/Authorized Recycling Facility: Waste recycler approved by applicable provincial authority or other users of material for recycling accepted by the Consultant.
- .3 Class III: Non-Hazardous Waste: Construction renovation and demolition waste.
- .4 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities
- .5 Inert Fill: Inert waste; exclusively asphalt and concrete.
- .6 Waste Source Separation Program (WSSP): Implementation and coordination of ongoing activities to ensure designated waste materials will be sorted into predefined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
- .7 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .8 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .9 Recycling: Process of sorting, cleansing, treating, and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .10 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
- .1 .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
- .2 .2 Returning reusable items including pallets or unused products to vendors.
- .11 Salvage: Removal of structural and non-structural materials from deconstruction / disassembly projects for purpose of reuse or recycling.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- .13 Separate Condition: Refers to waste sorted into individual types.
- .14 Source Separation: Act of keeping different types of waste materials separate beginning from the point they became waste.
- .15 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .16 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

- .17 Waste Management Plan (WMP): A Project-related plan for the collection, transportation, and final disposition of the waste generated at the construction site. The purpose of the Plan is to ultimately reduce the amount of material being landfilled. The Plan involves measuring and estimating the quantity and composition of waste and identifying reasons for waste generation including and any operational factors. Then, based on this information, address opportunities for reduction, reuse, salvaging, or recycling of materials.
- .18 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating required submittal and reporting requirements.
- .19 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials generated by Project. Specifies diversion goals, implementation, and reporting procedures, anticipated results, and responsibilities.

1.5 DOCUMENTS

- .1 Post and maintain in visible and accessible area at job site, one (1) copy of following documents:
 - .1 Waste Management Plan (WMP).
 - .2 Waste Reduction Workplan (WRW).

1.6 USE OF SITE FACILITIES

- .1 Execute work with least possible interference or disturbance to site.
- .2 Provide temporary security measures.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare and submit following prior to Project start-up:
 - .1 One (1) electronic copy of completed Waste Management Plan (WMP).
 - .1 List landfill options in the area and what materials can be recycled.
 - .2 One (1) electronic copy of completed Waste Reduction Workplan (WRW).
- .3 Prepare and submit on monthly basis throughout Project, or at intervals agreed to by Consultant, the following:
 - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.
 - .2 Updated Waste Materials Tracking.
 - .3 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled, and landfilled, and brief status of ongoing waste management activities.
- .4 Submit prior to final payment the following:

- .1 Waste Diversion Report indicating final quantities by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills, and other waste processors that received waste materials.
- .2 Provide receipts, scale tickets, waybills, and/or waste disposal receipts that confirm quantities and types of materials reused, recycled, or disposed; and destination.

1.8 WASTE MANAGEMENT PLAN (WMP)

- .1 Prepare and submit WMP at least ten (10) days prior to Project start-up.
- .2 WMP identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and complies with applicable regulations, based on information acquired from WA.
- .3 WMP should include but not be limited to:
 - .1 Applicable regulations.
 - .2 Specific goals for waste reduction, identify existing barriers and develop strategies to overcome them.
 - .3 Destination of materials identified.
 - .4 Deconstruction/disassembly techniques, and schedules.
 - .5 Methods to collect, separate, and reduce generated wastes.
 - .6 Location of waste bins on-site.
 - .7 Security of on-site stock piles and waste bins.
 - .8 Protection of personnel and Subcontractors.
 - .9 Clear labelling of storage areas.
 - .10 Training plan for Contractor and Subcontractors.
 - .11 Methods to track and report results reliably.
 - .12 Details on materials handling and removal procedures.
 - .13 Recycler and reclaimer requirements.
 - .14 Quantities of materials to be salvaged for reuse or recycled and materials sent to landfill.
 - .15 Requirements for monitoring on-site wastes management activities.
- .4 Structure WMP to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .5 Post WMP or summary where workers on-site are able to review content.
- .6 Monitor and report on waste reduction by documenting total volume in tonnes, and cost of actual waste removed from Project.

1.9 USE OF SITE AND FACILITIES

- .1 Execute Work with minimal interference and disturbance to normal use of premises.
- .2 Maintain security measures established by facility; provide temporary security measures accepted by the Owner.

1.10 WASTE PROCESSING SITES

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities within the Province of Alberta, or to users of material for recycling.

1.11 QUALITY ASSURANCE

- .1 After award of Contract, a mandatory site examination will be held for this Project for Contractor and/or Subcontractors responsible for construction and demolition / deconstruction waste management.
 - .1 Date, time and location will coincide with the on-site start-up meeting.
- .2 Waste Management Meeting: Waste Management Coordinator is to provide an update on status of waste diversion and management activities at each meeting. Written monthly Waste Diversion Report Summary to be provided by Waste Management Coordinator.

1.12 STORAGE, HANDLING AND PROTECTION

- .1 Store materials to be reused, recycled, and salvaged in locations as determined on site to provide protection of materials to maintain like new conditions.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property.
- .3 Protect, stockpile, store, and catalogue salvaged materials.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect surface drainage, mechanical, and electrical from damage and blockage.
- .6 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .7 Separate and store materials produced during Project in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled, and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off site processing facility for separation.
 - .3 Obtain waybills, receipts, and/or scale tickets for separated materials removed from site.
 - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.13 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of oil, mineral spirits, volatile materials, waste, paint thinner, or other manmade materials into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.

- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.
- .4 Remove materials off site as Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis, as identified in the waste audit.

1.14 SCHEDULING

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 APPLICATION

- .1 Do Work in compliance with WRW and WSSP.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 11 – Cleaning.
- .3 Waste Management: Separate waste materials for reuse and recycling in accordance with this Section.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Sort separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Consultant; and consistent with applicable fire regulations.
 - .1 Mark containers or stockpile areas.

- .2 Provide instruction on disposal practices.
- .2 On-site sale of recovered, recyclable, salvaged, reusable materials is not permitted.

3.4 WASTE DIVERSION REPORT

- .1 At completion of Project, prepare written Waste Diversion Report indicating quantities of materials reused, recycled, or disposed of; as well as the following:
 - .1 Identify final diversion results and measure success against goals from Waste Reduction Workplan.
 - .2 Compare final quantities/percentages diverted with initial projections in Waste Audit and Waste Reduction Workplan and explain variances.
 - .1 Supporting documentation.
 - .2 Waybills and tracking forms.
 - .3 Description of issues, resolutions and lessons learned.

3.5 WASTE MANAGEMENT PLAN (WMP)

- .1 WMP Packaging and Construction Waste Chart:

(1) Material Category	(2) Person(s) Responsible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected	Actual	(5) Recycled Amount (unit) Projected	Actual	(6) Material(s) Destination
Cardboard							
Glass							
Metal							
Paper							
Plastics (#1-7)							

3.6 WASTE MANAGEMENT CONTACT INFORMATION

- .1 Contact List for City of Lethbridge

Province	Address	General Inquires	Fax
Alberta	Waste Management Canada 2230 39 Street N, Lethbridge, AB T1H 5J2	P: 403-328-4443, TF: 1-877-784-7336	
	Waste and Recycle Centre (landfill) 213044, Township RD 100, AB T1J 4P4	P: 403-329-7367 P: 403-327-3288	

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 23 10 – Site Excavation, Filling and Grading.

Part 2 Products

- .2 NOT USED

Part 3 Execution

3.1 GENERAL INFORMATION

- .1 The information shown on the Drawings concerning type and location of underground and/or overhead utilities is not guaranteed to be accurate or all-inclusive. The Contractor is required to request the assistance of Alberta One Call for marking utilities. A copy of the One Call results shall be provided to the Engineer.
- .2 Make arrangements and pay for the temporary relocation of any telephone, power, street lights, gas lines, or any other underground or overhead utilities should this be necessary as a result of Work performed under this Contract.
- .3 Maintain the flow in existing water services, storm and sanitary sewers, drains, and water courses which may be encountered during the course of the Work.
- .4 The Contractor is responsible for all costs associated with the locating, hydrovac, hand excavation, protection, repair and restoration of the existing underground utilities, utility trenches, or structures to meet utility companies' or local municipality standards and other requirements, if the Contractor fails to do so.
- .5 Removal and/or relocation of existing utility lines will be coordinated with the Engineer, affected utility company, Contractor and Client; to minimize disruption to the Construction Schedule.

3.2 SEWERS

- .1 For a crossing over an existing sewer, if the height from underside of the proposed water or sewer pipe to top of sewer pipe is less than 800mm, excavate around the existing pipe to firm ground; place cement stabilized granular bedding around the existing pipe and up to the underside of the bedding specified for the sewer or water pipe. The top of the stabilized bedding shall extend across the full width of the trench and 500mm on either side of the sewer pipe and shall slope downward and outward at 1H:1V on both sides of the sewer pipe to firm ground.
- .2 No unauthorized persons or equipment shall be allowed entry into any utility vault or manhole. If entry into such vault or manhole is necessary in connection with work under the Contract, notify the utility Client at least twenty four (24) hours before the intended entry in order to obtain permission and proper instructions and to be accompanied where necessary by a qualified representative of the utility. In addition, use proper procedures for entry into confined space as required in the Occupational Health and Safety Act and Regulations.
- .3 When temporary removal of a manhole or vault lid is required for adjustment or other Work, do not leave the manhole or vault open while unattended. Provide adequate protection and cover if it becomes necessary to leave the manhole or vault unattended without its lid in place.

- .4 Provide catch basins and manholes with approved temporary covers to prevent debris from entering the sewer system. If debris does enter the system, clean out immediately if sewage is flowing, or at end of work day if system is dry.

3.3 STREET AND PUBLIC FURNITURE

- .1 Notify the local authority and arrange for removal or relocation of transit shelters, postal boxes, newspaper vending machines, telephone booths, parking meters, signage, fencing, and other street and public furniture affected by construction.
- .2 Notify the local authority to inform the removal and/or relocation of street and public furniture that is designated to be completed by the Contractor.

3.4 HYDRANT USE

- .1 Local bylaws may require that Contractors obtain a Hydrant Use Permit in order to take water from a hydrant. If water is needed at a job site, apply for a Hydrant Use Permit from the local utility at least five (5) working days beforehand.
- .2 Pay all fees, deposits, fines, water use charges, and any other charges pursuant to the requirements of the local utility and bylaws.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Substantial Performance of the Work is achieved when there are no interior construction deficiencies and all items noted below have been completed to the satisfaction of the Consultant.
- .2 Release of Project Holdback: Project Holdback shall be released as per SACC clauses in the Contract.
- .3 Contract will be considered fully complete when:
 - .1 The required deliverables have been received in accordance with the contract.
 - .2 The Owner has accepted the deliverables and the invoice has been paid in accordance with the contract price and basis of payment.
 - .3 There are no outstanding work deficiencies, changes, payments or claims that require formal release action.

1.2 CONTRACTOR'S INSPECTION OF WORK

- .1 The Contractor and all Subcontractors shall conduct an inspection of the Work, identify deficiencies and defects, and submit list of deficiencies and defects to Consultant.
- .2 Prior to requesting a Substantial Performance of the Work Review by the Consultant, the Contractor will verify in writing that all the deficiencies and defects noted in the Contractor's inspection of the Work have been rectified.

1.3 PREREQUISITES TO FINAL ACCEPTANCE OF THE WORK

- .1 Prior to requesting Consultant's review for Final Acceptance of the Work, the Contractor shall confirm in writing that the following items have been completed:
 - .1 Review the Contract Documents and inspect the Work to confirm that prerequisites for Final Acceptance of the Work have been fulfilled and that the Work is ready for review.
 - .2 Obtain and submit evidence of compliance with regulatory requirements, including Occupancy Permit(s) (subject to provision of 'C' Schedules by Consultant) and inspection/operating certificates.
 - .3 Remove from Project site temporary facilities, along with construction tools, equipment, mock-ups, and all similar items.
 - .4 Systems Testing and Verification has been completed and documentation submitted to Consultant.
 - .5 Component Testing and Verification has been completed and documentation submitted to Consultant.
 - .6 Mechanical and electrical systems commissioning has been completed as specified, and documentation has been submitted to Consultant.
 - .7 Testing, adjusting, and balancing of systems and equipment has been completed as specified, and documentation submitted to Consultant.

- .8 Integrated systems testing has been completed as specified, and documentation submitted to Consultant.
- .9 Final cleaning has been completed.
- .10 Project record documents have been completed and submitted to Consultant.
- .11 Operations and Maintenance Manuals have been completed and submitted to Consultant.
- .12 Spare parts and maintenance materials have been provided to the Owner and confirmation documentation submitted to the Consultant.
- .13 Installation of all architectural items and finishes is complete, as well as all mechanical and electrical covers, trims, and identifications.
- .14 All finish hardware is installed and adjusted.
- .15 Radio antenna conduit is installed.
- .16 Acoustic requirements are complete and have been verified and tested, and acceptable to the testing agent. Test results have been submitted to the Consultant.
- .17 Cylinders previously turned over to the Owner for keying have been installed.
- .18 Exterior site work is advanced sufficiently to allow normal operation of the facility without interference to the building users or the public, or future interruption to the normal facility use by the Contractor required to complete unfinished exterior work.

1.4 CONSULTANT REVIEW FOR FINAL ACCEPTANCE OF THE WORK

- .1 When prerequisites are complete and written confirmation of such has been submitted to Consultant, Contractor is to submit a written request to Consultant for Final Acceptance of the Work. Consultant will, within ten (10) days of the request:
 - .1 Proceed with an inspection of the Work, or:
 - .2 Advise the Contractor that the prerequisites have not been adequately fulfilled.
- .2 If Consultant review determines that the Work is not complete, Contractor to immediately complete outstanding items and request a re-inspection. All Consultant and Owner costs for re-review to be borne by the Contractor.

1.5 DECLARATION OF SUBSTANTIAL PERFORMANCE

- .1 When the Owner and Consultant determine that all deficiencies and incomplete work have been corrected and the requirements of the Contract have been substantially performed, Owner and Consultant will declare that Final Acceptance of the Work has been achieved and the Contractor may post notice of Substantial Performance of the Work in accordance with Lien Legislation.
- .2 Upon issuance of the Certificate of Substantial Performance, the Owner will assume responsibility for care, custody and control of the Work, including responsibility for:
 - .1 Facility operation, including all systems and equipment
 - .2 Maintenance
 - .3 Security
 - .4 Property and liability insurance

.5 Utility costs

- .3 NOTE: The Contractor will not be allowed access to the interior of the building after the building is turned over to Owner, except with written approval from the Owner for the specific warranty work requiring attention, and the duration of that work.

1.6 WARRANTY

- .1 Prior to end of the warranty period, Consultant will conduct a review of the Work.
- .2 Following the review, Consultant will advise the Contractor of items which are to be corrected.
- .3 On receipt of the review report, immediately make access arrangements with the Owner to correct the items noted.
- .4 On completion of warranty work, submit written confirmation to Consultant that all warranty items noted in the review report have been corrected.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submittals: In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 Four (4) weeks prior to Substantial Performance of the Work, submit one (1) review copy, in English, of completed Operations and Maintenance Manuals to the Consultant.
- .4 Copy will be returned with Consultant's comments.
- .5 Revise content of documents as required prior to final submittal.
- .6 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant two (2) final copies of operating and maintenance manuals in English, and one (1) scanned electronic copy of the final Operations and Maintenance Manuals.
- .7 NOTE: submission of complete Operations and Maintenance Manuals is a prerequisite to Substantial Performance.
- .8 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.
- .9 Furnish evidence if requested, for type, source, and quality of products provided.
- .10 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .11 Pay costs of transportation.

1.2 FORMAT

- .1 Organize data as instructional manual; separate binders are required for architectural/structural (black); mechanical/civil (green); and electrical (blue).
- .2 Binders: Commercial quality, fabric-coated, hard-covered, 3-post extension type, attached to spine with metal piano hinges. Acco 05436-0, Expanding Barlock Catalogue Binder, available from Grand & Toy.
- .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 embossed title, as per detail at end of this Section.
- .5 Arrange content by systems, under Specification 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: Fold larger Drawings and place in a punched plastic sleeve or scan and reduce to size of text pages.
- .9 Place one (1) copy of shop drawings for non-operational components such as rebar, joists, siding etc., in a separate plastic expandable file.
- .10 Electronic Copy: Contractor shall provide one (1) electronic copy of completed Manuals in the form of a USB flash drive, with the information provided in PDF Format.

1.3 CONTENTS - EACH VOLUME

- .1 Table of Contents: Provide title of Project;
 - .1 Date of submission.
 - .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.
 - .1 Include colour finish schedule of interior finishes.
- .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 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.
- .6 Training: Refer to Section 01 79 00 – Demonstration and Training.

1.4 RECORD DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Consultant one (1) record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry, and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for review by Consultant.

1.5 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, provided by Consultant.
- .2 Provide felt tip marking pens, maintaining separate colours 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 Documents.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: Legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and Change Orders.
- .6 Other Documents: Maintain manufacturer's certifications, inspection certifications, and field test records required by individual Specification Sections.
- .7 NOTE: Submission of accurate and complete Record Documents is a prerequisite to Substantial Performance.

1.6 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 – Examination and Preparation, certifying that elevations and locations of completed Work are in conformance with Contract Documents.
- .2 Provide topographical information sufficient to verify final grades and slopes are in accordance with the Contract Documents.
- .3 Final site survey is a prerequisite to Substantial Performance.

1.7 EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: Include 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 colour-coded wiring diagrams.
- .4 Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, 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 Provide Servicing and Lubrication Schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include 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 colour-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 as specified in Section 01 45 00 – Quality Control, and 01 91 13 – General Commissioning.
- .15 Additional requirements: as specified in individual Specification Sections.

1.8 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: Include product data with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .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.

1.9 SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual Specification Sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include accepted listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.10 MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual Specification Sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include accepted listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.11 SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in individual Specification Sections.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include accepted listings in Maintenance Manual.
- .5 Obtain receipt for delivered special tools and submit prior to final payment.

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, within ten (10) days after completion of applicable items of Work.
- .4 Warranty start date to be the date of Substantial Performance of the Work.
- .5 Verify that warranty documents are in proper form, contain full information, are for the warranty period specified, and are notarized.
- .6 Co-execute submittals where required.
- .7 Retain warranties and bonds until time specified for submittal.
- .8 Respond in a timely manner to oral or written notification of required construction warranty repair work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

(DISCIPLINE)
**OPERATIONAL
AND
MAINTENANCE
MANUAL**

PROJECT RECORD DOCUMENTS

FOR

**COALDALE PROTECTIVE
SERVICES BUILDING
COALDALE, ALBERTA
PROJECT NO. 9030**

SPINE

(DISCIPLINE)
**OPERATIONAL AND MAINTENANCE
MANUAL
PROJECT RECORD DOCUMENTS**

FOR

**COALDALE PROTECTIVE SERVICES BUILDING
COALDALE, ALBERTA
PROJECT NO. 9030**

ARCHITECT:

STEPHENS KOZAK - ACI ARCHITECTS AND PLANNERS

(DISCIPLINE) **CONTRACTOR:**

(NAME)

(DISCIPLINE) **ENGINEER:**

(NAME)

FRONT

Part 1 General

1.1 DESCRIPTION

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's designated personnel one (1) week prior to date of Substantial Performance of the Work review.
- .2 Owner will provide list of personnel to receive instructions and will coordinate their attendance at agreed-upon times.
- .3 Training and demonstrations are to be video recorded.

1.2 QUALITY CONTROL

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's designated personnel, and provide written report that demonstration and instructions have been completed.

1.3 SUBMITTALS

- .1 Submittals: In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two (2) weeks prior to designated dates, for Owner's and Consultant's acceptance.
- .3 Submit reports within one (1) week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of each demonstration, with list of persons present.

1.4 CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with Specifications.
- .2 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 – General Commissioning, and equipment and systems are fully operational.
- .3 Provide copies of completed Operation and Maintenance Manuals for use in demonstrations and instructions.
 - .1 Recordings of demonstrations to be included as electronic files in Operation and Maintenance Manuals.

1.5 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.6 DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled agreed upon times, at the equipment location.
- .2 Instruct personnel in phases of operation and maintenance using Operation and Maintenance Manuals as basis of instruction.
- .3 Review contents of Manual in detail to explain aspects of operation and maintenance.
- .4 Prepare and insert additional data in Operations and Maintenance Manuals when need for additional data becomes apparent during instructions.
- .5 Prepare instruction sheets for quick reference for major system failures. Instructions to be step by step processes for proper shut down and restart.

1.7 TIME ALLOCATED FOR INSTRUCTIONS

- .1 Ensure minimum amount of time allocated for instruction of each item of equipment or system as follows:
 - .1 Heating Plant: Four (4) hours of instruction.
 - .2 Cooling and Ventilation System: Four (4) hours of instruction.
 - .3 Control System: Four (4) hours of instruction.
 - .4 Plumbing System: One half (1/2) hour of instruction.
 - .5 Electrical System: Two (2) hours of instruction.
 - .6 Overhead Doors: One half (1/2) hour of instruction.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 PROCESS OVERVIEW

- .1 The Commissioning Process follows a logical sequence, from Contractor equipment start-up and testing to Component Verifications, through to System Performance Verification Testing and finally Integrated System Testing.
- .2 At completion of the Commissioning Process, all defined system components, each mode of systems operation, and each control sequence will have been started and tested in accordance with the manufacturer's requirements and verified operational relative to design intent and operational requirements.
- .3 Equipment Starting and Testing:
 - .1 Complete equipment starting and testing procedures as defined in the respective Sections of this Specification.
 - .2 All starting, testing, adjusting, balancing, and calibration activities are to be documented by the Contractor.
 - .3 All Contractor and manufacturer start-up and testing procedures are to be completed and approved prior to conducting the System Performance Verification Testing.
 - .4 The Contractor will be responsible for identifying in the Commissioning Schedule the required equipment starting and testing, including all manufacturer's start-up and field verifications.
 - .5 The Consultant will observe the Contractor's and the manufacturer's equipment start-ups and testing on a random basis.
- .4 Component Verifications:
 - .1 The Contractor shall be responsible for completing the Component Verification sheets in accordance with this Specification.
 - .2 Component Verification sheets have been developed by the Consultant and have been incorporated in the respective Divisions.
 - .3 The respective Subcontractor shall be responsible for completing the component verification sheets, as outlined.
 - .4 The Consultant will be responsible for random verifications of the Contractor's submitted Component Verification sheets.
- .5 System Performance Verification Testing:
 - .1 The System Performance Verification Test have been developed by the Consultant and have been incorporated in the respective Divisions.
 - .2 The tests provide for a functional demonstration of the system performance during the various modes of operation including start-up, operation, shutdown, and various disturbance situations such as power failure and fire alarm.
 - .3 System Performance Verification testing comprises of a two-part process, 'Contractor Proving & 'Consultant Verification'.

- .1 In the 'Contractor Proving', the intent is to have the Contractor execute the tests to ensure testing criteria and operations can be achieved.
 - .1 The Contractor completes the 'Contractor Proving' portion of the test report.
 - .2 Once satisfied that the system operation meets the test requirements, the Contractor submits the completed test package to the Consultant for review.
- .2 In the 'Consultant's Verification', the intent is to have the Contractor conduct the System Performance Verification Test in the presence of the Consultant.
 - .1 Following the Consultant's review and acceptance of the 'proving' results the Contractor schedules the Performance Verification Test for the Consultant to witness.
 - .2 The 'Consultant's Verification' portion of the test report shall be completed in the presence of the Consultant.
- .4 All Contractor and manufacturer's start-up and proving tests are to be completed and approved prior to conducting the defined System Performance Verification Tests.
- .5 All Component Verifications related to a given system shall be completed and approved prior to conducting the defined System Performance Verification Testing.
- .6 The Contractor will be responsible for the coordinating, scheduling and implementation the System Performance Verification Testing.
- .6 Integrated System Testing
 - .1 The Integrated System Tests have been developed by the Consultant and have been incorporated into this Section.
 - .2 Integrated Systems Testing shall be under the direction of this Division with any required support provided by the respective Subcontractors.
 - .3 The tests ensure that the integrated systems operations conform with the design, such that proper interaction between related systems is achieved.
 - .4 The tests verify performance of systems operating in conjunction with one another under various conditions and modes of operation.
 - .5 Systems are to be operated for as long as required to complete commissioning.
 - .6 Ensure reported results of testing and procedures are checked and verified correct within stated tolerances. If inconsistencies appear between reported results and demonstrated values, the relevant testing procedures are, and adjustments made until satisfactory results are obtained.
 - .7 All Contractor and manufacturers start-up and proving tests are to be completed and approved prior to conducting the defined system performance verification tests.
 - .8 All system performance verifications related to a given system shall be completed and approved prior to conducting the defined System Performance Verification Tests.

- .7 The Commissioning Process associated with the component and systems verifications does not negate the need for the normal contractor equipment and system start-up and proving and the associated training requirements.

1.2 QUALITY ASSURANCE

- .1 Provide testing organization services under provisions specified in Section 01 45 00 – Quality Control, and specific trade sections.
- .2 Testing Organization: Current member in good standing of Associated Air Balance Council, certified to perform specified services.
- .3 Comply with applicable procedures and standards of the certification sponsoring association.
- .4 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.3 SCHEDULES

- .1 Prepare a schedule for implementing and conducting the Component Verifications, the System Performance Verification Testing, and the Integrated System Testing.
- .2 Provide sufficient notice, minimum twenty-one (21) working days, prior to commencing the System Performance Verification Testing and the Integrated System Testing.
- .3 Unless otherwise specified in writing by the Consultant, all Commissioning verifications, testing, and related requirements specified herein must be successfully performed and documented prior to Interim Acceptance/Occupancy Acceptance.

1.4 COORDINATION

- .1 Coordinate all subtrades, other divisions, manufacturers, suppliers, and other specialists as required to ensure all phases of work shall be properly organized prior to commencement of each particular start-up, testing, and commissioning procedure.
- .2 Coordinate the activities of this Section with the starting and testing of:
 - .1 Mechanical Systems an equipment.
 - .2 Electrical Systems and equipment
 - .3 Other component and systems testing specified in this and other Divisions.
- .3 Where any components or systems require testing prior to starting, ensure that such work has been completed and approved prior to starting of the components and systems.

1.5 SEASONAL CONSTRAINTS

- .1 Notwithstanding all inclusive requirements specified in this Section, additional separate cycles of Commissioning may be necessary at a later time for components and systems whose full operation is dependent on seasonal conditions.
- .2 Seasonal commissioning activities will be subject to a deficiency holdback amount as determined by the Consultant.

1.6 COMMISSIONING MEETINGS

- .1 In addition to the Construction Progress meetings, Commissioning Progress Meetings are to be held.
- .2 These meetings will begin with construction and will continue on the same schedule as the Progress Meetings until Substantial Completion is achieved, as noted in Section 01 77 00 – Closeout Procedures.
- .3 The Consultant is to put forward the agenda, chair the meeting, as well as record and distribute the minutes.
- .4 Based on the requirements of the agenda, the attendees shall include but not be limited to:
 - .1 Contractor's Representatives: Contractor's Site Superintendent, Mechanical and Electrical Subcontractors, Controls Subcontractor; and when requested by the Consultant, Subcontractors, suppliers, and their parties involved in the Work. Contractor's Representatives shall be qualified and authorized to act on behalf of the party each represents.
 - .2 Consultant, Project Administrators, and inspection and testing company Representatives.
- .5 Meetings will introduce, monitor progress, and resolve any issues or deficiencies related to the Commissioning progress.

1.7 EQUIPMENT STARTING AND TESTING

- .1 Prior to starting and testing, ensure all mechanical components and equipment are cleaned and free of dust.
- .2 After testing, protect components and equipment from dust.
- .3 Do not conceal or cover components or equipment until inspected, tested, and approved by the Consultant.
- .4 Contractor is responsible for all liabilities associated with the starting and testing.
- .5 Contractor is responsible for all costs associated with the starting, testing, adjusting, and balancing, including the supply of testing equipment.

1.8 WITNESSING EQUIPMENT STARTING AND TESTING

- .1 Prior to Component Verifications, and System Performance Testing, prepare a schedule for the required verifications and tests. Review schedule and seek approval of the Consultant.
- .2 Provide sufficient notice, minimum twenty-one (21) working days prior to commencing tests.
- .3 The Consultant may witness all or any portion of the Component Verifications and will witness all System Performance Verification Testing performed by the Contractor.
- .4 Contractor to be present for all tests.

1.9 QUALITY ASSURANCE

- .1 All starting, testing, adjusting, and balancing procedures shall be in accordance with:

- .1 These Contract Documents.
 - .2 Requirements of Authorities Having Jurisdiction.
 - .3 Manufacturer's published instructions.
 - .4 All applicable standards, including portions of ASME, ASHRAE, AABC, NEBB, SMACNA, ASTM AND NFPA.
- .2 Personnel involved in starting, testing, adjusting, and balancing procedures shall have experience in Division 23 component verification and system testing, and shall be able to interpret results of readings and tests and report the state of equipment and systems in a clear and concise manner.
 - .3 If the requirements of this or related sections conflict, notify the Consultant before proceeding with the tests and obtain written clarification.

1.10 MANUFACTURER'S STARTING RECOMMENDATIONS

- .1 Prior to starting components or systems, obtain and review manufacturer's installation, operation and starting instructions. Read in conjunction with the procedures specified herein.
- .2 Use manufacturer's and supplier's starting personnel where required to maintain validity of manufacturer's warranty. Confirm with manufacturer that all testing specified in these specifications will not void any warranties.
- .3 Compare installation to manufacturer's published data and record discrepancies. Modify procedures detrimental to components performance prior to starting equipment.
- .4 Manufacturer's Reports:
 - .1 Arrange for manufacturer to submit copies of all production test records required by these specifications prior to shipping.
 - .2 The production test records will be certified by the manufacturer, that the item meets the testing performance criteria specified.
 - .3 Arrange for manufacturer to submit brief step-by-step description to entire starting procedure to allow the Consultant to repeat starting at anytime.

1.11 PRESIDING AUTHORITIES

- .1 Verification and testing procedures defined in this Specification may duplicate verifications conducted by presiding authorities. To facilitate expedient turnover of the project, arrange for the Consultant to witness procedures in a manner that avoids unnecessary duplication of tests.
- .2 Obtain certificates of approval, acceptance and comply with rules and regulations of Authorities Having Jurisdiction. Provide copies of all certificates to the Consultant.

1.12 IMPLEMENTATION

- .1 Unless otherwise specified in writing by the Consultant, all commissioning requirements specified herein must be performed prior to Interim Acceptance/Occupancy Acceptance.

1.13 CORRECTION OF DEFICIENCIES

- .1 Correct all Contract deficiencies found during Commissioning and the Consultant's verifications program.

1.14 COMPLIANCE WITH DEFINED PROCEDURES

- .1 Failure to follow the specific instructions defined herein pertaining to correct starting procedures may result in re-evaluation of components by an independent testing agency selected by the Consultant at the Contractor's expense. Should results reveal components have not been started in accordance with the specified requirements, components may be rejected. If rejected, remove components from site and replace. Replacement components shall also be subject to full starting procedures, using the same procedures specified on the originally installed components.

1.15 VERIFICATIONS CONDUCTED BY CONSULTANT

- .1 The Consultant may select and conduct at random component, system, and/or integrated systems to be re-tested.
- .2 Performance testing of any components, systems, or integrated systems by the Consultant does not reduce the Contractor's obligations for complete testing and start-ups as specified.
- .3 The Contractor will provide without cost, support for these tests, including:
 - .1 Making all test equipment and instrumentation available to the Consultant.
 - .2 Operating the appropriate components and systems.
- .4 Any tests duplicated by the Consultant will be conducted under the same terms of reference applied to the Contractor testing.
- .5 The Contractor, as directed by the Consultant shall witness any testing conducted by the Consultant.
- .6 Should any component or system fail under the Consultant's performance testing the Contractor will correct the deficiency and retest to the satisfaction of the Consultant, at the Contractor's expense.

1.16 SPECIAL TESTING AGENCIES

- .1 All reports generated by special testing agencies shall be submitted by the Contractor to the Consultant.
- .2 All proposed special testing agencies require the approval of the Consultant and must have acceptable facilities and qualifications.

Part 2 PRODUCTS

2.1 CONTRACTOR TESTING INSTRUMENTS

- .1 Provide two-way radios, ladders, and other equipment as required to complete the commissioning program as outlined in this Specification.

- .2 Provide all safety equipment required for personnel involved in the Commissioning program.
- .3 Provide a list of equipment and instruments that will be required for the starting, testing, adjusting, balancing and commissioning, for approval and review by the Consultant.
- .4 Use instruments supplied or calibrated by approved laboratory or manufacturer. Submit to the Consultant the current calibration certificates for each instrument to be used.

2.2 USE OF INSTRUMENTS SUPPLIED UNDER CONTRACT

- .1 Calibrated air flow measuring stations shall be used to measure air flow during the system balancing and commissioning performance testing.
- .2 Use balancing valve pressure tapping, orifice plates, annubars, etc., to measure fluid flow rates.
- .3 Calibrated environmental control system, temperature, humidity, and pressure sensors may be used to gather system performance data provided the Consultant confirms that the calibrations have been accepted.
- .4 Instruments for testing, adjusting, balancing, and commissioning supplied under Contract may be used provided the Consultant is satisfied that the instrument accuracy complies with this Specification and the calibration certificate has been provided with each instrument.

Part 3 EXECUTION

3.1 EQUIPMENT STARTING & TESTING

- .1 Schedule and complete the equipment start-up, run-ins, and testing as defined in the respective Sections.
- .2 Submit all start-up and test reports, including manufacturer's reports, to the Consultant for approval.
- .3 All start-up and testing is to be done in accordance with approved manufacturer's procedures.

3.2 COMPONENT VERIFICATIONS

- .1 Complete Component Verifications and Verification testing in accordance with:
 - .1 Mechanical Commissioning Requirements.
 - .2 Electrical Commissioning Requirements.

3.3 INTEGRATED SYSTEM TESTING

- .1 Integrated System Testing verify the performance of systems operating in conjunction with one another under various modes of operation. Each system is to be operated for as long as required to complete the Commissioning.
- .2 Reported results of testing and procedures are checked and verified to be correct within stated tolerances. If inconsistencies appear between reported results and demonstrated

- values, the relevant testing procedures are repeated, and adjustments are made until satisfactory results are obtained.
- .3 The sample Integrated System Test provided at the end of this Section is a representative sample and will be replaced by the Project-specific Integrated System Tests following Contract award.
 - .4 Integrated Systems Testing shall be scheduled and conducted by the Contractor.
 - .5 The Consultant shall witness all Integrated System Testing.
 - .6 Coordination:
 - .1 Integrated System Testing shall not take place until all related system tests have been completed.
 - .2 Testing shall not take place until Operations and Maintenance Manuals have been reviewed and accepted by the Consultant.
 - .7 Responsibilities:
 - .1 The Consultant will do the following during the Integrated System Testing.
 - .1 Witness and provide instruction during the testing.
 - .2 Review and verify the Contractor-recorded test results.
 - .3 Diagnose problems and determine if they are design related or are the result of contract deficiencies.
 - .4 Request repeat tests as required following correction of contract deficiencies.
 - .5 Conduct user surveys and take environmental measurements as necessary to identify existing and potential problems.
 - .6 Provide direction and instruction in the fine tuning of the systems under test to satisfy the operating requirements.
 - .8 The Contractor will do the following during the Integrated System Testing
 - .1 Coordinate and conduct the Integrated System Testing.
 - .2 Modify operating parameters of the systems to satisfy the fine-tuning requirements outlined by the Consultant so as to ensure proper system operation. For example:
 - .1 Make adjustments which may become apparent as testing proceeds.
 - .2 Undertake modifications to suit changes as equipment settles down during the `running-in' period.
 - .3 Documentation of test results.
 - .4 Diagnosis of problems.
 - .5 Correct Contract deficiencies identified during testing.
 - .6 Fine-tuning will provide for the adjustment of the system where the Integrated Systems Testing have shown a need, such as:
 - .1 Temperature, relative humidity, air movement in the occupied zone; ventilation, air purity, noise, vibration, and pressure.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 City of Lethbridge, Waste and Recycle Centre (landfill), 213044, Township Road 100, AB T1J 4P4, P: 403-327-3288.
- .2 Canadian Environmental Protection Act, 1999 (CEPA 1999).

1.2 DEFINITIONS

- .1 Demolition: Rapid destruction of assembly materials.
- .2 Hazardous Materials: Dangerous substances, dangerous goods, hazardous commodities and hazardous products; may include but not be limited to asbestos PCBs, CFCs, HCFCs, poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly.
- .3 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities, as well as coordinating related, required submittal and reporting requirements.
- .4 Waste Management Work Plan (WMWP): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WMWP is based on information acquired from WMC.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings.
 - .1 Convene pre-demolition meeting one (1) week prior to beginning Work of this Section, in accordance with Section 01 32 16.07 – Construction Progress Schedules – Bar (GANTT) Chart to:
 - .1 Verify Project requirements.
 - .2 Review installation conditions.
 - .3 Coordination with other subtrades.
 - .2 Arrange for site visit with Consultant to examine existing site conditions adjacent to demolition work, prior to start of Work.
 - .3 Hold Project meetings in accordance with Section 01 31 19 – Project Meetings.
 - .4 Ensure key personnel attend.
 - .5 Reporting Requirements: WMC to complete.
- .2 Scheduling: Meet project time lines:
 - .1 Notify Owner and Consultant in writing when unforeseen delays occur.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Waste Management Work Plan:

- .1 Prior to beginning of Work on site, submit detailed Waste Management Work Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal, and indicate:
 - .1 Schedule of selective demolition.
 - .2 Name and address of waste facilities.
- .3 Certificates:
 - .1 Written authorization from Owner is required to deviate from receiving organizations, haulers, and facilities listed in Waste Management Work Plan.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit Project Waste Reduction Work Plan highlighting schedule, subtrade and Contractor coordination plans to reduce waste generated on site.
 - .2 Erosion and Sedimentation Control: Submit copy of Erosion and Sedimentation Control Plan in accordance with Section 01 35 43 – Environmental Procedures.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable provincial/territorial regulations and CEPA.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Storage and Protection.
 - .1 Protect in accordance with Section 31 23 38 – Trench Excavation and Backfill.
 - .2 Protect existing items designated to remain. In event of damage to such items, immediately replace or make repairs to acceptance of Consultant and at no cost to the Work.
 - .3 Remove and store materials to be reused, in manner to prevent damage.
 - .4 Store and protect in accordance with requirements for maximum preservation of material.
- .3 Develop Construction Waste Management Plan related to Work of this Section, and in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.7 SITE CONDITIONS

- .1 Site Environmental Requirements.
 - .1 Perform work in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater, and wildlife, or contribute to excess air and noise pollution.

- .3 Do not dispose of waste of volatile materials, including but not limited to mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout the Project.
- .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .6 Protect trees, plants, and foliage on site and adjacent properties where indicated.
- .2 Existing Conditions.
 - .1 Remove contaminated or hazardous materials as defined by Authorities Having Jurisdiction from site, prior to start of demolition work, and dispose of at designated disposal facilities in safe manner in accordance with TDGA and other applicable regulatory requirements.

Part 2 Products

2.1 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site with Consultant and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage, and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition except those designated for removal.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect and Cap Designated Utility Services.

3.2 REMOVAL OF HAZARDOUS WASTES

- .1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

- .4 Site report indicates there is no topsoil on site. If topsoil is found or if topsoil is brought to site early, stockpile topsoil for final grading and landscaping:
 - .1 Provide erosion control and seeding if not immediately used.
- .5 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site at authorized facilities approved in Waste Management Work Plan.
- .6 Backfill:
 - .1 Backfill in areas as indicated and in accordance with Section 31 23 38 – Trench Excavation and Backfill.

3.4 STOCKPILING

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage, and theft.
- .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

- .1 Remove stockpiled material as directed by Consultant, when it interferes with operations of Project.
- .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .3 Transport material designated for alternate disposal using approved receiving organizations and haulers in accordance with applicable regulations.
 - .1 Written authorization from Owner is required to deviate from receiving organizations, facilities, and haulers listed in Waste Management Work Plan.
- .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work, match condition of adjacent, undisturbed areas.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses, or ground water.

3.7 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.

- .2 Remove debris, trim surfaces, and leave work site clean upon completion of Work.
- .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses, or ground water.
- .2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 11 – Cleaning.
- .3 Waste Management: Remove waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.8 PROTECTION

- .1 Repair damage to adjacent materials or property caused by selective site demolition.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 76 00 – Protecting Existing Utilities and Structures.
- .2 Section 31 23 38 – Trench Excavation and Backfill.
- .3 Section 31 23 10 – Site Excavation, Filling and Grading.

1.2 TRAFFIC PROVISIONS

- .1 Provide and maintain roadways, walkways and detours for vehicular and pedestrian traffic and access to fire hydrants.

1.3 PROTECTION

- .1 Protect items designated to remain and materials designated for salvage. In event of damage, immediately replace such items or make repairs to approval of Engineer and at no additional cost to Owner.

Part 2 Products

2.1 MATERIALS

- .1 Pavement Removal: asphalt, concrete and granular base.
- .2 Concrete Removal: curb, curb and gutter, gutter, walk, ramp, crossing and other slabs, including granular base and reinforcing.
- .3 Salvageable Materials: asphalt, concrete and gravel base designated by the Engineer for salvage.
- .4 Surplus Materials: all debris from the removal operation and materials not designated by the Engineer for salvage, including organic material found under removal structures.

2.2 EQUIPMENT

- .1 The use of drop hammer type breaking equipment is not permitted.
- .2 Equipment shall be suitably muffled to conform to the local noise abatement bylaws.
- .3 Only vehicles licensed for highway use shall be used for hauling on or across developed roadways.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site and verify with Engineer items designated for removal and items to be preserved.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Notify utility companies before starting demolition.

3.2 REMOVAL

- .1 Remove items indicated.
- .2 Do not disturb adjacent items designated to remain in place.
- .3 In removal of pavement and concrete:
 - .1 Sawcut the limits of removal on existing pavement and concrete to a depth necessary to produce a straight clean vertical edge through the full depth of the existing pavement structure or concrete before breaking.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect granular base materials below adjacent pavement and concrete.
 - .4 Break asphalt pavement and concrete into pieces with no dimension greater than 750mm.
- .4 Following removal and disposal of pavement, concrete and any organic materials, the exposed subgrade materials shall be inspected and approved by the Geotechnical Engineer. Remove unsuitable subgrade materials and dispose off-site, as directed by the Engineer

3.3 SALVAGE AND DISPOSAL

- .1 Carefully dismantle items containing materials directed or indicate for salvage. Deliver salvaged materials to location specified by the Owner.
- .2 Dispose of materials off-site not designated for salvage or re-use in work.

3.4 RESTORATION

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Reinststate areas and existing work outside areas of demolition to conditions that existed prior to commencement of work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 84 00 – Fire Stopping
- .2 Section 07 92 00 – Joint Sealants
- .3 Section 09 91 23 – Interior Painting

1.2 REFERENCES STANDARDS

- .1 Definitions:
 - .1 Dangerous Goods: Product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: Product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: Hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .2 Reference Standards:
 - .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
 - .2 Department of Justice Canada (Jus)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).
 - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
 - .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2011, 3rd Edition, Standard for Paints and Coatings.
 - .2 GS-36-2013, 2ne Edition, Standard for Adhesive for Commercial Use.
 - .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .5 National Research Council Canada Institute for Research in Construction (NRC-IRC)
 - .1 National Fire Code of Canada-2015.
- .3 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2016, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.

- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for hazardous materials; include product characteristics, performance criteria, physical size, finish, and limitations.
 - .2 Submit electronic copy of WHMIS MSDS in accordance with Section 01 35 43 – Environmental Procedures, to Consultant for each hazardous material required, prior to bringing hazardous material on site.
 - .3 Submit Hazardous Materials Management Plan to Consultant that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.
- .3 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit Project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Low-Emitting Materials: Submit listing of adhesives and sealants, paints, and coatings used in building. Comply with VOC and chemical component limits or restrictions requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions, and Section 01 61 00 – Common Product Requirements.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
 - .1 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .2 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
 - .3 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .4 Transfer of flammable and combustible liquids is prohibited within buildings.
 - .5 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
 - .6 Solvents or cleaning agents must be non-flammable or have flash point above 38°C.
 - .7 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

- .8 Observe smoking regulations; smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .9 Storage requirements for quantities of hazardous materials and wastes in excess of 5kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
 - .6 Store hazardous materials and wastes in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
 - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
 - .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .12 Report spills or accidents immediately to Owner and Consultant. Submit a written spill report to Consultant within twenty-four (24) hours of incident.
- .5 Develop Construction Waste Management Plan related to Work of this Section, and in accordance with Section 01 35 43 – Environmental Procedures.
- .6 Packaging Waste Management: Remove for reuse and return pallets, crates, and packaging materials as specified in Construction Waste Management Plan; in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Description:
 - .1 Bring on site only quantities hazardous material required to perform Work.
 - .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
 - .3 Sustainability Characteristics:
 - .1 Adhesives and Sealants in accordance with Section 07 92 00 – Joint Sealants.

- .1 Adhesives and Sealants: Maximum VOC limit to meet SCAQMD Rule 1168 limits.
- .2 Primers, paints, and coatings in accordance with manufacturer's recommendations for surface conditions and Section 09 91 23 – Interior Painting.
 - .1 Primer: Maximum VOC limit to meet SCAQMD Rule 1113 limits.
 - .2 Paints: Maximum VOC limit 50 g/L to SCAQMD Rule 1113.
 - .3 Coatings: Maximum VOC limit to meet SCAQMD Rule 1113 limits.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 11 – Cleaning.
- .3 Waste Management: Separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
 - .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
 - .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
 - .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
 - .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
 - .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
 - .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
 - .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Lead-acid battery recycling.
 - .3 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA O86-14 Engineering Design in Wood.
 - .3 CSA O121-17, Douglas Fir Plywood.
 - .4 CSA O151-17, Canadian Softwood Plywood.
 - .5 CSA O153-13 (R2017), Poplar Plywood.
 - .6 CSA O325-16, Construction Sheathing.
 - .7 CSA S269.1-16, Falsework and Formwork.
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC S701.1:2017, Standard for Thermal Insulation, Polystyrene Board.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .2 Place materials defined as hazardous or toxic in designated containers.
 - .3 Divert wood materials from landfill to a composting facility as approved by Consultant.
 - .4 Divert plastic materials from landfill to a recycling facility as approved by Consultant.
 - .5 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Consultant.

Part 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 and CSA O86.
 - .2 For concrete with special architectural features, use formwork materials to CSA A23.1.

- .3 Rigid insulation board: to ULC-S701.1.
- .4 Tubular column forms: round, seamless laminated fibre forms, internally treated with release material.
 - .1 Spiral pattern not to show in hardened concrete.
- .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 diameter in concrete surface.
 - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .3 Form liner:
 - .1 Plywood: high density overlay.
- .4 Form release agent: non-toxic, biodegradable, low VOC.
- .5 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110s Saybolt Universal at 40 degrees C, flashpoint minimum 150 degrees C, open cup.
- .6 Falsework materials: to CSA S269.1.
- .7 Sealant: to Section 07 92 00 - Joint Sealants.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Consultant's approval for use of earth forms not indicated on drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .8 Fabricate and erect formwork in accordance with CSA S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1.
- .9 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .10 Use 25 mm chamfer strips on external corners, unless specified otherwise.

- .11 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .12 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .13 Clean formwork in accordance with CSA A23.1, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 Three days for walls and sides of beams.
 - .2 Four days for columns.
 - .3 Fourteen days for beam soffits, slabs, decks and other structural members, or two days when replaced immediately with adequate shoring to standard specified for falsework.
 - .4 Two days for pile caps.
- .2 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .3 Re-use formwork and falsework subject to requirements of CSA A23.1.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
 - .1 SP-66-(04), ACI Detailing Manual 2004.
- .2 ASTM International
 - .1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A143/A143M-07 (2014), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A1064/A1064M-17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete .
- .3 Canadian Standards Association (CSA International)
 - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA A23.3-14, Design of Concrete Structures.
 - .3 CSA G30.18-09(R2014), Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CSA W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 Reinforcing Steel Manual of Standard Practice.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
 - .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 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.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
 - .2 Detail lap lengths and bar development lengths to CSA A23.3, unless otherwise indicated.

- .1 Provide type B lap splices unless otherwise indicated.
- .4 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Consultant prior to its use.

1.3 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .1 Mill Test Report: upon request, provide Consultant with certified copy of mill test report of reinforcing steel.
 - .2 Upon request submit in writing to Consultant proposed source of reinforcement material to be supplied.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground.
 - .2 Replace defective or damaged materials with new.

Part 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 CSA G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA G30.18, grade 400W.
- .4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.
- .5 Deformed steel wire for concrete reinforcement: to ASTM A1064/A1064M.
- .6 Welded steel wire fabric: to ASTM A1064/A1064M.
 - .1 Provide in flat sheets only.
- .7 Welded deformed steel wire fabric: to ASTM A1064/A1064M.
 - .1 Provide in flat sheets only.
- .8 Galvanizing of non-prestressed reinforcement: to ASTM A123/A123M, minimum zinc coating 610 g/m².
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.

- .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
- .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 In this case, no restriction applies to temperature of solution.
- .4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.
 - .1 Provide product description as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .9 Chairs, bolsters, bar supports, spacers: to CSA A23.1.
- .10 Mechanical splices: subject to approval of Consultant.
- .11 Plain round bars: to CSA G40.20/G40.21, Grade 300W.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA A23.1.
- .2 Obtain Consultant's written 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.

Part 3 Execution

3.1 PREPARATION

- .1 Galvanizing to include chromate treatment.
 - .1 Duration of treatment to be 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 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 slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.3 PLACING REINFORCEMENT

- .1 Place reinforcing steel in accordance with CSA A23.1.

- .2 Use plain round bars as slip dowels in concrete.
 - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
 - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Consultant's review of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C260/C260M-10a (2016), Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-17, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C1017/C1017M-13e1, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .5 ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .6 ASTM D624-00(2012), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - .7 ASTM D1751-04(2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .8 ASTM D1752-04a(2013), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA A23.3-14, Design of Concrete Structures.
 - .3 CSA A283-06(R2016), Qualification Code for Concrete Testing Laboratories.
 - .4 CAN/CSA A3000-13, Cementitious Materials Compendium.

1.2 ABBREVIATIONS AND ACRONYMS

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
 - .1 Type GU, GUb and GUL - General use cement.
 - .2 Type MS and MSb - Moderate sulphate-resistant cement.
 - .3 Type MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 Type HE, HEb and HEL - High early-strength cement.
 - .5 Type LH, LHb and LHL - Low heat of hydration cement.
 - .6 Type HS and HSb - High sulphate-resistant cement.
- .2 Fly ash:
 - .1 Type F - with CaO content less than 15%.
 - .2 Type CI - with CaO content ranging from 15 to 20%.

- .3 Type CH - with CaO greater than 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit proposed concrete mix design.
- .3 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
- .4 Provide two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Provide Consultant, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
- .3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Consultant on following items:
 - .1 Hot weather concrete.
 - .2 Cold weather concrete.
 - .3 Curing.
 - .4 Finishes.
 - .5 Formwork removal.
 - .6 Joints.
- .4 Quality Control Plan: provide written report to Consultant verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.
- .5 Sustainability Standards Certification:
 - .1 Construction Waste Management: provide copy of plan.
 - .2 Recycled Content: minimum 20%.
 - .1 Provide listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and pre-consumer content, and total cost of materials for project.
 - .2 When Supplementary Cementing Materials (SCMs) are used, provide evidence to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .2 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Portland Cement: to CAN/CSA A3000, Type GU, HS.
- .2 Supplementary cementing materials: with minimum 20% fly ash replacement, by mass of total cementitious materials to CAN/CSA A3000.
- .3 Water: to CSA A23.1.
- .4 Aggregates: to CSA A23.1, and as follows:
 - .1 Sandblasted Architectural Concrete Column: 10 mm "Exposed Rock", colours as approved by the Consultant.
 - .2 Submit samples of aggregate for review.
- .5 Admixtures:
 - .1 Air entraining admixture: to CSA A23.1.
 - .2 Chemical admixture: to CSA A23.1. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1.
 - .1 Compressive strength: 50 MPa at 28 days.
 - .2 Net shrinkage at 28 days: maximum 0%.
- .7 Curing compound: to CSA A23.1 white.
- .8 Mechanical waterstops: ribbed extruded PVC of sizes indicated with prewelded corner and intersecting pieces with legs not less than 75 mm long:
 - .1 Tensile strength: to ASTM D412, method A, Die "C", minimum 12 MPa.
 - .2 Elongation: to ASTM D412, method A, Die "C", minimum 275%.
 - .3 Tear resistance: to ASTM D624, method A, Die "B", minimum 30 kN/m.
- .9 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D1751, 12 mm thickness x required strength.
- .10 Weep hole tubes: plastic.

- .11 Dovetail anchor slots: minimum 0.6 mm thick galvanized steel with insulation filled slots.
- .12 Bonding agent: high polymer resin emulsion, mixed with cement mortar or grout to form a water resistant adhesive bond.

2.2 MIX

- .1 Supply concrete mix proportioned to produce concrete specified in Concrete Mix Schedule.
- .2 Requirements not specified in Schedule shall conform to CSA A23.1.
- .3 Use of admixtures, other than air-entraining admixtures, are not permitted without prior approval of the Consultant.
- .4 Fly ash up to a maximum of 30% of the total cement content may be used for concrete placed at the following locations:
 - .1 Piles: 30%,
 - .2 Walls/Grade Beams/Pile Caps: 25%
 - .3 Slabs: 20%
 - .4 Toppings: 15%.
- .5 Superplasticizers shall be used in strict accordance with the recommendations of the manufacturer. Concrete slump after superplasticizing shall not exceed 20 mm.
- .6 All admixtures are subject to Consultant's approval. List all proposed admixtures in mix design submission.
- .7 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
- .8 Provide quality management plan to ensure verification of concrete quality to specified performance.
- .9 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Consultant's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete is permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.

- .6 Prior to placing of concrete obtain Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application of concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
 - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .11 Do not place load upon new concrete until authorized by Consultant.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1.
- .2 Sleeves and inserts:
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through beams or columns, except where indicated or approved by Consultant.
 - .2 Where approved by Consultant, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Consultant.
 - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Consultant before placing of concrete.
 - .5 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts:
 - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Consultant.
 - .1 Formed holes: 100 mm minimum diameter.
 - .2 Drilled holes: 25 mm minimum diameter larger than bolts used.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with epoxy grout.
 - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .5 Finishing and curing:

- .1 Finish concrete in accordance with CSA A23.1, Section 03 35 00- Concrete Finishing, and as follows.
 - .2 Use procedures as reviewed by Consultant or those noted in CSA A23.1 to remove excess bleed water. Ensure surface is not damaged.
 - .3 All concrete shall receive moist curing for a period of seven days. One of the following methods shall be used as soon as the concrete has hardened sufficiently to prevent marring:
 - .1 Surface covered with canvas, burlap or other satisfactory material and kept thoroughly wet.
 - .2 Surface sealed with polyethylene sheeting and the concrete kept thoroughly wet.
 - .3 Subject to approval of the Consultant, a liquid membrane curing compound used in accordance with the manufacturer's recommendations, may be used. Membrane to remain intact during the curing period.
 - .4 Surfaces of concrete that are protected by formwork which is left in place for seven days will not require any additional curing except as specified for hot weather. If the formwork is removed in less than seven days, the concrete shall receive moist curing until seven days have elapsed since the concrete was placed.
 - .5 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.
 - .6 Curing compounds shall not be used on concrete surfaces to receive topping or other type of bonded finish unless approved by the Consultant.
 - .7 Do not use curing compound in locations where chemical hardener is to be used or where polished concrete finish or paint are specified.
 - .8 Provide scratch finish where bonded topping or floor tile is to be applied.
 - .9 Provide swirl-trowelled finish unless otherwise indicated.
 - .10 Finishing formed surfaces:
 - .1 Upon removal of forms, treat imperfections in formed surfaces in accordance with CSA A23.1.
 - .2 Rough Finish Concrete Surfaces Not Exposed to View: Place concrete against forms true and plane. Cut off form ties a minimum of 10 mm below concrete surface. Patch tie holes and defects. Remove fins exceeding 5 mm.
 - .3 Smooth Finish Overhead Surfaces Exposed to View: Place concrete against plywood, steel or tempered hardboard. Patch tie holes and defects. Remove fins.
 - .4 Surfaces with special architectural features: Refer to Architectural Drawings for specific required finish. Patch bug holes and defects. Remove fins.
 - .11 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.
 - .12 Coat exposed concrete walking surfaces and other flatwork not to receive an integral hardener with curing compound of type that provides permanent seal.
- .6 Waterstops:
- .1 Install waterstops to provide continuous water seal.

- .2 Do not distort or pierce waterstop in way as to hamper performance.
 - .3 Do not displace reinforcement when installing waterstops.
 - .4 Use equipment to manufacturer's requirements to field splice waterstops.
 - .5 Tie waterstops rigidly in place.
 - .6 Use only straight heat sealed butt joints in field.
 - .7 Use factory welded corners and intersections unless otherwise approved by Consultant.
- .7 Sandblast Texturing
- .1 The object of the sandblasting is to remove the cement mortar matrix sufficiently to expose the aggregate and leave it in a medium or moderate relief.
 - .2 The amount of relief required will depend on the aggregate size and the placing techniques used.
 - .3 Produce three sample panels of sandblasted finishes on the concrete surface in a location approved by the Consultant.

Each panel shall have different degrees of aggregate exposure, produced by variation of one or more of the following:
 - .1 Sand grading in the concrete mix.
 - .2 Distance from nozzle to concrete surface.
 - .3 Number and/or speed of passes of the nozzle.
 - .4 The sample panels outlined above shall be done with close supervision of the Consultant. The sample areas designated as acceptable by the Consultant shall remain available for inspection as a standard for comparison until all sandblasting operations on the project are completed to the Consultant's satisfaction.
 - .5 Modify the concrete mix by reducing the amount of fines in order to achieve an acceptable surface. Ensure that the mix, as modified, is used consistently throughout all concrete to be sandblasted.
 - .6 No sandblasting shall be undertaken on concrete surfaces less than 28 days old.
 - .7 In the event that sandblasting uncovers reinforcing bars or other steel inserts, the steel surface shall be thoroughly cleaned by sandblasting. After sandblasting is completed in the area around the exposed steel, the steel shall be carefully brush painted with two (2) coats of clear polyurethane coating, extending approximately 6 mm onto the surrounding concrete surface.
 - .8 Where areas to be sandblasted adjoin architectural metal, brick, plaster, or any other finished surface, such surfaces shall be masked and protected from damage and marking by the sandblasting operation.
- .8 Joint fillers:
- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant.
 - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form joints as indicated.

- .4 Install joint filler.
- .5 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.
- .9 Place floor slabs on grade as one continuous pour between construction joints indicated on drawings. Control joints for each pour shall be formed by sawing a continuous $\frac{1}{4}$ slab depth slot at 4.5 m centres each way unless otherwise indicated on drawings. Sawing shall be done as soon as the concrete has sufficiently hardened to prevent raveling of the edges but in no case later than 18 hours after the concrete slab has been placed.

3.3 SURFACE TOLERANCE

- .1 Refer to Section 03 35 00 – Concrete Finishing.

3.4 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows and in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 7 and 28 days/56 days as applicable.
 - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials shall be carried out by testing laboratory designated by Contractor for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Pay for costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
- .4 Testing Agency will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .6 Inspection or testing by Owner will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.
- .7 Provide and maintain facilities at the site for storage of concrete test cylinders in a temperature controlled environment that maintains the temperature between 15°C and 25°C immediately adjacent the cylinders for the first 24 hours.
- .8 Testing firm shall do the following:
 - .1 Take three (or four) test cylinders from each 60 m³ of concrete, or fraction thereof, of each type of concrete placed in any one day.
 - .2 Take samples of concrete mix close to the point of final deposit in the form. Provide suitable access to the Work for obtaining samples.
 - .3 Moist cure and test one cylinder in 7 days and moist cure and test the remaining two cylinders in 28 days, or moist cure and test one cylinder at each of 7 days and 28 days and the remaining two cylinders at 56 days.

- .4 Take one additional test cylinder when the temperature is likely to fall below 0°C with 48 hours after placing and no provisions have been made to heat the concrete to greater than 10°C. Test cylinder to be cured on job-site under same conditions as concrete it represents and tested in 7 days.
- .5 Make at least one slump test and one entrained air test for each set of test cylinders taken.
- .6 Slump tests shall be performed prior to the addition of super-plasticizers.
- .9 Results of field tests shall be reported immediately to the Contractor by the field representative of the testing firm. These results are for the Contractor's information. Acceptability of the work will be determined by the Consultant.
- .10 Results of concrete tests shall be forwarded to the Consultant, the Owner and the Contractor. Included with the results shall be the following information: Name of Project, Date of Sampling, Name of Supplier, Delivery Truck Number, Identification of Sampling and Testing Technician and exact location in the structure of the concrete sampled.
- .11 Testing firm personnel are not authorized to revoke, relax, enlarge or release any requirements of the specification.
- .12 Contractor may arrange and pay for additional tests for use as evidence to expedite construction.
- .13 Strength evaluation tests and analysis:
 - .1 The Owner may order an independent testing firm to obtain cores, x-rays, or similar non-destructive tests.
 - .2 The Owner may order a load test and/or analysis as defined by CSA A23.3, Section 18, if the non-destructive tests are impractical or inconclusive.
 - .3 Reinforce by additional construction or replace as directed by the Consultant at own expense, concrete judged inadequate by structural analysis or by results of load tests.
 - .4 Pay the cost of testing and/or analysis which is required to demonstrate the adequacy of the structure which does not meet the requirements for strength or which has been placed before formwork and reinforcing have been inspected and approved by the Consultant.
 - .5 The Owner may order additional testing at any time even though the required tests indicate that the strength requirements have been met. In this instance the Owner will pay for those tests that meet the specified requirements and the Contractor shall pay for those that do not.
- .14 Field cure cylinders shall be stored on the floor right below the slab they represent and be protected against wind unless the floor below is heated, in which case they shall be stored on top of the slab but covered with a plywood box. The cylinders are to be undisturbed at this location until picked up by the Testing Agency.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

3.6 CONCRETE MIX SCHEDULE

Component	Min. Comp. Strength @ 28 Days/56 Days (MPa)	Max. Water/Cement Ratio	Nominal Agg. Size (mm)	Slump Range (mm)	Air Content Range (%)	Minimum Cement Content (kg/m)	Cement Type
Weather Exposed Concrete: Exposure Class: C-1							
Exterior slabs, pads, and walls, Interior slabs of Outbuilding	-/35	0.40	20-5	60-90	5-8		GU
Weather Exposed Concrete: Exposure Class S-2							
Piles	-/35	0.40	20-5	70-100	5-8		HS
Grade Beams, Pile Caps and Pilasters	-/35	0.40	20-5	60-90	5-8		HS
Non-Weather Exposed Concrete: Exposure Class: N							
Interior Slabs, Main Building	30/-	0.45	20-5	50-80			GU
Electrical Ducts	20/-	.55	20-5	60-90	4-7		GU
Column	30/-	0.45	20-5	60-90			GU

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Floor Classifications: Classification of concrete floor slabs based on their intended use, methods of finishing and finish materials applied to flooring as denoted by the F-rating below, and as follows:
 - .1 Single Course Floor: Floors placed in a single course with final finishing applied to properly levelled concrete.
 - .2 Finish or Finishes: Materials applied to finished concrete surface, i.e.: stained or coloured concrete, carpet, resilient flooring or ceramic tile.
 - .3 Finishing: Methods, tools and equipment employed to achieve levelness or surface flatness for shored slabs and slabs-on-grade, and durability indicated and as follows:
 - .1 F1-Finishing: Floors having a straightedge value of ± 8 mm over 3050 mm; similar to CSA A23.1 Class A Slab Finishing. Non-Critical or Parkade Floors: Non-critical floor slabs include electrical and mechanical rooms, service spaces, non-viewed areas, automobile surfaces.
 - .2 F3-Finishing: Floors having a straightedge value of ± 5 mm over 3050 mm; similar to CSA A23.1 Class C Slab Finishing. Flat Institutional or Commercial Floors: Slabs having thin set tile and resilient tile floor finish for Institutional or Commercial floors and/or office occupancies.

1.2 RELATED REQUIREMENTS

- .1 Section 03 30 00 – Cast-in-Place Concrete

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate a meeting between Contractor, Subcontractor responsible for concrete placement, and the Consultant to determine Site Quality Control testing section borders and sample measurement line locations, method of measurement, and accuracy requirements of the measuring devices.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Action Submittals: Submit the following before starting any work of this Section:
 - .1 Product Data: Submit manufacturer's product data for each material specified, including recommended application rates and methods of installation.
- .3 Informational Submittals: Provide the following submittals during the course of the Work:
 - .1 Purchase Orders: Submit copies of purchase orders and packing slips indicating the quantity of materials required for the Project.

- .2 Site Quality Control Submittals: Submit results for straightedge measurements to demonstrate compliance with specified tolerances. Record the following information on a drawing indicating floor slab layout, column locations and slab penetrations:
 - .1 Layout of test section borders with an identification number for each test section.
 - .2 Indicate number and direction of sample measurement lines used in each test section, the starting and stopping locations and identification number that relates to the test section number.
 - .3 Indicate elevations of all sample reading points.
 - .4 Indicate profile curvature between all reading points separated by 600 mm.
 - .5 Indicate variance from specified straightedge measurements as a positive (+) or negative (-) value.
 - .6 Indicate variance from estimated flatness and levelness at each measuring point tolerances using associated 90% confidence interval in parentheses, i.e.: F_F 24.5 (23.0 – 26.0), and as follows:
 - .1 F_F estimate for each test sample.
 - .2 F_F composite for each test section.
 - .3 F_L estimate for each test sample.
 - .4 F_L composite for each test section (combined test samples).
 - .5 List calculated overall F -Number results for the entire test surface as a whole number not containing a confidence interval.
 - .7 Failed tests in excess of 50% of the straightedge will require the Contractor to flash patch floor to achieve specified tolerance; example of tolerance failure:
 - .1 Slabs-on-Grade: Measurement of 2.5 mm or greater than ± 5 mm measurement will be considered as a failed test and will require flash patching.
 - .8 Work that is found to be below the minimum acceptable standards established by CSA A23.1 and this specification shall be demolished and rebuilt or repaired as directed by the Consultant at no additional cost to the Owner.

1.5 PROJECT CLOSEOUT SUBMISSIONS

- .1 Operation and Maintenance Data: Submit detailed cleaning and maintenance instructions for floor stain and concrete densifier products and instruct Owner in proper care and maintenance of specified floor finishes, including a complete list of floor care products that will be required for ongoing maintenance.

- .2 Maintenance Materials: Leave a minimum of one (1) 18.9 L container of maintenance coating, and remaining portion of coating from first treatment, stored on site at location directed by Owner.

1.6 QUALITY ASSURANCE

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Installers: Use skilled workmen experienced in concrete finishing methods similar in complexity and extent to that required for the Work of the Contract.

Part 2 Products

2.1 MATERIALS

- .1 Concrete Formwork: Specified on Structural Drawings.
- .2 Concrete Materials and Reinforcement: Specified on Structural Drawings.

2.2 LEVELLING MATERIALS

- .1 Overlayment: Cementitious, self-levelling, single component, polymer modified overlayment, for application thicknesses to a minimum of 13 mm to 25 mm; acceptable materials as follows:
 - .1 Sika Canada Ltd., Sikafloor Level 25
 - .2 W.R. Meadows of Canada, Sure-Flo FT 100
- .2 Cementitious Moisture Reduction Barrier Materials: Two-component, polymer-modified, cementitious-based waterproofing slurry topping; formulated to reduce water infiltration; applicable from 2 mm to 4 mm; acceptable materials as follows:
 - .1 MAPEI Canada Inc., Planiseal MRB
 - .2 Sika Canada Ltd., Epocem 81

2.3 CONCRETE COLUMN

- .1 Provide smooth concrete finish at column located on H-10.
 - .1 No honeycombing to be present.
 - .2 Fill all air holes with high finish sack rub.

Part 3 Execution

3.1 FINISHING FLOORS AND SLABS

- .1 Finish floors and slabs in accordance with CSA A23.1 and ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces; do not wet concrete surfaces.
- .2 Float (Initial) Finishing:
 - .1 Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats.
 - .2 Re-straighten, cut down high spots, and fill low spots.

- .3 Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
- .4 Apply float finishing to surfaces receiving trowel finishing.
- .3 Trowel (Final) Finishing:
 - .1 Commence trowel finishing after all bleed water has disappeared and when the concrete has stiffened sufficiently to prevent the working of excess mortar to the surface.
 - .2 Apply first trowelling and consolidate concrete by hand or power-driven trowel after applying float finishing; continue trowelling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance; repair or smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - .3 Apply a trowel finishing to surfaces exposed to view or to be covered with resilient flooring, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - .4 Finish surfaces to the tolerances indicated in Item 1.1.3 above.
- .4 Trowel and Fine Broom Finishing:
 - .1 Apply trowel finishing to surfaces where large format tile is scheduled for installation by either thickset method.
 - .2 Slightly scarify surface with a fine broom while concrete is still plastic.
 - .3 Finish surfaces to the tolerances indicated in Item 1.1.3 above.
- .5 Broom Finishing:
 - .1 Apply broom finishing to exterior concrete platforms, steps, and ramps, and elsewhere as indicated:
 - .2 Slightly roughen trafficked surface by brooming with fibre-bristle broom perpendicular to main traffic route immediately after float finishing.
 - .3 Coordinate required final finishing with Consultant before application.
- .6 Sandblast Finishing:
 - .1 Sandblast concrete columns to a medium exposure, to expose the same area of both coarse aggregate and matrix.

3.2 SITE QUALITY CONTROL

- .1 Testing and Measurements:
 - .1 Straightedge Measurement: Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 3050 mm long straightedge resting on two (2) high spots and placed anywhere on the surface does not exceed values indicated in Item 1.1.3 above.
- .2 Non-Conforming Work: Repair concrete floor slabs where they exceed the tolerances listed in this Section as follows:
 - .1 Floor Level Excess (High Spots): Grind and smooth surface areas that are higher than listed tolerances.

- .2 Floor Level Deficiency (Bird Baths):
 - .1 Saw-cut perimeter of surface areas that are lower than listed tolerances, to a minimum depth of 6 mm.
 - .2 Grind perimeter to a minimum of 6 mm to allow for flush flash patching.
 - .3 Roughen surface of flash patch area to a minimum ICRI CSP 5 – Medium Shotblast.
 - .4 Clean flash patch area and trowel in floor levelling mortar in accordance with manufacturers written instructions.
 - .5 Smooth and level surface of flash patch to match adjacent floor surfaces.
- .3 Leave floors in ready condition for floor finishes supplied and installed by other Sections.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 35 00 – Concrete Finishing
- .2 Section 04 05 12 – Masonry Mortar and Grout
- .3 Section 04 22 00 – Concrete Unit Masonry
- .4 Section 04 23 00 – Glass Unit Masonry

1.2 REFERENCES STANDARDS

- .1 Brick Industry Association (BIA)
 - .1 Technical Note No. 18A-2006, Accommodating Expansion of Brickwork
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A165 Series-04 (R2014), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
 - .2 CSA A179-04 (R2014), Mortar and Grout for Unit Masonry.
 - .3 CSA-A371-04 (R2014), Masonry Construction for Buildings.
- .3 International Masonry Industry All-Weather Council (IMIAC)
 - .1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meetings: Comply with Section 01 31 19 – Project Meetings. Conduct pre-installation meeting one (1) week prior to commencing Work of this Section, to:
 - .1 Verify project requirements, including mock-up requirements.
 - .2 Verify substrate conditions.
 - .3 Coordinate products, installation methods, and techniques.
 - .4 Sequence work of related Sections.
 - .5 Coordinate with other building subtrades.
 - .6 Review manufacturer's installation instructions.
 - .7 Review masonry cutting operations, methods, and tools, and determine worker safety and protection from dust during cutting operations.
 - .8 Review warranty requirements.
- .2 Sequencing: Sequence with other Work in accordance with Construction Progress Schedules – Bar (GANTT) Chart. Comply with manufacturer's written recommendations for sequencing construction operations.
- .3 Scheduling: Schedule with other Work in accordance with Construction Progress Schedules – Bar (GANTT) Chart.

1.4 ACTION AND INFORMATION SUBMITTALS

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

- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, Specifications, and datasheets; include product characteristics, performance criteria, limitations, and colours.
 - .2 Submit electronic copy of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 35 43 – Environmental Procedures.
- .3 Samples:
 - .1 Submit samples as follows:
 - .1 Two (2) glass block, stone, and concrete block units specified, including special shapes, supplemented with specific requirements.

1.5 QUALITY ASSURANCE

- .1 Certificates: Submit manufacturer's product certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Test and Evaluation Reports:
 - .1 Provide certified test reports in accordance with Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
 - .2 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.
 - .3 Provide data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards, indicating initial rates of absorption.
- .3 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.
- .4 Qualifications:
 - .1 Manufacturer: Capable of providing field service representation during construction and approving application method.
 - .2 Installer: Experienced in performing Work and specialized in installation of Work similar to that required for this Project.
 - .3 Masons: Company or person specializing in masonry installations with five (5) years experience with masonry work similar to this Project.
 - .1 Masons employed on this Project must demonstrate ability to reproduce mock-up standards.
- .5 Mock-Ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 – Quality Control.
 - .2 Construct mock-up panel of exterior and interior concrete unit, brick, and glass masonry wall; construction showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar and workmanship. Sizes of mock-ups as specified in respective Specification Sections.
 - .3 Mock-Up Used:
 - .1 To judge workmanship, substrate preparation, operation of equipment, and material application.

- .4 Construct mock-up where directed by Consultant.
- .5 Allow twenty-four (24) hours for inspection of mock-up by Consultant before proceeding with Work.
- .6 When accepted by Consultant, mock-up will demonstrate minimum standard for this Work. Mock-up may remain as part of finished Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations, in clean, dry, well-ventilated area.
 - .2 Store and protect masonry from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
 - .4 Keep materials dry until use.
- .4 Develop Construction Waste Management Plan related to Work of this Section, and in accordance with Section 01 35 43 – Environmental Procedures.
- .5 Packaging Waste Management: Remove for reuse of pallets, in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.7 SITE CONDITIONS

- .1 Ambient Conditions: Assemble and erect components when temperatures are above 4°C.
- .2 Weather Requirements: To CSA-A371 and to IMIAC - Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction.
- .3 Cold Weather Requirements:
 - .1 To CSA-A371 and to IMIAC with following requirements.
 - .1 Maintain temperature of mortar between 5°C and 32°C until batch is used or becomes stable.
 - .2 Maintain ambient temperature of masonry work and its constituent materials between 5°C and 32°C and protect site from wind chill.
 - .3 Maintain temperature of masonry above 0°C for minimum of twenty-eight (28) days, after mortar is installed.
 - .4 Preheat unheated wall sections in enclosure for minimum seventy-two (72) hours above 10°C, before applying mortar.
- .4 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.

- .3 Spray mortar surface at intervals and keep moist for maximum of three (3) days after installation.

1.8 CLOSEOUT SUBMITTALS

- .1 Provide manufacturer's instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.9 WARRANTY

- .1 For Work in this Section 04 05 00 – Common Work Results for Masonry, twelve (12) months.

Part 2 Products

2.1 MANUFACTURERS

- .1 Ensure manufacturer has minimum five (5) years experience in manufacturing components similar to or exceeding requirements of Project.

2.2 MATERIALS

- .1 Masonry materials are specified elsewhere in related Sections:
 - .1 Section 04 22 00 – Concrete Unit Masonry.
 - .2 Section 04 23 00 – Glass Unit Masonry.

Part 3 Execution

3.1 INSTALLERS

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

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 EXAMINATION

- .1 Examine conditions, substrates and work to receive Work of this Section.
 - .1 Coordinate with Section 01 71 00 – Examination and Preparation.
- .2 Examine openings to receive masonry units. Verify opening size, and location, and that opening is square and plumb and ready to receive Work of this Section.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.

- .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Consultant.
- .3 Verification of Conditions:
 - .1 Verify that:
 - .1 Substrate conditions which have been previously installed under other Sections or Contracts are acceptable for product installation, in accordance with manufacturer's instructions prior to installation of brick, concrete, and glass unit masonry.
 - .2 Field conditions are acceptable and are ready to receive work.
 - .3 Built-in items are in proper location, and ready for roughing into masonry work.
 - .2 Commencing installation means acceptance of substrates.

3.4 PREPARATION

- .1 Surface Preparation: Prepare surface in accordance with manufacturer's written recommendations and coordinate with Section 01 71 00 – Examination and Preparation.
- .2 Establish and protect lines, levels, and coursing.
- .3 Protect adjacent materials from damage and disfiguration.

3.5 INSTALLATION

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CSA-A371.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.6 CONSTRUCTION

- .1 Exposed Masonry:
 - .1 Remove chipped, cracked, and otherwise damaged units in accordance with CSA A-165, in exposed masonry and replace with undamaged units.
- .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 Strike flush joints concealed in walls and joints in walls to receive plaster, tile, sheet membrane air and vapour seal, insulation, or other applied material except paint or similar thin finish coating.
- .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 jambs with mortar in interior walls and Doors 115, and 130B. Other exterior door jambs filled with insulation.
- .5 Support of Loads:
 - .1 Use grout to CSA-A179, where concrete fill is used in lieu of solid units.
 - .2 Install air and vapour seals below voids to be filled with concrete or grout; keep membrane 25 mm back from faces of units.
- .6 Provision for Movement:
 - .1 Leave 3 mm space below shelf angles.
 - .2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
 - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .7 Loose Steel Lintels:
 - .1 Install loose steel lintels. Center over opening width.
- .8 Control Joints:
 - .1 Construct continuous control joints with maximum spacing as noted in structural documents.
- .9 Movement Joints:
 - .1 Build-in continuous movement joints as indicated on Drawings and in Technical Note 18A.

3.7 SITE TOLERANCES

- .1 Tolerances in notes to CSA-A371 apply.

3.8 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection:
 - .1 Perform field inspection and testing in accordance with Section 01 45 00 – Quality Control.
 - .2 Notify inspection agency minimum of twenty-four (24) hours in advance of requirement for tests.
- .2 Acoustic Inspections:
 - .1 Inspection and testing of acoustic application will be carried out by a third-party inspection agency certified to perform inspections to confirm Sound Transmission Class (STC) ratings of designated acoustic rooms.
 - .2 Contractor to coordinate inspections at completion of acoustic rooms, prior to Substantial Completion. Inspection costs to include travel, living allowance, site

inspections, testing, and reports; to be drawn from Allowance 5, Section 01 21 00 – Allowances.

- .3 If acoustic rooms perform lower than the noted STC ratings, Contractor to pay for all remediation to construction and retesting by the same inspection agency until STC levels are met.
- .4 Rooms 102, 103, 104, 109, 116, 131 and 132, 148, 168, 169, 170, and 171 are to be tested to STC 50. Rooms 131 and 132 are considered one (1) room. Rooms 169, 170, and 171 are considered one (1) room.

3.9 CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
- .2 Progress Cleaning: In accordance with related masonry sections.
- .3 Final Cleaning:
 - .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
 - .2 Upon completion of installation and verification of performance of installation, remove surplus materials, rubbish, tools, and equipment barriers.
- .4 Waste Management:
 - .1 Divert unused or damaged masonry units and glass block from landfill as specified in Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.10 PROTECTION

- .1 Temporary Bracing:
 - .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
 - .2 Contractor to have bracing engineered.
 - .3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.
- .2 Moisture Protection:
 - .1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.
 - .2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.
 - .3 Air Temperature Protection: protect completed masonry as recommended in 1.7 SITE CONDITIONS.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 00 – Common Work Results for Masonry
- .2 Section 04 22 00 – Concrete Masonry Units
- .3 Section 04 23 00 – Glass Unit Masonry

1.2 REFERENCES STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA A179-04 (R2014), Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA A371-04 (R2014), Masonry Construction for Buildings.
 - .4 CAN/CSA-A3000-13, Cementitious Materials Compendium; CAN/CSA-A3002-13, Masonry and Mortar Cement.
- .2 International Masonry Industry All-Weather Council (IMIAC)
 - .1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.
- .3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for masonry; include product characteristics, performance criteria, physical size, finish, and limitations.
 - .3 Submit electronic copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 35 43 – Environmental Procedures. Indicate VOCs mortar, grout, parging, colour additives, and admixtures. Expressed as grams per litre (g/L).
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .3 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit Project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

- .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of recycled content materials and products, showing their percentages of post-consumer, post-industrial content, and total cost of materials for project.
- .3 Regional Materials: Submit evidence that Project incorporates regional materials.

1.4 QUALITY ASSURANCE

- .1 Certificates: Provide in accordance with Section 04 05 00 – Common Work Results for Masonry.
- .2 Test Reports: Submit certified test reports, including Sand Gradation Tests, in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 – Common Work Results for Masonry.
- .3 Pre-Installation Meetings: Conduct pre-installation meeting in accordance with Section 04 05 00 – Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions, and manufacturer's warranty requirements.
- .4 Mock-Ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 – Quality Control, and requirements of Section 04 05 00 – Common Work Results for Masonry, supplemented as follows:
 - .1 Construct mock-up panel of exterior and interior concrete unit, stone and masonry construction 1200 x 1800 mm.
 - .2 Construct mock-up strip of glass block masonry construction 1200 x 200 mm.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle masonry mortar and grout materials in accordance with Section 01 61 00 – Common Product Requirements, supplemented as follows:
 - .1 Deliver pre-packaged, dry-blended mortar mix to project site in labelled plastic-lined bags each bearing name and address of manufacturer, production codes or batch numbers, and colour or formula numbers.
 - .2 Maintain mortar, grout, and packaged materials clean, dry, and protected against dampness, freezing, traffic and contamination by foreign materials.
- .2 Packaging Waste Management: Remove for reuse of pallets in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.6 SITE CONDITIONS

- .1 Provide in accordance with Section 04 05 00 – Common Work Results for Masonry.
- .2 Ambient Conditions: Maintain materials and surrounding air temperature to:
 - .1 Minimum 5°C prior to, during, and forty-eight (48) hours after completion of masonry work.

- .2 Maximum 32°C prior to, during, and forty-eight (48) hours after completion of masonry work.
- .3 Weather Requirements: CAN/CSA A371 International Masonry Industry All-Weather Council (IMIAC) – Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction.

1.7 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: Provide in accordance with Section 04 05 00 – Common Work Results for Masonry.
- .2 Warranty Documentation: Submit warranty documents specified.

Part 2 Products

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire Project.
- .2 Cement:
 - .1 Portland Cement: To CAN/CSA-A3000, Type GU – General Use Hydraulic Cement (Type 10)
- .3 Water: Clean and potable.
- .4 Lime:
 - .1 Quick Lime: To CAN/CSA A179, Type S.
 - .2 Hydrated Lime: To CAN/CSA A179, Type S.

2.2 MORTAR MIXES

- .1 Mortar for exterior and interior masonry above grade is to be Type S.
- .2 Mortar for Glass Block Masonry: CAN/CSA A179, Type S, using the property specification.

2.3 MORTAR MIXING

- .1 Mix mortar ingredients in accordance with CAN/CSA A179, in quantities needed for immediate use.
- .2 Maintain sand uniformly damp immediately before mixing process.
- .3 Do not use antifreeze compounds, including calcium chloride or chloride-based compounds.
- .4 Do not add air entraining admixture to mortar mix.
- .5 Use a batch type mixer in accordance with CAN/CSA A179.
- .6 Re-temper mortar only within two (2) hours of mixing, when water is lost by evaporation.
- .7 Use mortar within two (2) hours after mixing at temperatures of 32°C, or 2-1/2 hours at temperatures under 5°C.

- .8 Use high yield mortar to fill block walls surrounding rooms 121, 122, 124, 125, and 127

2.4 GROUT MIXING

- .1 Mix batched and delivered grout in accordance with CAN/CSA-A23.1; transit mixed.
- .2 Mix grout ingredients in quantities needed for immediate use, in accordance with CAN/CSA A179 coarse grout.
- .3 Do not use calcium chloride or chloride-based admixtures.

2.5 MIX TESTS

- .1 Testing Mortar Mix:
 - .1 Test mortar to requirements of Section 01 45 00 – Quality Control, and in accordance with CAN/CSA A179 for proportion specification. Test during construction for:
 - .1 Compressive strength.
 - .2 Consistency.
 - .3 Mortar aggregate ratio.
 - .4 Sand/cement ratio.
 - .5 Water content and water/cement ratio.
 - .6 Air content.
- .2 Testing Grout Mix:
 - .1 Test grout to requirements of Section 01 45 00 – Quality Control, and in accordance with CAN/CSA A179 for proportion specification. Test during construction for:
 - .1 Compressive strength.
 - .2 Slump.

Part 3 Execution

3.1 EXAMINATION

- .1 Request inspection of spaces to be grouted.

3.2 PREPARATION

- .1 Plug clean-out holes with block masonry units. Brace masonry for wet grout pressure.

3.3 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.

3.4 CONSTRUCTION

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

3.5 MIXING

- .1 All pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes.
- .2 Clean all mechanical mixing equipment between batches.

3.6 MORTAR PLACEMENT

- .1 Install mortar to requirements of CAN/CSA A179.
- .2 Remove excess mortar from grout spaces.

3.7 GROUT PLACEMENT

- .1 Install grout in accordance with CAN/CSA A179.
- .2 Work grout into masonry cores and cavities to eliminate voids.
- .3 Do not install grout in lifts greater than 400mm, without consolidating grout by rodding.
- .4 Do not displace reinforcement while placing grout.

3.8 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection: In accordance with Section 04 05 00 – Common Work Results for Masonry, supplemented as follows:
 - .1 Test and evaluate mortar during construction, in accordance with CAN/CSA A179.
 - .2 Test and evaluate grout during construction, to CAN/CSA A179; test in conjunction with masonry unit sections specified.
- .2 Manufacturer's Instructions: In accordance with Section 04 05 00 – Common Work Results for Masonry.

3.9 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Remove droppings and splashings, using clean sponge and water.
- .3 Clean masonry with low-pressure clean water and soft natural bristle brush.
- .4 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.10 PROTECTION OF COMPLETED WORK

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 00 – Common Work Results for Masonry
- .2 Section 04 05 12 – Masonry Mortar and Grout
- .3 Section 04 22 00 – Concrete Unit Masonry
- .4 Section 04 23 00 – Glass Unit Masonry

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A36/A36M-14, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .3 ASTM A167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .4 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .5 ASTM A580/A580M-16, Standard Specification for Stainless Steel Wire.
 - .6 ASTM A641/A641M-09a(2014), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .7 ASTM A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- .2 CSA Group
 - .1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA-A370-14, Connectors for Masonry.
 - .4 CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.
 - .5 CSA G30.18-09(R2014), 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 Construction.
- .3 National Research Council Canada (NRC)
 - .1 National Building Code of Canada 2015(NBC).
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 Reinforcing Steel Manual of Standard Practice, 2004.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for [anchorage and reinforcing materials]; include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta.
 - .2 Submit drawings detailing bar bending details, anchorage details, lists, and placement drawings.
 - .3 On placement drawings, indicate sizes, spacing, location, and quantities of reinforcement and connectors.
- .4 Manufacturers' Instructions: submit manufacturer's installation instructions.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that construction wastes were recycled or salvaged.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial and post-consumer content of materials for project.
 - .3 Regional Materials: submit evidence that project incorporates regional materials.

1.4 QUALITY ASSURANCE

- .1 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry.

1.5 SITE MEASUREMENTS

- .1 Make site measurements necessary to ensure proper fit of members.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect anchorage and reinforcing materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 43 – Environmental Procedures.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of crates, packaging materials, padding, pallets, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Bar reinforcement: Steel to CAN/CSA-A371 and CSA G30.18.
- .2 Connectors: to CAN/CSA-A370 and CSA S304.1.
- .3 Corrosion protection: to CSA S304.1, galvanized to CSA S304.1 and CAN/CSA-A370.
- .4 Ties: hot dip galvanized to CAN/CSA-A370 Table 5.2 steel finish.
 - .1 Unit ties, to CAN/CSA-A370: ladder or truss, fabricated cold drawn steel with corrosion resistant finish, size to suit application.
 - .2 Joint Reinforcement Ties: to CAN/CSA-A370:
 - .1 Single Wythe Joint Reinforcement: ladder type:
 - .1 Steel wire, hot dip galvanized: to ASTM A641, Class 3 after fabrication, 3.66 mm diameter.

2.2 FABRICATION

- .1 Fabricate reinforcing in accordance with CSA A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Fabricate connectors in accordance with CAN/CSA-A370.
- .3 Provide engineered documents indicating locations and design of reinforcement meets load requirements.
- .4 Upon acceptance of Consultant, weld reinforcement in accordance with CSA W186.
- .5 Ship reinforcement and connectors, clearly identified.

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 five (5) weeks prior to commencing reinforcement work.

- .2 Upon request inform Consultant of proposed source of material to be supplied.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for anchorage and reinforcing materials installation in accordance with manufacturer's written instructions.
 - .1 Visually review 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.

3.2 PREPARATION

- .1 Direct and coordinate placement of metal anchors for masonry supplied to other Sections.

3.3 INSTALLATION

- .1 Supply and install masonry connectors and reinforcement in accordance with CAN/CSA-A370, CAN/CSA-A371, CSA A23.1 and CSA S304.1 unless indicated otherwise.
- .2 Prior to placing mortar and grout, obtain Consultant's acceptance of placement of reinforcement and connectors.

3.4 BONDING AND TYING

- .1 Bond walls of two or more wythes using metal connectors in accordance with CSA S304.1, CAN/CSA-A371 and as indicated.
- .2 Tie masonry veneer to backing in accordance with National Building Code of Canada (NBC), CSA S304.1, CAN/CSA-A371 and as indicated.
- .3 Install unit, adjustable, single wythe and multiple wythe joint reinforcement where indicated and in accordance with CAN/CSA-A370 and CAN/CSA-A371.
 - .1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA-A371 and as indicated.
 - .2 Install horizontal joint reinforcement 400 mm on centre.
 - .3 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.
 - .4 Place joint reinforcement continuous in first and second joint below top of walls.
 - .5 Lap joint reinforcement ends minimum 150 mm.
 - .6 Connect joint corners and intersections with strap anchors 400 mm on centre.

3.5 REINFORCED LINTELS AND BOND BEAMS

- .1 Reinforce masonry beams, masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA S304.1, CAN/CSA-A371, and CAN/CSA-A179.

- .3 Support and position reinforcing bars in accordance with CAN/CSA-A371.

3.6 GROUTING

- .1 Grout masonry in accordance with CSA S304.1, CAN/CSA-A371 and CAN/CSA-A179 and as indicated.

3.7 ANCHORS

- .1 Supply and install metal anchors in accordance with CAN/CSA-A370 and CAN/CSA-A371.

3.8 LATERAL SUPPORT AND ANCHORAGE

- .1 Supply and install lateral support and anchorage in accordance with CSA S304.1, CAN/CSA-A370 and A371, and as indicated.

3.9 MOVEMENT JOINTS

- .1 Reinforcement will not be continuous across movement joints unless otherwise indicated.

3.10 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.

3.11 FIELD QUALITY CONTROL

- .1 Site inspections in accordance with Section 04 05 00- Common Work Results for Masonry.
- .2 Obtain Consultant acceptance of placement of reinforcement and connectors, prior to placing mortar and grout.

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 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 00 – Common Work Results for Masonry
- .2 Section 04 05 12 – Masonry Mortar and Grout
- .3 Section 07 62 00 – Sheet Metal Flashing and Trim

1.2 REFERENCES STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM E336-16A, Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A165 Series-14 (R2014), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2, A165.3).
 - .2 CAN/CSA A371-04 (R2014), Masonry Construction for Buildings.
 - .3 CSA S304-14, Design of Masonry Structures.
- .3 International Masonry Industry All-Weather Council (IMIAC)
 - .1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.
- .4 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit unit samples in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .4 Manufacturer's Written Instructions:
 - .1 Submit in accordance with Section 04 05 00 - Common Work Results for Masonry.

- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer, post-industrial content, and total cost of materials for project.
 - .3 Regional Materials: submit evidence that project incorporates regional materials.

1.4 QUALITY ASSURANCE

- .1 Certificates: provide in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Test and Evaluation Reports: provide certified test reports in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .3 Pre-Installation Meetings: conduct pre-installation meeting in accordance with Section 04 05 00 - Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Construct mock-up panel of exterior and interior concrete unit masonry construction 1200 x 1800 mm.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Packaging Waste Management:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 SITE CONDITIONS

- .1 Provide in accordance with Section 04 05 00 - Common Work Results for Masonry.

1.7 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: provide in accordance with Section 04 05 00 – Common Work Results for Masonry.
- .2 Warranty Documentation: submit warranty documents specified.

Part 2 Products

2.1 MATERIALS

- .1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1) and as follows:
 - .1 Classification: H/15/C/M in all locations unless noted otherwise.
 - .1 Base course walls between gridlines 9 to 12 and A to E size: two courses 200 x 400 x 100 high nominal size.
 - .2 Special shapes: provide square bull-nosed and double bull-nosed units for exposed corners, door heads and jambs. Provide purpose-made shapes for lintels, beams and bond beams. Provide additional special shapes as detailed on drawings.
 - .3 Profile/Texture for Architectural Concrete Unit Masonry:
 - .1 Surface texture: smooth, unless noted otherwise.
 - .2 Polished finish to be used on out building and garbage enclosure.
 - .4 Colour: Natural.
 - .5 Unit faces filled with cementitious grout.
 - .6 Provide concrete block of composition and type appropriate for fire ratings detailed on drawings.
- .2 Exterior exposed concrete block units: to CAN/CSA-A165.1 and as follows:
 - .1 Classification: H/15/C/M.
 - .2 Size: 190 mm x 190 mm x 390 mm.
 - .3 CBV 1
 - .1 Colour: Peitre Antica, manufactured by Expocrete.
 - .2 Finish: Burnished.
 - .3 Special Shapes: Provide burnished return corners, one face, one end.
 - .4 CBV 2
 - .1 Colour: #254 Charcoal, manufactured by Expocrete
 - .2 Finish: Smooth Face
 - .3 Special Shapes: Provide smooth faced return corners, one face, one end.
 - .5 Locations: Garbage enclosure and Out Buildings.
- .3 Terrazzo block veneer:
 - .1 Size: 90 mm veneer x 190 mm x 390 mm
 - .2 Colour: Pietre Antica, manufactured by Expocrete.
 - .3 Finish: Burnished.
 - .4 Special shapes: provide L-corners and half return corners.

2.2 REINFORCEMENT

- .1 Reinforcement in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.

2.3 CONNECTORS

- .1 Connectors in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.

2.4 FLASHING

- .1 Flashing: in accordance with Section 07 62 00 – Sheet Metal Flashing and Trim.

2.5 MORTAR MIXES

- .1 Mortar and mortar mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.

2.6 GROUT MIXES

- .1 Grout and grout mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.

2.7 CLEANING COMPOUNDS

- .1 Use low VOC products in compliance with SCAQMD Rule 1168.
- .2 Compatible with substrate and acceptable to masonry manufacturer for use on products.
- .3 Cleaning compounds compatible with concrete unit masonry and in accordance with manufacturer's written recommendations and instructions.

2.8 TOLERANCES

- .1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA A165.1, supplemented as follows:
 - .1 Maximum variation between units within specific job lot not to exceed 2 mm.
 - .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
 - .3 Out of square tolerance not to exceed 2 mm.
- .2 Tolerances for architectural concrete masonry units in accordance with CAN/CSA A165.1, supplemented as follows:
 - .1 Maximum variation in length or height between units within specific job lot for specified dimension not to exceed 2 mm.
 - .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
 - .3 Out of square tolerance not to exceed 2 mm.
 - .4 Maximum variation in width between units within specific job lot for specified dimension not to exceed 2mm.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify surfaces and conditions are ready to accept work of this Section.
- .2 Commencing installation means acceptance of existing substrates.

3.2 PREPARATION

- .1 Protect adjacent finished materials from damage due to masonry work.

3.3 INSTALLATION

- .1 Concrete block units:
 - .1 Bond: running
 - .2 Coursing height: 200 mm for one block and one joint typically and 200 mm for two blocks and two joints where noted otherwise.
 - .3 Jointing: concave where exposed or where paint or other finish coating is specified.
- .2 Architectural concrete unit masonry:
 - .1 Bond: running
 - .2 Coursing height: 200mm for one block and one joint typically and 100 mm high for one block and one joint where noted otherwise.
 - .3 Jointing: concave where exposed or where paint or finish coating is specified.
- .3 Special Shapes:
 - .1 Install special units to form corners, returns, offsets, reveals and indents without cut ends being exposed and without losing bond or module.
 - .2 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
 - .3 End bearing: not less than 200mm as indicated on drawings.
 - .4 Install special site cut shaped units.

3.4 REINFORCEMENT

- .1 Install reinforcing in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.5 CONNECTORS

- .1 Install connectors in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.6 FLASHING

- .1 Install flashings: in accordance with Section 07 62 00 – Sheet Metal Flashing and Trim.

3.7 MORTAR PLACEMENT

- .1 Place mortar in accordance with Section 04 05 12 - Masonry Mortar and Grout.

3.8 GROUT PLACEMENT

- .1 Place grout in accordance with Section 04 05 12 - Masonry Mortar and Grout.

3.9 CONSTRUCTION

- .1 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.
- .2 Construct masonry walls using running bond unless otherwise noted.
- .3 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.
- .4 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.
- .5 Install movement joints and keep free of mortar where indicated.
- .6 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.
- .7 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.
- .8 Ensure compacted head joints. Use full or face-shell joint as indicated.
- .9 Tamp units firmly into place.
- .10 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.
- .11 Tool exposed joints concave. Strike concealed joints flush.
- .12 After mortar has achieved initial set up, tool joints.
- .13 Do not interrupt bond below or above openings.

3.10 REPAIR/RESTORATION

- .1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

3.11 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Noise reduction between two rooms will be tested by independent testing agency appointed and paid by Allowance 5 in Section 01 21 00 – Allowances, in accordance with ASTM E336.
 - .2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

3.12 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning, supplemented as follows:
 - .1 Progress Cleaning:
 - .1 Standard Concrete Unit Masonry:

- .1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block. Clean wall surface with suitable brush or burlap.
- .2 Architectural Concrete Unit Masonry:
 - .1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block. Clean wall surface with suitable brush or burlap.
- .2 Waste Management: separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.13 PROTECTION

- .1 Brace and protect concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 00 – Common Work Results for Masonry
- .2 Section 04 05 12 – Masonry Mortar and Grout

1.2 REFERENCES STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
 - .2 ASTM D1187-97(2011)e1, Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA A179-04 (R2014), Mortar and Grout for Unit Masonry.
 - .2 CAN/CSA A371-04 (R2014), Masonry Construction for Buildings.
 - .3 CAN/CSA-A3000-13, Cementitious Materials Compendium; CAN/CSA-A3002-13, Masonry and Mortar Cement.
 - .4 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .4 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S106-15, Standard Method for Fire Test of Window and Glass Block Assemblies.

1.3 SYSTEM DESCRIPTION

- .1 Glass block installations not to be designed to support structural loads.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for brick masonry and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit unit samples in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .4 Manufacturer's Written Instructions:
 - .1 Submit in accordance with Section 04 05 00 - Common Work Results for Masonry.

- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer, post-industrial content, and total cost of materials for project.
 - .3 Regional Materials: submit evidence that project incorporates regional materials.

1.5 QUALITY ASSURANCE

- .1 Certificates: provide in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Test and Evaluation Reports: provide certified test reports in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .3 Pre-Installation Meetings: conduct pre-installation meeting in accordance with Section 04 05 00 - Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00- Quality Control and requirements of Section 04 05 00- Common Work Results for Masonry.
 - .1 Construct mock-up panel of exterior block construction 1200 x 200 mm.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Packaging Waste Management:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 SITE CONDITIONS

- .1 Provide in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Field Measurements:
 - .1 Make field measurements necessary to ensure proper fit of all members.

1.8 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: provide in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Warranty Documentation: submit warranty documents specified.

1.9 EXTRA MATERIALS

- .1 Provide manufacturer's instructions in accordance with Section 01 33 00 - Submittals Procedures covering maintenance requirements.
- .2 Extra Stock Maintenance Materials in accordance with Section 01 78 00 - Closeout Submittals: deliver to Owner extra materials. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
 - .1 Provide 6 glass blocks each type and size of glass units, under provisions of Section 01 78 00 - Closeout Submittals.
 - .2 Supply in original cartons using cushioning materials between units. Attach label identifying:
 - .1 Project Name.
 - .2 Description of Contents: name of manufacturer, trade name of product, generic description of contents.

Part 2 Products

2.1 MANUFACTURERS

- .1 Ensure manufacturer has minimum 5 years experience in manufacturing components similar to or exceeding requirements of project.

2.2 MANUFACTURED UNITS

- .1 Pre-approved: Seves Vistabrik – Glass block, Clearview with Sahara finish on 1 side. Distributor: Brock White Canada ULC, 21359 – 115th Avenue NW, Edmonton AB. P: 780-447-1774.
- .2 Solid glass block: standard with joint key for mortar bond.
 - .1 Pattern and design:
 - .1 Surfaces: Sandblast inner face of outside wythe and outer face of inner wythe.
 - .2 Colour: clear glass.
 - .3 Edge coating colour: manufacturer's standard translucent polyvinyl-butyl based white-coloured, latex based coloured edge coating, factory applied, to match mortar colour edge coating.
 - .2 Nominal sizes:
 - .1 Square units: 194 mm square x 76 mm thick.
 - .3 Visible light transmittance: minimum 90 percent.
 - .4 Compressive strength: 550 KPa.

2.3 ACCESSORIES

- .1 Mortar: as specified in Section 04 05 12 - Masonry Mortar and Grout.
- .2 Sealant: VOC content to comply with SCAQMD Rule 1168, rigid epoxy resin compound, styrene-free, two component, ASTM D695 Compressive strength 11,000 psi minimum,

suitable for use on substrate indicated, colour selected by Consultant from manufacturer's standard range.

- .3 Sealant backing: VOC content to comply with SCAQMD Rule 1168, Non-staining type recommended by sealant manufacturer.
- .4 Spacers: plastic, concealed type, allowing pointing mortar and placing reinforcing and panel anchors without obstruction, of size to provide horizontal and vertical joint width indicated, capable of supporting glass units until mortar set, incorporated into structural design of glass unit masonry.

2.4 SOURCE QUALITY CONTROL

- .1 Glass block, components and materials to be from single manufacturer.

Part 3 Execution

3.1 INSTALLERS

- .1 Provide experienced and qualified technicians to carry out erection, assembly and installation of glass block.

3.2 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.3 EXAMINATION

- .1 Examination: examine conditions in accordance with Section 04 05 00 Common Work Results for Masonry.

3.4 PREPARATION

- .1 Surface Preparation: prepare surface in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Ensure structure or substrate is adequate to support glass block.
- .3 Clean glass units of foreign substances.

3.5 INSTALLATION

- .1 Erect glass units and accessories in accordance with manufacturer's instructions.
- .2 Install glass unit spacers to manufacturer's recommendations.
- .3 Set glass units with full bond mortar joints. Furrowing not permitted. Remove excess mortar.
- .4 Do not install glass unit when ambient temperature is below 4 degrees C. Maintain ambient temperature above 4 degrees C for 48 hours after installation.
- .5 Place units to maintain uniform joint width of 6 mm.
- .6 Install unit masonry to avoid contact of glass units with metal accessories or frames.

3.6 CONSTRUCTION

- .1 Mortar Placement:
 - .1 Place pointing mortar in accordance with Section 04 05 12 - Masonry Mortar and Grout.
 - .2 Set glass with full bond mortar joints. Furrowing not permitted. Remove excess mortar.
 - .3 Place units to maintain uniform joint width of 6 mm.
- .2 Application of Sealant:
 - .1 Install sealant in accordance with Section 07 92 00 - Joint Sealants.
 - .2 Apply sealant 24 hours after glass unit masonry installation.
 - .3 Form surfaces of sealant smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Tool surface to a slight concave profile. Edges of joints to expose shoulders of glass units.
 - .4 Remove excess sealant.

3.7 TOLERANCES

- .1 Tolerance for glass block unit construction in accordance with Section 04 05 00 - Common Work Results for Masonry, supplemented as follows.
 - .1 Variation from specified joint width: plus 2 mm and minimum 0 mm.
 - .2 Maximum variation from plane of unit to adjacent unit: 1 mm.
 - .3 Maximum variation from flat plane: 1 mm in 1.2 m, non-cumulative.

3.8 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning, supplemented as follows.
 - .1 Remove mortar particles using a clean, wet sponge or cloth. Rinse sponge or cloth frequently in clean water to remove abrasive particles that could scratch glass surfaces. Allow any remaining film on the block to dry to a powder.
 - .2 Remove excess caulking materials with commercial solvents such as xylene mineral spirits naphtha and follow with normal wash and rinse. Do not damage caulking by overgenerous application of strong solvents. Comply with solvent manufacturers' printed data for toxicity and flammability warnings.
 - .3 When glass block panels are completely installed and are not exposed to direct sunlight, final cleaning may be carried out. Start at the top of the panel and wash with generous amounts of clean water. Dry all water from the glass block surface. Change cloth frequently to eliminate dried mortar particles that could scratch the glass surface. Use a clean, dry, soft cloth to remove the dry powder from the glass surfaces.
- .2 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.9 PROTECTION

- .1 Brace and protect glass block unit construction in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Make good damage to adjacent materials caused by glass block installation.

END OF SECTION

1. General

1.1 RELATED REQUIREMENTS

- .1 Section 04 22 00 – Concrete Unit Masonry

1.2 REFERENCES STANDARDS

- .1 Miscellaneous References:
 - .1 Canadian Environmental Assessment Act (CEAA).

1.3 ACTION AND INFORMATION SUBMITTALS

- .1 Product Data:
 - .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit manufacturer’s instructions, printed product literature, specifications and data sheets.
- .2 Submit electronic copies of Workplace Hazardous Materials Information System (WHMIS) – Material Safety Data Sheets (MSDS) in accordance with Section 01 35 43 – Environmental Procedures.
- .3 Manufacturer’s Instructions:
 - .1 Submit manufacturer’s cleaning instructions.
 - .2 Submit written methodology describing the graffiti removal process.

1.4 QUALITY ASSURANCE

- .1 Use only materials from one (1) manufacturer and a single source of supply.
- .2 Use only proprietary material from the specified manufacturer’s: non-proprietary or secret formulae, or materials having an unknown composition will not be permitted as these may contain harmful substances and may cause deleterious effects to surrounding material or masonry surfaces.
- .3 Application to be provided by manufacturer trained and approved applicators only.

1.5 EXTRA MATERIALS

- .1 Provide maintenance information in accordance with Section 01 33 00 – Submittal Procedures indicating proper care of anti-graffiti coatings, cleaning instructions, locally available materials used to clean and maintain surfaces, and approximate recoating requirements.
- .2 Provide two (2) - 4L (1 gal) container of maintenance cleaner listed in item 2.2 below stored in location directed by the Owner, in accordance with Section 01 78 00 – Closeout Submittals.

2. Products

2.1 MATERIALS: GENERAL

- .1 Water: Clean potable water free from contaminants; treat water that has high metal content before use in cleaning.
- .2 Masking Materials: Polyethylene or strippable masking (butyl rubber spray) at choice of Trade Contractor.

2.2 ANTI-GRAFFITI COATING

- .1 Non-sacrificial, fully breathable sealer that does not alter the look of the substrate to which it is being applied, specifically formulated to prevent graffiti from curing into masonry and precast concrete substrate pores.
 - 1 Acceptable materials:
 - .1 Fabrikem Fabrishield PR Series.
 - .2 Graffiti Master, Acryli-Master.
 - .3 ProSoCo, Defacer Eraser Graffiti Barrier NS, with Protective Film Hardener.
 - .2 Maintenance Cleaners: Manufacturer's recommended maintenance cleaners formulated to clean all masonry types specified prior to application of anti-graffiti coating.

2.3 TOOLS AND EQUIPMENT

- .1 Use only brushes with natural or soft plastic bristles.
- .2 Use only scrapers of wood or plastic.
- .3 Use air compressors equipped with on-line oil filters to avoid spraying oil onto masonry.
- .4 Use only plastic or non-ferrous metal piping and fittings.
- .5 Use nozzles that give nebulized droplet spray.

3. Execution

3.1 PREPARATION

- .1 Place safety devices and signs near work areas as indicated and directed.
- .2 Clean all masonry surfaces to receive coating with product specified in accordance with manufacturer's standard range.
- .3 Seal or repair openings and joints where there is potential risk of water or chemical infiltration through the wall assembly in accordance with coating manufacturer's recommendations.
- .4 Cover surfaces not scheduled for coatings.
- .5 Cover and protect surfaces and non-masonry finishes within areas scheduled for coatings.

3.2 APPLICATION

- .1 Apply product in environmental conditions that conform with manufacturer's recommendations. Do not apply in wind conditions that will cause overspray to fall beyond the immediate vicinity of the building.
- .2 Inspect all masonry surfaces to ensure preparation meets manufacturer's recommendations. Where surfaces are not suitable, do not apply coating until surfaces are made suitable.
- .3 Commencing application constitutes acceptance of substrate conditions.
- .4 Apply coating at rate and quantity recommended by manufacturer.
- .5 Apply coating to all exposed masonry surfaces.

3.3 CLEAN-UP

- .1 Rinse off masonry until no indications of chemicals are present.

- .2 Rinse from bottom to top and from top to bottom.
- .3 Clean up work area as work progresses.
- .4 Remove debris and waste from site at end of each work day.

3.4 PROTECTION

- .1 Mask or seal vents, windows, and other openings.
- .2 Mask glass, and metal adjacent to masonry.
- .3 Hang sheeting material from scaffolding to enclose spray.
- .4 Workers shall wear eye, head, and face protection, and protective gloves, overalls, boots and filter mask in accordance with MSHA/NIOSH standard.

3.5 SCHEDULE

- .1 Provide anti-graffiti coating to all exterior exposed concrete unit masonry.
- .2 Provide anti-graffiti coating to all exterior exposed stone veneer.

END OF SECTION

- .1 Stone Units: Show sizes, profiles, spacing, details, and locations of special shapes.
- .2 Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
- .3 Submit stone masonry veneer tie design documents, stamped and signed by professional engineer registered or licensed in the Province of Alberta.
 - .1 Letter of engineering for masonry wall systems.
 - .2 Indicate design loads, member sizes, materials, design thickness exclusive of coatings, coating specifications, connection and bracing details, screw sizes and spacing, and anchors.
 - .3 Indicate locations, dimensions, openings and requirements of related work.
- .5 Quality Assurance – Quality Control:
 - .1 Submit proof of manufacturer and installer qualifications.

1.5 QUALITY ASSURANCE

- .1 Certificates: provide in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Test and Evaluation Reports: provide certified test reports in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .3 Pre-Installation Meetings: conduct pre-installation meeting in accordance with Section 04 05 00 - Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Construct mock-up panel of exterior and interior concrete unit masonry construction 1200 x 1800 mm.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Packaging Waste Management:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Follow manufacturer's instruction.
- .4 Store moisture-sensitive materials in weather protected enclosures.

1.7 CLOSEOUT SUBMITTALS

- .1 Submission Procedures: Section 01 78 00.
- .2 Submit Maintenance Guide for all installed product.
- .3 Special Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing for a period of fifty (50) years following date of Substantial Completion

Part 2 Products

2.1 VENEER STONE MATERIALS

- .1 Rundle Stone:
 - .1 Size: 90 mm veneer x random heights and lengths
 - .2 Colour: Prairie Black
 - .3 Finish: Random
- .2 Tyndall Stone:
 - .1 Size: 90 mm veneer x 90 mm and 190 mm heights x random lengths. Refer to elevations.
 - .2 Colour: Buff
 - .3 Finish: Sawn Face.
- .3 Manufactured Masonry Physical Properties:
 - .1 Bond Between Stone Unit, Type S Mortar, and Backing: ASTM C42, 345 kPa (50 psi).
 - .2 Fire Hazard Test: to Underwriters Laboratories listing, flame spread/smoke developed 0/0.
 - .3 Fire Hazard Test: ASTM E84, Class A (Class 1).
 - .4 Maximum Veneer Unit Weight: 52 kg/m²

2.2 RELATED MATERIALS

- .1 Ties: hot dip galvanized to CAN/CSA-A370 Table 5.2 steel finish.
 - .1 Slotted Rap-Tie: Slotted L-plate, V-tie, and insulation support
- .1 Fasteners:
 - .1 Into Metal Studs: Minimum 11.1 mm (7/16 inch) head diameter, corrosion-resistant, self-drilling, self-tapping, pancake head screws of sufficient length to penetrate 10 mm (3/8 inch) minimum into the stud.

- .2 Mortar: Premixed Type N or mortar mixed using components and proportions following manufactured masonry manufacturer's installation instructions. Comply with CAN/CSA A179.
- .3 Sealants: In accordance with Section 07 92 00 – Joint Sealants.
 - .1 Sealant: Maximum VOC limit 250 g/L To SCAQMD Rule 1168.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrates upon which manufactured masonry will be installed.
- .2 Coordinate with responsible entity to correct unsatisfactory conditions.
- .3 Commencement of work by installer is acceptance of substrate conditions.

3.2 PREPARATION

- .1 Protection: Prevent work from occurring on the opposite of walls to which manufactured masonry is applied during and for 48 hours following installation of the manufactured masonry.
- .2 Surface Preparation: Follow manufacturer's instructions designated below for the appropriate type of manufactured masonry and substrate.
- .3 Clean surfaces thoroughly and allow to dry prior to installation.

3.3 FLASHINGS

- .1 Install flashings as shown on Drawings.

3.4 INSTALLATION

- .1 Install Stone[®] products in accordance with manufacturer's Cultured Stone[®] installation instructions using grouted.
- .2 Install/Apply Related Materials specified above in accordance with type of substrate and manufactured masonry manufacturer's installation instructions.

3.5 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services: Provide 2 periodic site visits.

3.6 CLEANING

- .1 Section 01 74 00 – Cleaning and Waste Management
- .2 Clean manufactured masonry in accordance with manufacturer’s installation instructions.

3.7 PROTECTION

- .1 Protect finished work from rain during and for 48 hours following installation.
- .2 Protect finished work from damage during remainder of construction period.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Quality Control: Tests, inspections, procedures, and related actions during and after execution of the Work by a third party testing agency to evaluate that completed construction complies with requirements whose services do not include contract enforcement activities performed by Consultant.
- .2 Quality Assurance: Activities, actions, and procedures performed before and during execution of the Work by the Contractor and Trade Contractor to guard against defects and deficiencies and ensure proposed construction complies with requirements.
 - 1.1.1 Delegated Design Professional Engineer: The professional engineer hired or contracted to the fabricator or manufacturer to design specialty elements, produce delegated design submittals and shop drawings to meet the requirements of the Project; who is registered in the province of the Work; and who is not the Consultant.
- .3 Letter of Commitment and Letter of Compliance: Documents prepared by the delegated design professional engineer as recommended by APEGA's "Responsibilities of Engineering Services for Building Projects".

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA S16 -14, Design of Steel Structures
 - .2 CSA W47.1-09 (R2014), Fusion Welding of Steel
 - .3 CSA W178.1-14, Certification of Welding Inspection Organizations
 - .4 CSA W55.3-08 (R2013), Certification of Companies for Resistance Welding of Steel and Aluminum
 - .5 CSA W59-13, Welded Steel Construction (metal arc welding)

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate shop priming and finishing requirements with structural drawings.
- .2 Testing and Inspections: Contractor will appoint and pay for services of testing agency to perform testing and inspection of work of this Section:
 - .1 Notify testing agency prior to commencement of fabrication work so testing and inspection may be properly scheduled and reviewed.
 - .2 Owner may request additional testing and inspection at Contractor's expense when defects revealed.
 - .3 Correct, or remove and replace structural steel with defects revealed by testing and inspection to the recommendations of the testing authority and to the approval of authorities having jurisdiction.

- .3 Sequencing: Sequence steel work to account for the following:
 - .1 Supply anchorage items embedded in or attached to other construction without delaying the Work
 - .2 Deliver steel bearing plates and other devices built into concrete and masonry construction so as not to cause delay to the project
 - .3 Schedule delivery of structural steel to Project site in quantities and at times to maintain continuity of installation
 - .4 Schedule delivery of steel joists to Project site in quantities and at times to maintain continuity of installation
- .4 Delegated Design Requirements: Design structural steel connections, open web steel joists, chiller support frame, steel deck, and wind bearing steel studs required by the Contract Documents to withstand design loadings indicated and in accordance with requirements of the Building Code and CAN/CSA S16-14 to resist forces, moments, shears and allow for movements indicated:
 - .1 Engage fabricator who utilizes registered professional engineer to prepare calculations, shop drawings, and other structural data for steel joists and connections, chiller support frame, steel deck, and wind bearing steel studs not shown on drawings that comply with requirements of this Section.
 - .2 Retain registered professional engineer to ascertain and report fabrication true for all the delegated design items listed above and erection for chiller support frame of work meets specified design criteria for materials referenced.

1.4 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Product Data: Submit following product test reports for steel deck materials, from qualified testing agency indicating each of following complies with requirements, based on comprehensive testing of current products:
 - .1 Provide product certificates signed by steel deck manufacturers certifying products provided comply with requirements of specifications and Building Code.
 - .2 Provide product data for mechanical and adhesive fasteners indicating load ratings and methods of installation.
- .3 Informational Submittals: Provide the following submittals during the course of the work:
 - .1 Quality Management Plan: Written documents provided by the Trade Contractor indicating quality assurance and activities undertaken by the Trade Contractor including; but not limited to, the following:
 - .1 Schedule of Tests and Inspections: Submit schedule of tests and inspections performed by the Trade Contractor; prepared in tabular form and including the following:
 - .1 Specification section number and title
 - .2 Description of test and inspection

- .3 Identification of applicable standards
- .4 Identification of test and inspection methods
- .5 Number of tests and inspections required
- .6 Time schedule or time span for tests and inspections
- .7 Entity responsible for performing tests and inspections
- .8 Requirements for obtaining samples
- .9 Unique characteristics of each quality assurance service
- .2 Reports: Submit written reports prepared by Trade Contractor's inspection agency that includes the following:
 - .1 Date of issue
 - .2 Project title and number
 - .3 Name, address, and telephone number of testing agency
 - .4 Dates and locations of samples and tests or inspections
 - .5 Names of individuals making tests and inspections
 - .6 Description of the Work and test and inspection method
 - .7 Identification of product and specification section
 - .8 Complete test or inspection data
 - .9 Test and inspection results and an interpretation of test results
 - .10 Ambient conditions at time of sample taking and testing and inspecting
 - .11 Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements
 - .12 Name and signature of laboratory inspector
 - .13 Recommendations on re-testing and re-inspecting
- .2 Delegated Design Submittals: Submit Letters of Assurance and Due Diligence as follows:
 - .1 At the onset of work of this section and prior to shop drawing submission, prepare and submit a Letters of Commitment, in a form similar to Schedule B-1, including a summary of the work covered by this section.
 - .2 On completion of work of this section, prepare and submit a Letter of Compliance, in a form similar to Schedules C-2, including a summary of the work covered by this section.
 - .3 Letters referred to in .1 and .2 above must cover all aspects of structural steel connections not shown on drawings, steel joist, steel deck work, chiller support frame, and wind bearing steel studs including; but not limited to, design of connections and erection.
- .3 Source Quality Control Submittals: Submit following mill test reports signed by manufacturers certifying their products comply with following requirements when requested by the Consultant:
 - .1 Structural steel, including chemical and physical properties
 - .2 Bolts, nuts, and washers, including mechanical properties and chemical analysis

- .3 Direct tension indicators
- .4 Headed stud shear connectors
- .5 Twist-off tension control bolts or other alternative design bolts

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: Provide design, materials and fabrication in accordance with CAN/CSA S16-14 and CWB certification requirements including, but not limited to, the following:
 - .1 Fabricator certified by CWB to CSA W47.1 (R2014), Division 1 or 2.1.
 - .2 Fabricator only subcontract or sublet work of fabrication or installation to another CWB certified company.
 - .3 Installer CWB certified where they are directly subcontracted by the Contractor to same requirements as fabricator.
- .2 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Fabricator: Use fabricator experienced in fabricating structural steel similar to that indicated for this Project and with record of successful in service performance, and sufficient production capacity to fabricate structural steel without delaying the Work.
 - .2 Installers: Use installers; if different than fabricator, experienced with structural steel work similar in material, design, and extent to that indicated for this Project; with record of successful in service performance; using welders certified by CWB for classification of work being performed; and having same certifications as required by CSA and CWB for fabricator.
 - .3 Delegated Design: Delegated design performed by professional engineer, registered in the province of the Work and experienced in providing engineering services for the work specified, and as required by Authority Having Jurisdiction.
 - .4 Certifications: Provide proof of the following during the course of the Work:
 - .5 Welding Certificates: Comply with applicable CWB standards for classification of work being performed including, but not limited to, following:
 - .1 Welding inspection: to CSA W178.1-14.
 - .2 Resistance welding: to CSA W55.3-08 (R2013).
 - .3 Fusion welding: to CSA W59-13.
 - .6 Failure of fabricator and installer to maintain CSA and CWB requirements for certification will result in having their certification withdrawn in accordance with the contract that they sign with CSA and CWB, and considered as being in breach of Contract for the Work of the Project leading to decertification.
- .3 Quality Management Plan: Provide inspections, testing and reports during the course of the work confirming that the work of steel fabrication and erection is conducted in accordance with the Contract Documents; the frequency of testing and inspection by the inspection and testing agency may be adjusted in consultation with the Owner, Contractor and Consultant where the steel Subcontractor's own Quality Management Plan demonstrates its effectiveness during the course of the project

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Handling Requirements: Store materials to permit easy access for inspection and identification; keep steel members off ground by using pallets, platforms, or other supports; protect steel members and packaged materials from erosion and deterioration, and as follows:
 - .1 Store fasteners in a protected place
 - .2 Clean and re-lubricate bolts and nuts that become dry or rusty before using
 - .3 Do not store materials on structure in manner that might cause distortion or damage to members or supporting structures
 - .4 Repair or replace damaged materials or structures as directed

Part 2 Products

2.1 SUBSTITUTIONS

- .1 Use of structural steel sections other than those shown on the Drawings or listed in the Specifications will require a formal contract change unless written acceptance was obtained from the Departmental Representative by the fabricator.

Part 3 Execution

3.1 EXAMINATION

- .1 Report any discrepancy and potential problem areas to Consultant for direction before commencing fabrication or erection.
- .2 Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads.
- .2 Confirm site safety measures in place and personal protection equipment worn in accordance with General Conditions of Contract.

3.3 ERECTION

- .1 Erect structural steel in accordance with CAN/CSA S16-14 and CSA S136.
- .2 Obtain Consultant's review before site cutting or altering any members.
- .3 Set structural steel accurately in locations and to elevations indicated on Drawings and reviewed shop drawings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 05 05 00 – Common Work Results for Metals.
- .2 Section 09 91 13 – Exterior Painting
- .3 Section 09 91 23 – Interior Painting

1.2 SUBMITTALS

- .1 Provide requested information in accordance with Section 01 33 00.
- .2 Submit product data for each type of coating products and primers that will receive subsequent architectural coatings indicating:
 - .1 Submit components and application procedures of the paint system as a single coordinated submittal and indicate compatibility and maximum recoat times for each product.
 - .2 Identify required surface preparation, primer, intermediate coat (if applicable) and finish coat.
- .3 Submit samples indicating welds and finishing techniques prior to starting any architecturally exposed welding and finishing work, as follows:
 - .1 Submit sample of Hollow Steel Section (HSS) indicating Level 1 and Level 2 welds, using same sized section as detailed on structural drawings.
 - .2 Submit sample of Channel indicating Level 1 and Level 2 welds, using same sized section as detailed on structural drawings.
 - .3 Finish samples with primer listed in for use in this Section.
 - .4 Samples shall be prepared free of tool marks, foundry identification marks, pits and scale and other defects detrimental to finished appearance.
 - .5 Sample will be used by the Consultant to determine acceptability of welds and surface preparation for architecturally exposed steel fabrications on site.
 - .6 Consultant may request modifications to the submitted sample, fabricator shall make the changes as indicated until acceptance is obtained from the Consultant.
- .4 Submit shop drawings detailing fabrication of AES components, as follows:
 - .1 Provide erection drawings clearly indicating which members are considered as AES members.
 - .2 Include details that clearly identify requirements listed in for Fabrication and Erection; provide connections for exposed AES consistent with concepts shown on the architectural or structural drawings.
 - .3 Indicate welds by standard CWB symbols, distinguishing between shop and field welds, and show size, length and type of each weld; identify grinding, finish and profile of welds as defined in this Section.
 - .4 Indicate type, size, finish and length of bolts, distinguishing between shop and field bolts; identify high strength bolted slip critical, direct tensioned

- shear/bearing connections; indicate which direction bolt heads should be oriented in final assembly.
- .5 Clearly indicate which surfaces or edges are exposed and class of surface preparation.
- .6 Indicate special tolerances and erection requirements as noted on the drawings or defined herein.
- .5 Submit qualification data for firms and persons fabricating and erecting AES demonstrating their capabilities and experience when requested by the Consultant; include lists of completed project names and address, names and addresses of Consultants and Owners, and other information specified; and photographs showing detail of installed AES in referenced projects.

1.3 REFERENCE STANDARDS

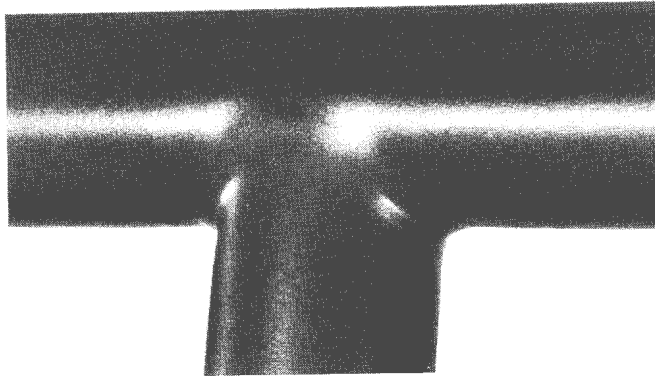
- .1 ASTM International
 - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
 - .2 ASTM A780/A780M-09(2015), Standard practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- .2 CSA International
 - .1 CAN/CGSB 1.181-99, Ready Mixed Organic Zinc-Rich Coating
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 QUALITY ASSURANCE

- .1 Fabricator Qualifications: In addition to qualifications specified in Section 05 05 00, engage a firm experienced in fabricating AES similar to that indicated for this Project with a record of successful in-service performance, as well as sufficient production capacity to fabricate AES without delaying the Work.
- .2 Erector Qualifications: In addition to qualifications listed in Section 05 05 00, engage an experienced erector who has completed AES work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

.3 The following levels finish for architecturally exposed steel are required by this specification:

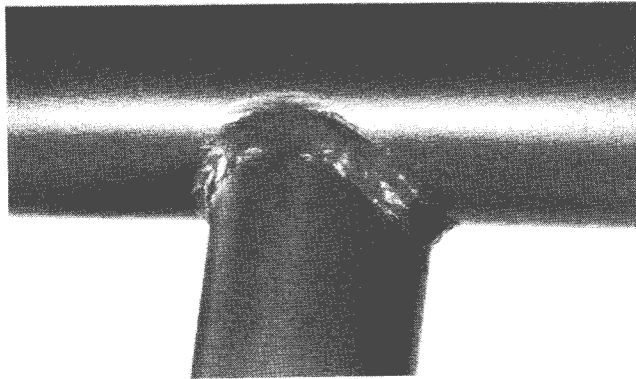
- .1 Level 1 – Steel structure including exposed exterior brick support angles and connections outside the vapour retarder, all structure within 2440 mm (8'-0") of the areas designed to serve the public and located in open areas where appearance and finish are of the highest importance and requiring smooth, ornamental quality welds and joints free from pits, tool and assembly marks, as follows:



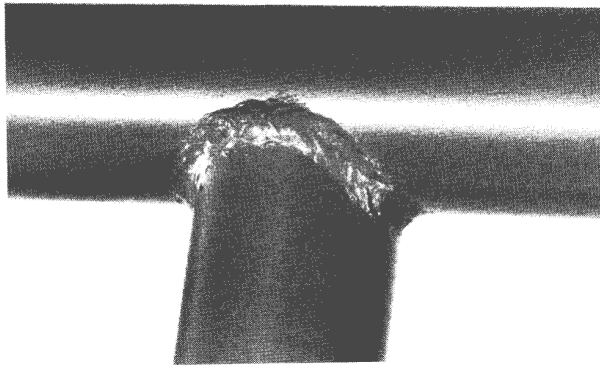
- .2 Level 2 – Steel structure between 3600 mm (12'-0") and 4500 mm (14'-9") away from the public, located in exposed areas where appearance and finish are not the prime criteria but still requiring cleanly finished welds with minimal tool and assembly marks, as follows:



- .3 Level 3 – Steel structure exposed to view in non-public areas, and floor and roof framing located more than 6100 mm (20'-0") above the public, located in semi-concealed areas where appearance and finish are not the prime criteria, and only minor touch-up is required, as follows:



- .4 Level 4 – Steel structure not exposed to view, located in concealed areas where appearance and finish are not the prime criteria, as follows:



- .4 Conduct a pre-installation conference at Project site, agenda shall include:
- .1 Review of requirements of finishing requirements for architecturally exposed steel.
 - .2 Coordination with affected Division 5 Sections and Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials to permit easy access for inspection and identification.
- .2 Keep steel members off ground by using pallets, platforms, or other supports.
- .3 Protect steel members and packaged materials from erosion and deterioration.
- .4 Use special care in handling to prevent twisting or warping of AES members.
- .5 Erect pre-painted finish pieces using padded slings or other methods to protect them from damage arising from handling including, but not limited to, the following:
 - .1 Provide padding as required to protect while rigging and aligning member's frames.

- .2 Weld tabs for temporary bracing and safety cabling only at points concealed from view in the completed structure or where accepted by the Consultant during the pre-installation meeting.
- .3 Submit methods of removing temporary erection devices and finishing, and refinishing pre-painted pieces for review and acceptance by the Consultant prior to erection.

1.6 COORDINATION

- .1 The use of bulk shop primers and temporary coatings for all exterior and interior architecturally exposed steel work will not be permitted unless it forms a part of a painting system specified in Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting.
- .2 Where non-complying primers are used, this section of work shall completely remove deficient primer from surfaces, and prepare and prime surfaces in accordance with the requirements of Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting for painted steel work at no additional cost to the Consultant or Owner.
- .3 Coordinate compatible shop primer for architecturally exposed steel with Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting as follows:
 - .1 This section will be responsible for surface preparation and application of compatible primer systems.
 - .2 Structural steel and metal fabrications fabricator may use painting contractor for application of primer provided that Bid Price is coordinated through Contractor.
 - .3 Metal fabricators will be responsible for applying primer to match shop applied materials at field welds, immediately after completion of welds.
 - .4 Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting will perform minor site touch-up and repair to priming system, and apply finish coats of paint.
 - .5 This method of finishing has been specified to minimize primer and finish coating incompatibility, and to satisfy primer "open-time" limits for proper application of finish coats.
 - .6 The primers specified are intended to form a part of a total system and shall be compatible with and be produced by the same manufacturer as the finish coats.
- .4 Coordinate installation of anchors for AES members that connect to the work of other trades as follows:
 - .1 Furnish setting drawings, templates, and directions for installing anchors, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.
 - .2 Deliver such items to the project site in time for installation.

Part 2 Products

2.1 SHOP FINISHING; NON-ARCHITECTURALLY EXPOSED STEEL

- .1 Clean steel surfaces by removing loose rust, mill scale, spatter, slag and flux deposits, and prepare in accordance with SSPC SP3.

- .2 No additional primer or finishing is required for interior.
- .3 Exterior primer as indicated in Section 09 91 13 - Exterior Painting.

2.2 SHOP PRIMING; ARCHITECTURALLY EXPOSED STEEL

- .1 Primer for Bare Steel: As required by MPI Coating System specified in Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting and as follows:
 - .1 Surface preparation: Minimum SSPC SP3 (interior) or SP6 (exterior) as required by Paint Finish System.
- .2 Primer for Galvanized Steel: As required by MPI Coating System specified in Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting and as follows:
 - .1 Surface preparation: Minimum SSPC SP3 (interior) or SP6 (exterior) as required by Paint Finish System.

2.3 GALVANIZING

- .1 Hot Dip Galvanized Finish: In accordance with ASTM A123/A123M-15 or CAN/CSA G164 to locations indicated; 300 g/m² minimum zinc coating; galvanize components after assembly where size permits.
- .2 Galvanizing Repair Paint: High zinc dust content paint for galvanizing welds and repair painting galvanized steel, with dry film coating not less than 94% zinc dust by weight.
- .3 Repair of Hot Dip Galvanized Finish: In accordance with ASTM A780; clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint.

2.4 SHOP COATINGS

- .1 Zinc Rich Paint: Single component organic zinc anticorrosive primer in accordance with CAN/CGSB 1.181 and as follows:
 - .1 Clean metal to SSPC SP3 (interior) or SP6 (exterior) in accordance with surface preparation requirements and environmental exposure limitations listed in CAN/CGSB 1.181.
 - .2 Apply one (1) coat zinc rich paint to all surfaces exposed after assembly to manufacturer's minimum dry film thickness.
- .2 Apply coating immediately after cleaning.
- .3 Use primer as prepared by manufacturer without thinning or adding admixtures. Paint on dry surfaces, free from rust, scale, grease, do not paint when temperature is below 7°C.
- .4 Do not paint surfaces to be field welded. Prime and apply first finish coat after field welding has been completed, immediately prior to applying final finish coat to completed assembly.

2.5 SHOP CONNECTIONS

- .1 Bolted Connections: Make in accordance with Section 05 05 00 – Common Work Results of Metalwork Finishing and Structural Drawings.
- .2 Provide bolt type and finish as noted herein and align bolt heads as indicated on the accepted shop erection drawings.

- .3 Welded Connections:
 - .1 Comply with CWB requirements.
 - .2 Appearance and quality of welds shall be consistent with the mock up.
 - .3 Assemble and weld built up sections by methods that will maintain alignment of members without warp exceeding the tolerance of this section.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify exposure of steel components, architectural or non-exposed, and finish assemblies as specified.
- .2 Report any discrepancy and potential problem areas to Consultant for direction before commencing finishing operations.

3.2 APPLICATION OF PRIMERS AND COATINGS

- .1 Primer: Spray applied at fabrication shop by this Section, touch up and recoating by Section in Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting, and as follows:
 - .1 Work primer into all corners
 - .2 Touch up bare or worn areas on site after installation.
 - .3 Leave surfaces unpainted as follows:
 - .1 Surfaces that are embedded in concrete or mortar; prime partially embedded members to a depth of 50 mm (2") only.
 - .2 Surfaces that will be field welded.
 - .3 Surfaces that will be high strength bolted with slip critical connections.
 - .4 Surfaces that will receive sprayed applied fire resistant material.
- .2 Field touch up and repair shop primer and galvanized finishes at bolts, welds and burned or scratched surfaces using same primer as applied in shop and coat with zinc paint in accordance with ASTM 780.

3.3 ERECTION, ARCHITECTURALLY EXPOSED STEEL (AES)

- .1 Set AES accurately in locations and to elevations indicated.
- .2 Field welding: Weld profile, quality, and finish shall be consistent with mock-ups accepted prior to fabrication.
- .3 Splice members only where indicated, or where found acceptable by the Consultant.
- .4 Obtain permission for any torch cutting or field fabrication from the Consultant; finish sections thermally cut during erection to a surface appearance consistent with the mock up.
- .5 Do not enlarge unfair holes in members by burning or by using drift pins; ream holes that must be enlarged to admit bolts; replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.

3.4 FIELD CONNECTIONS (AES)

- .1 Bolted Connections: Install bolts of the specified type and finish in accordance with Structural Drawings
- .2 Welded Connections: Comply with CWB procedures for appearance; refer to Section 05 05 00 – Common Work Results for Metalwork and Finishing and Structural Drawings for other requirements, and as follows:
 - .1 Assemble and weld built up sections by methods that will maintain true alignment of axes without warp.
 - .2 Verify that weld sizes, fabrication sequence, and equipment used for AES will limit distortions to allowable tolerances.
 - .3 Obtain Consultant’s acceptance for appearance of welds in repaired or field modified work.

3.5 FIELD QUALITY CONTROL (AES)

- .1 Structural requirements: Testing and inspecting in accordance with Section 05 05 00 – Common Work Results for Metalwork and Finishing for detailed bolt and weld testing requirements.
- .2 AES Acceptance: The Consultant will observe the AES in place and determine acceptability based on the mock up; materials not meeting the standard of workmanship established by the mock up shall be repaired, or removed and replaced at no additional cost to the Owner or Consultant.

3.6 ADJUSTING AND CLEANING

- .1 Touch up Painting: Cleaning and Touch up painting of field welds, bolted connections, and abraded areas of shop paint shall be completed to blend with the adjacent surfaces in accordance with manufacturer’s instructions as specified in Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting.
- .2 Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing in accordance with ASTM A780/A780M-09(2015).

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM A36/A36M-14, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
 - .4 ASTM F1554-17e1, Standard Specification for Anchor Bolts, Steel, 36, 55 and 105 ksi Yield Strength.
 - .5 ASTM F3125/F3125M-15a, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- .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 Manufacturers Association (CPMA).
 - .1 CISC Handbook of Steel Construction, latest edition.
 - .2 CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S16-14, Design of Steel Structures.
 - .3 CSA S136-16, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .4 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel.
 - .5 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
 - .6 CSA W55.3-08(R2013), Certification of Companies for Resistance Welding of Steel and Aluminum.
 - .7 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .5 Master Painters Institute
 - .1 MPI-INT 5.1-08, Structural Steel and Metal Fabrications.
 - .2 MPI-EXT 5.1-08, Structural Steel and Metal Fabrications.
- .6 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International
 - .1 NACE No. 3/SSPC SP-6-07, Commercial Blast Cleaning.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
- .3 Erection drawings:
 - .1 Submit erection drawings indicating 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 bracing.
- .4 Fabrication drawings:
 - .1 Submit fabrication drawings showing designed assemblies, components and connections, stamped and signed by qualified professional engineer licensed in the Province of Alberta, Canada.
- .5 Source Quality Control Submittals:
 - .1 Submit mill test reports 4 weeks prior to fabrication of structural steel.
 - .1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.
 - .2 Provide mill test reports certified by metallurgists qualified to practice in Province of Alberta, Canada.
- .6 Fabricator Reports:
 - .1 Provide structural steel fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.
- .7 Certification
 - .1 Submit proof of certification to CSA W47.1 and/or CSA W55.3.
- .8 Delegated Design Submittals:
 - .1 Submit Letter of Commitment and Letter of Compliance in accordance with Section 05 05 00 Common Work Results for Metals.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.
- .3 Packaging Waste Management: remove for reuse of packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN REQUIREMENTS

- .1 Design details and connections in accordance with requirements of 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 Steel Construction" when connection for shear only (standard connection) is required.
 - .2 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, when shears are not indicated.

2.2 MATERIALS

- .1 Structural steel: to CSA G40.20/G40.21 Grade 350W except plates and angles to 300W.
- .2 Anchor rods: to ASTM F1554, Grade 36.
- .3 Bolts, nuts and washers: to ASTM F3125/F3125M, Grade A325/A325M.
- .4 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
- .5 Shop paint primer: to CISC/CPMA 2-75 solvent reducible alkyd.
- .6 Hot dip galvanizing: galvanize steel, where indicated, to ASTM A123/A123M, minimum zinc coating of 600 g/m².
- .7 Shear studs: to CSA W59, Appendix H.

2.3 FABRICATION

- .1 Fabricate structural steel in accordance with CSA S16.
- .2 Install shear studs in accordance with CSA W59.
- .3 Continuously seal members by continuous welds where indicated.

2.4 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CSA S16.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Where structural steel is to be finish painted, prepare surface according to NACE No.3/SSPC-SP-6.
- .3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness of 50 to 75 micrometers, except:
 - .1 Surfaces to be encased in concrete.
 - .2 Surfaces to receive field installed stud shear connections.
 - .3 Surfaces and edges to be field welded.
 - .4 Faying surfaces of slip-critical connections.
 - .5 Below grade surfaces in contact with soil.

- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .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.

Part 3 Execution

3.1 GENERAL

- .1 Structural steel work: in accordance with CSA S16.
- .2 Welding: in accordance with CSA W59.
- .3 Companies to be certified under Division 1 or 2 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

3.2 MARKING

- .1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When 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.

3.3 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CSA S16.
- .2 Field cutting or altering structural members: to approval of Consultant.
- .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Contractor.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Consultant.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

- .1 Structural Steel: Section 05 12 23

1.2 RELATED DOCUMENTS

- .1 For definitions of Categories AESS 1, 2, 3, 4, and C, refer to the CISC Code of Standard Practice Appendix I.

1.3 SUMMARY

- .1 This Subsection includes requirements regarding the appearance, surface preparation and integration of Architecturally Exposed Structural Steel (AESS) only.

For technical requirements, refer to the other Subsections of Division 5 “Structural Steel” Section.

This Subsection applies to any structural steel members noted on Structural Design Documents as AESS. All AESS members will also be identified by their Category.

- .2 Related Sections: The following Sections contain requirements that may relate to the Subsection:
- .1 Division 1 “Quality Control” Section for independent testing agency procedures and administrative requirements;
 - .2 Division 9 “Painting” Section for finish coat requirements and coordination with primer and surface preparation specified in this Subsection.

1.4 SUBMITTALS

- .1 Submit Electronically.
- .2 Shop Drawings detailing fabrication of AESS components:
- .1 Provide erection drawings clearly indicating which members are considered as AESS members and their Category;
 - .2 Include details that clearly identify all of the requirements listed in sections 2.3 “Fabrication” and 3.3 “Erection” of this specification. Provide connections for AESS consistent with concepts, if shown on the Structural Design Documents;
 - .3 Indicate welds by standard CWB symbols, distinguishing between shop and field welds, and show size, length and type of each weld. Identify grinding, finish and profile of welds as defined herein;
 - .4 Indicate type and finish of bolts. Indicate which side of the connection bolt heads should be placed;
 - .5 Indicate any special tolerances and erection requirements.

1.5 QUALITY ASSURANCE

- .1 Fabricator Qualifications: In addition to those qualifications listed in Section 05 12 23 - Structural Steel for Buildings, Fabricator shall be competent in fabricating AESS similar to that indicated for this Project with sufficient production capacity to fabricate the AESS elements.

- .2 Erector Qualifications: In addition to those qualifications listed in Section 05 12 23 - Structural Steel for Buildings, Erector shall have completed comparable AESS work.
- .3 Comply with applicable provisions of the following specification documents:
 - .1 CISC Code of Standard Practice, latest edition.
- .4 Visual samples when specified will include any of the following:
 - .1 3-D rendering of specified element;
 - .2 Physical sample of surface preparation and welds;
 - .3 First off inspection: First element fabricated for use in finished structure subject to alterations for subsequent pieces.
 - .4 Mockups: As specified in Structural Design Document. Mockups are either scaled or full-scale. Mockups are to demonstrate aesthetic effects as well as qualities of materials and execution:
 - a. Mockups may have finished surface (including surface preparation and paint system);
 - b. The Consultant's approval of mockups is required before starting fabrication of final units;
 - c. Mockups are retained until project is completed;
 - d. Approved full-scale mockups may become part of the completed work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Ensure that all items are properly prepared, handled and/or packaged for storage and shipping to prevent damage to product.
- .2 Erect finished pieces using softened slings or other methods such that they are not damaged. Provide padding as required to protect while rigging and aligning members and frames. Weld tabs for temporary bracing and safety cabling only at points concealed from view in the completed structure or where approved by the Consultant.

Part 2 Products

2.1 MATERIALS

- .1 General: Meet requirements of Section 05 12 23 - Structural Steel for Buildings.

2.2 SPECIAL SURFACE PREPARATION

- .2 Primers: Meet requirements of Section 05 12 23 - Structural Steel for Buildings.

2.3 FABRICATION

- .1 For the special fabrication characteristics, see Table I1 in the CISC Code of Standard Practice - AESS Category Matrix.
- .2 Fabricate and assemble AESS in the shop to the greatest extent possible. Locate field joints in AESS assemblies in concealed locations or as approved by the Consultant.

- .3 Fabricate AESS with surface quality consistent with the AESS Category and visual samples if applicable.

2.4 SHOP CONNECTIONS

- .1 Bolted Connections: Make in accordance with Section 05 12 23. Provide bolt type and finish as specified and place bolt heads as indicated on the approved shop drawings.
- .2 Welded Connections: Comply with CSA W59 and Section 05 12 23. Appearance and quality of welds shall be consistent with the Category and visual samples if applicable. Assemble and weld built-up sections by methods that will maintain alignment of members to the tolerance of this Subsection.

Part 3 Execution

3.1 EXAMINATION

- .1 The erector shall check all AESS members upon delivery for twist, kinks, gouges or other imperfections, which might result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

3.2 PREPARATION

- .1 Provide connections for temporary shoring, bracing and supports only where noted on the approved shop erection drawings. Temporary connections shown shall be made at locations not exposed to view in the final structure or as approved by the Consultant. Handle, lift and align pieces using padded slings and/or other protection required to maintain the appearance of the AESS through the process of erection.

3.3 ERECTION

- .1 Set AESS accurately in locations and to elevations indicated, and according to CSA S16.
- .2 In addition to the special care used to handle and erect AESS, employ the proper erection techniques to meet the requirements of the specified AESS Category:
 - .1 AESS Erection tolerances; Erection tolerances shall meet the requirements of the standard frame tolerances for structural steel per CSA S16.
 - .2 Bolt Head Placement: All bolt heads shall be placed as indicated on the structural design document. Where not noted, the bolt heads in a given connection shall be placed on one side.
 - .3 Removal of field connection aids: Run-out tabs, erection bolts and other steel members added to connections to allow for alignment, fit-up and welding in the field shall be removed from the structure. Welds at run-out tabs shall be removed to match adjacent surfaces and ground smooth. Holes for erection bolts shall be plug welded and ground smooth where specified.
 - .4 Filling of connection access holes: Filling shall be executed with proper procedures to match architectural profile, where specified.
 - .5 Field Welding: Weld profile, quality, and finish shall be consistent with Category and visual samples, if applicable, approved prior to fabrication.

3.4 FIELD CONNECTIONS

- .1 Bolted Connections: Make in accordance with Section 05 12 23. Provide bolt type and finish as specified and place bolt heads as indicated on the approved shop drawings.
- .2 Welded Connections: Comply with CSA W59 and Section 05 12 23. Appearance and quality of welds shall be consistent with the Category and visual samples if applicable. Assemble and weld built-up sections by methods that will maintain alignment of members to the tolerance of this Subsection.
 - .1 Assemble and weld built-up sections by methods that will maintain alignment of axes. Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances.

3.5 REVIEW BY THE CONSULTANT

- .1 The Consultant will review the AESS steel in place and determine acceptability based on the Category and visual samples (if applicable). The Fabricator/Erector shall advise the Consultant the schedule of the AESS Work.

3.6 ADJUSTING AND CLEANING

- .1 Touch-up Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint shall be completed to blend with the adjacent surfaces of AESS. Such touchup work shall be done in accordance with manufacturer's instructions.
- .2 Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.
- .2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)
 - .1 CISC/CPMA 2-75, Quick-Drying Primer for Use on Structural Steel.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S16-14, Design of Steel Structures.
 - .3 CSA S136-16, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .4 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel.
 - .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .4 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for steel joist framing and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
 - .2 Indicate on erection drawings, relevant details such as joist mark, depth, spacing, bridging lines, bearing, anchorage and details.
 - .3 Indicate particulars, on shop drawings, relative to joist geometry, framed openings, splicing details, bearing and anchorage. Include member size, properties, specified and factored member loads, and stresses under various loadings, deflection and camber.
- .4 Delegated Design Submittals:
 - .1 Submit calculations and joist design drawings for typical joists to Consultant for review at least 4 weeks prior to fabrication and/or delivery.
 - .2 Submit Letter of Commitment and Letter of Compliance in accordance with Section 05 05 00 Common Work Results of Metals.

1.3 QUALITY ASSURANCE

- .1 Submit mill test reports at least 4 weeks prior to fabrication of steel joists and accessories. Reports to show:
 - .1 Chemical and physical properties.
 - .2 Other details of steel to be incorporated into work.
 - .3 Certification by qualified metallurgists confirming that tests conform to requirements of CSA G40.20/G40.21.
- .2 Submit affidavit prepared by fabricator of structural steel joists stating that materials and products used in fabrication conform to this specification.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Design steel joists and bridging to carry loads indicated on drawings, to CSA S16.
- .2 Design joists, bridging and anchorages for uplift forces as indicated.
- .3 Ensure joists are manufactured to consider load effects due to fabrication, erection and handling.
- .4 Limit roof joist deflection due to specified live load to 1/360 maximum of span.

2.2 MATERIALS

- .1 Open web steel joists: to CSA S16.
- .2 Structural steel: to CSA G40.20/G40.21.
- .3 Welding materials: to CSA W59.
- .4 Shop paint primer: to CISC/CPMA 2-75.

2.3 FABRICATION

- .1 Fabricate steel joists and accessories as indicated in accordance with CSA S16.

- .2 Weld in accordance with CSA W59.
- .3 Provide bottom chord extensions where indicated.
- .4 Provide diagonal and horizontal bridging and anchorages as indicated.

2.4 SHOP PAINTING

- .1 Clean, prepare and shop prime surfaces of steel joists to CSA S16.
- .2 Clean members of loose mill scale, rust, oil, dirt and other foreign matter.
- .3 Apply one coat of primer to steel surfaces to achieve dry film thickness of .065 mm to .080 mm. except surfaces to receive spray fireproofing.
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .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.

Part 3 Execution

3.1 INSTALLATION

- .1 Steel joist framing: to CSA S16.
- .2 Welding: to CSA W59.
- .3 Ensure installers are certified to CSA W47.1 for fusion welding.
- .4 Submit certification that welded joints are qualified by Canadian Welding Bureau.

3.2 FIELD QUALITY CONTROL

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Owner.
- .2 Testing laboratory will inspect representative joists for integrity, accuracy of fabrication and soundness of welds.

3.3 ERECTION

- .1 Erect steel joists and bridging as indicated to CSA S16.
- .2 Complete installation of bridging and anchorages before placing construction loads on joists.
- .3 Field cutting or altering joists or bridging: to approval of Consultant.
- .4 Clean and touch up shop primer to bolts, welds, burned or scratched surfaces at completion of erection.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A653/A653M-17, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M-10(2015), Standard 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 S16-14, Design of Steel Structures.
 - .2 CSA S136-16, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .3 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel.
 - .4 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI 10M-13, Standard for Steel Roof Deck.
 - .2 CSSBI 12M-17, Standard for Composite Steel Deck.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11-2015, Edition 3.2, Paints, Coatings, Stains, and Sealers.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for steel decking and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
 - .2 Submit design calculations if requested by Consultant.
 - .3 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.
- .4 Delegated Design Submittals:
 - .1 Submit Letter of Commitment and Letter of Compliance in accordance with Section 05 05 00 Common Work Results for Metals.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect decking from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse of padding as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Design steel deck to CSA S136.
- .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 1/360 of span.

2.2 MATERIALS

- .1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM A653/A653M structural quality Grade 230, with ZF75 coating, for interior surfaces not exposed to weather, unpainted finish, 0.76 mm minimum base steel thickness.
- .2 Decks to be painted: zinc-iron alloy coated decks suitable for finish painting.
- .3 Closures: in accordance with manufacturer's recommendations.
- .4 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm minimum. Metallic coating same as deck material.
- .5 Primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .6 Acoustic Closures: 25 mm thick, closed cell foam rubber, profiled to deck corrugations.

2.3 TYPES OF DECKING

- .1 Steel roof deck: 0.76 mm minimum base steel thickness, interlocking side laps.
- .2 Closure Strips, Flashing, Cover Plates: 0.76 mm minimum thickness base sheet steel, coating to match deck, or required profiles and sizes.

Part 3 Execution

3.1 INSTALLATION

- .1 Steel decking work: in accordance with CSA S136.
- .2 Welding: in accordance with CSA W59, except where specified otherwise.
- .3 Companies to be certified under Division 1 or 2 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.2 ERECTION – GENERAL

- .1 Erect steel deck as indicated and in accordance with CSA S136.
- .2 Butt ends: to 1.5 to 3 mm gap. Install steel cover plates over gaps wider than 3 mm.
- .3 Locate all end joints over support. Minimum end bearing on steel supports: 38 mm. Lap ends: 50 mm minimum.
- .4 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

3.3 ROOF DECK INSTALLATION

- .1 Fasten roof deck to all supports with 20 mm diameter fusion welds at 300 mm on centre, unless noted.
- .2 Mechanically fasten side laps at 300 mm on centre by button punching.
- .3 Install 150 mm minimum width continuous cover plates where deck changes direction. Weld or screw in place at 300 mm on centre maximum.
- .4 Install angle or channel closures full length on all deck edges at perimeter, walls and openings.
- .5 Fasten deck to provide structural diaphragm in accordance with requirements shown on drawings.
- .6 Install acoustical closures over walls and partitions.

3.4 CLOSURES

- .1 Install closures in accordance with approved details.

3.5 OPENINGS AND AREAS OF CONCENTRATED LOADS

- .1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.
- .2 Reinforce openings between 150 to 450 mm in any dimension with 51 x 51 x 6.4 mm steel angles. Place angles at right angles to ribs and weld to a minimum of two flutes each side of opening.

- .3 For deck openings with any one dimension greater than 450 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.6 CONNECTIONS

- .1 Install connections in accordance with CSSBI recommendations as indicated.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

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

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M-17, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc- Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM A792/A792M-10(2015), Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .4 ASTM C1007-11a(2015), Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
 - .5 ASTM C955-18e1, Standard Specification for Cold-Formed Steel Structural Framing Members.
- .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 W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel Structures.
 - .2 CSA W55.3-08(R2013), Certification of Companies for Resistance Welding of Steel and Aluminum.
 - .3 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
 - .4 CSA S136-16, North American Specification for the Design of Cold-Formed Steel Structural Members.
- .4 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI 51-06, Lightweight Steel Framing Design Manual.
 - .2 CSSBI Fact Sheet SSF 03-17, Care and Maintenance of Prefinished Sheet Steel Building Products.
 - .3 CSSBI Technical Bulletin Vol. 7, No. 2 (September 2011), Standard Thicknesses for Canadian Lightweight Steel Framing Applications.
 - .4 CSSBI S5-11, Guide Specification for Wind Bearing Steel Studs.
- .5 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural metal studs and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta.
 - .2 Indicate design loads, member sizes, materials, design thickness exclusive of coatings, coating specifications, connection and bracing details, screw sizes and spacing, and anchors.
 - .3 Indicate locations, dimensions, openings and requirements of related work.
 - .4 Indicate welds by welding symbols as defined in CSA W59.
- .4 Delegated Design Submittals:
 - .1 Submit Letter of Commitment and Letter of Compliance in accordance with Section 05 05 00 Common Work Results of Metals.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect structural metal studs from nicks, scratches, and blemishes.
 - .3 Protect steel studs during transportation, site storage and installation in accordance with CSSBI SSF 03-17.
 - .4 Handle and protect galvanized materials from damage to zinc coating.
 - .5 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Design structural metal stud framing to carry loads indicated on drawings, to CSA S136.
- .2 Ensure studs are manufactured to consider load effects due to fabrication, erection and handling.
- .3 Wind load deflection shall not exceed 1/720 of span where studs are used as backup for masonry veneer and 1/360 of span elsewhere.

2.2 MATERIALS

- .1 Steel: to CSA S136, fabricated from ASTM A653/A653M Grade 230 steel.
- .2 Zinc coated steel sheet: quality to ASTM A653/A653M, with Z180 designation coating.

- .3 Welding materials: to CSAW59 and certified by Canadian Welding Bureau.
- .4 Screws: pan head, self-drilling, self-tapping sheet metal screws, corrosion protected with minimum zinc coating thickness of 0.008 mm.
- .5 Anchors: concrete expansion anchors or other suitable drilled type fasteners.
- .6 Bolts, nuts, washers: hot dipped galvanized to ASTM A123/A123M, 380 g/m² zinc coating.
- .7 Touch up primer: zinc rich, to CAN/CGSB-1.181, MPI #18.
- .8 Acoustical sealant: in accordance with Section 07 92 00 – Joint Sealing.
- .9 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

2.3 STEEL STUD DESIGNATIONS

- .1 Colour code: to CSSBI Technical Bulletin Vol.7, No. 2.

2.4 METAL FRAMING

- .1 Steel studs: to ASTM C955 and CSA S136, fabricated from metallic coated steel, depth as indicated.
 - .1 Minimum steel thickness of 0.84 mm.
- .2 Stud tracks: fabricated from same material and finish as steel studs, depth to suit.
 - .1 Bottom track: single piece.
 - .2 Top track: 2 piece telescoping.
- .3 Bridging: fabricated from same material and finish as studs, 38 x 12 x 1.09 mm minimum thickness.
- .4 Angle clips: fabricated from same material and finish as studs, 38 x 38 mm x depth of steel stud, 1.37 mm minimum thickness.
- .5 Tension straps and accessories: as recommended by manufacturer.

2.5 SOURCE QUALITY CONTROL

- .1 Ensure mill reports covering material properties are reviewed by Consultant.

Part 3 Execution

3.1 GENERAL

- .1 Weld in accordance with CSA W59.
- .2 Certification of companies: to CSA W47.1 for fusion welding, CSA W55.3 for resistance welding.
- .3 Do structural metal stud framing work to CSSBI S5.

3.2 ERECTION

- .1 Erect components to requirements of reviewed shop drawings.

- .2 Anchor tracks securely to structure at 600 mm on centre maximum, unless lesser spacing prescribed on shop drawings.
- .3 Erect studs plumb, aligned and securely attached with 2 screws minimum.
- .4 Seat studs into bottom tracks, 2 piece telescoping top track.
- .5 Install 50 mm minimum telescoping track at top of walls where required to accommodate vertical deflection.
 - .1 Nest top track into deflection channel minimum of 30 mm and maximum of 40 mm.
 - .2 Do not fasten tracks together.
 - .3 Stagger joints.
- .6 Install studs at not more than 50 mm from abutting walls, and each side of openings, corners and terminations with dissimilar materials.
- .7 Brace steel studs with horizontal internal bridging at 1500 mm maximum.
 - .1 Fasten bridging to steel clips fastened to steel studs with screws or by welding.
- .8 Frame openings in stud walls to adequately carry loads by use of additional framing members and bracing as detailed on shop drawings.
- .9 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .10 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .11 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud walls.
- .12 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .13 Touch up welds with coat of zinc rich primer.

3.3 ERECTION TOLERANCES

- .1 Plumb: not to exceed 1/500th of member length.
- .2 Camber: not to exceed 1/1000th of member length.
- .3 Spacing: not more than +/- 3 mm from design spacing.
- .4 Gap between end of stud and track web: not more than 4 mm.

3.4 CUTOUTS

- .1 Maximum size of cutouts for services as follows:

Member Depth	Across Member Depth	Along Member Length	Centre to Centre Spacing (mm)
92	40 max.	105 max.	600 min.
102	40 max.	105 max.	600 min.
152	65 max.	115 max.	600 min.

- .2 Limit distance from centerline of last unreinforced cutout to end of member to not less than 300 mm.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 09 91 13 – Exterior Painting
- .2 Section 09 91 23 – Interior Painting
- .3 Section 09 97 19 – Painting Exterior Metal Surfaces

1.2 REFERENCES STANDARDS

- .1 ASTM International
 - .1 ASTM A53/A53M-18, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A269/A269M-15a, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .4 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts, Studs and Threaded Rod 60 000 PSI Tensile Strength.
 - .5 ASTM A653/A653M-17, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 CSA International
 - .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S16-14, Design of Steel Structures.
 - .3 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .4 CSA W59-18, Welded Steel Construction (Metal Arc Welding) [Metric].
- .3 Green Seal Environmental Standards (GS)
 - .1 GC-03- Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, January 7, 1997
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 The Master Painters Institute (MPI)
 - .1 Master Painters Institute Green Performance Standard GPS-1-08.
- .6 Specialty Steel Industry of North America (SSINA)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Submit copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
 - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Canada.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - .3 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage and waste diversion requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that construction wastes were recycled or salvaged.
 - .4 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer, pre-consumer content, and total cost of materials for project.
 - .5 Regional Materials: submit evidence that project incorporates regional materials and products.
 - .6 Low-Emitting Materials:
 - .1 Submit listing of paints and coatings used in building, comply with VOC and chemical component limits or restrictions requirements.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections: to CSA G40.20/G40.21, Grade 350W.
- .2 Steel plates: to CSA G40.20/G40.21, Grade 300W.
- .3 Steel pipe: to ASTM A53/A53M
- .4 Welding materials: to CSA W59.
- .5 Welding electrodes: to CSA W48 Series.
- .6 Bolts and anchor bolts: to ASTM A307.
- .7 Stainless steel tubing: to ASTM A269, seamless welded with AISI No. 4 finish.
- .8 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164, ASTM A123/A123M.
- .2 Shop coat primer: in accordance with chemical component limits and restrictions requirements and VOC limits of GC-03.
- .3 Zinc primer: zinc rich, ready mix in accordance with chemical component limits and restrictions requirements and VOC limits of GC-03.

2.4 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.5 SHOP PAINTING

- .1 Primer: VOC limit 250 g/L maximum to GC-03.

- .2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .4 Clean surfaces to be field welded; do not paint.

2.6 ANGLE LINTELS AND BRICK ANGLES

- .1 Steel angles: galvanized, sizes provided for openings full length and full length of masonry veneers.
- .2 Finish: galvanized to ASTM A123/A123M

2.7 BOLLARDS

- .1 Steel HSS: prime painted, sizes indicated on drawings.
- .2 Finish: shop primed. Plastic pipe sleeves, refer to section 10 80 00 – Miscellaneous Specialties.

2.8 SITE SIGN SUPPORTS

- .1 Steel HSS: prime painted.
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.9 GARBAGE ENCLOSURE MEMBERS

- .1 Steel HSS: prime painted, sizes indicated on drawings.
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.10 TRANSFORMER AND GAS METER ENCLOSURE MEMBERS

- .1 Steel HSS: prime painted, sizes indicated on drawings.
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.11 OVERHEAD DOOR CONTROL POST

- .1 Steel plate and pipe: prime painted, sizes indicated on drawings
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.12 OVERHEAD DOOR JAMB AND HEADER

- .1 Steel plate: prime painted, sizes indicated on drawings
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.13 OVERHEAD DOOR CHAIN ENCLOSURES

- .1 Bent steel plate and lock hasp: prime painted, sizes indicated on drawings
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.14 OVERHEAD DOOR TRACK ENCLOSURES

- .1 Steel plate: prime painted, sizes indicated on drawings
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.15 SLAB EDGE STEEL ANGLE

- .1 Fabricated from 16 ga. prefinished metal.
- .2 Finish: galvanized to ASTM A123/A123M

2.16 GUN RACK LOCK BAR

- .1 Steel bar with slots as detailed.
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.17 MISCELLANEOUS SUPPORT STEEL

- .1 Steel angles, plates, HSS tubes fabricated to support millwork writing desks, benches, and open work stations.
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.18 DUAL COMPARTMENT SUMP PITS LIDS AND GRATING

- .1 Fabricate steel from raised pattern plated set in steel angle frame and lids. Include anchors at 300 mm on centre for embedding steel angle frame in concrete. Supply trench covers in 1200 mm maximum removable lengths.
- .2 Finish: galvanized to ASTM A123/A123M

2.19 STAINLESS STEEL COUNTERTOP

- .1 Fabricate stainless steel, 3 mm thick, with 100 mm high backsplash at millwork as noted.
- .2 Weld lengths together as necessary for single piece appearance.
- .3 Finish: stainless steel, brushed.

2.20 SHIPS LADDER RAILINGS

- .1 Steel HSS tubes for metal pipes fabricated to construct ships ladder railings.
- .2 Finish: shop painted.

- .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

2.21 CORNER GUARDS

- .1 Steel brake shape L and U shapes at outside corners of walls.
 - .1 3 mm thick.
 - .2 50 mm legs on L shapes.
 - .3 Fit to wall thickness with 50 mm legs on U shapes.
- .2 Finish: stainless steel, brushed.

2.22 PERFORATED METAL SCREENS

- .1 Perforated metal on steel posts.
- .2 Finish: shop painted and repainted after perforations completed.
 - .1 Primer: VOC limit 250 g/L maximum to GC-03 when applied onsite.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications 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.

3.2 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 plywood backing, anchor clips, bar anchors, and expansion bolts and shields.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Weld field connection.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of installation:

- .1 Primer: maximum VOC limit 250 g/L to GC-03.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
 - .1 Primer: maximum VOC limit 250 g/L to GC-03.

3.3 SHIPSLADDER

- .1 Install shipsladders with railings in locations as indicated.
- .2 Erect ladders clear of wall on bracket supports.

3.4 CHANNEL FRAMES

- .1 Install steel channel frames to openings as indicated.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 40 00 – Shop Fabricated Architectural Woodwork
- .2 Section 09 21 16 – Gypsum Board Assemblies
- .3 Section 09 22 16 – Non-Structural Metal Framing

1.2 REFERENCES STANDARDS

- .1 American Wood-Preservers' Association (AWPA)
 - .1 AWWA M2-16, Standard for the Inspection of Preservative Treated Products for Industrial Use.
 - .2 AWWA M4-15, Standard for the Care of Preservative-Treated Wood Products.
- .2 ASTM International
 - .1 ASTM E119-16a, Standard Test Method for Fire Tests of Building Construction and Materials.
- .3 CSA International
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O80 Series-15, Wood Preservation.
 - .3 CSA O121-17, Douglas Fir Plywood.
 - .4 CSA O141-05 (R2014), Softwood Lumber.
 - .5 CSA O151-17, Canadian Softwood Plywood.
 - .6 CAN/CSA-O325-16, Construction Sheathing.
 - .7 CAN/CSA-Z809-08 (R2013), Sustainable Forest Management.
- .4 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001 (Version 4-0), FSC Principle and Criteria for Forest Stewardship.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11 3rd Edition (2011), Paints and Coatings.
- .6 National Institute of Justice
 - .1 NIJ 018.01, Ratings of Bullet Resistant Materials.
- .7 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2016, Architectural Coatings.
- .9 Sustainable Forestry Initiative (SFI)

- .1 SFI-2015-2019, Standard and Rules.
- .10 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 UL 752, Standard for Bullet-Resisting Equipment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for rough carpentry work and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.
 - .2 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
 - .3 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
 - .4 Low-Emitting Materials:
 - .1 Submit listing of paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.
 - .2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, laminate adhesives used in building, stating that they contain no urea-formaldehyde.

1.4 MAINTENANCE MATERIALS SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19 mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

1.5 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.
- .4 Sustainable Standards Certification:
 - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for of pallets, banding, as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 - Construction Waste Management.

Part 2 Products

2.1 MATERIALS

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, backing, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.
- .3 Panel Materials:
 - .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .1 Urea-formaldehyde free.
 - .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .1 Urea-formaldehyde free.

- .3 Plywood, wood based composite panels: to CAN/CSA-O325.
 - .1 Urea-formaldehyde free.
- .4 Wood Preservative:
 - .1 Surface-applied wood preservative: copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
 - .2 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an appropriate sealer.
- .5 Fire-retardant coated wood: to CAN/ULC-S102:
 - .1 Flame Spread Classification: not more than 20.
 - .2 Smoke developed: not more than 15.
 - .3 Interior use on surface mounted electrical panel plywood in rooms 146 and 184.
 - .4 Finish: white.
- .6 Primers, Paints: in accordance with manufacturer's recommendations for surface conditions:
 - .1 Comply with GS-11 SCAQMD Rule 1113.

2.2 ACCESSORIES

- .1 Fasteners: to CAN/CSA-G164, for exterior work pressure- preservative, treated lumber.
- .2 Wood screws: plain type and size to suit application.
- .3 Nails, spikes and staples: to CSA B111.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry 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.

3.2 PREPARATION

- .1 Application of Preservatives:
 - .1 Treat surfaces of material with wood preservative, before installation.

- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one (1) minute soak on plywood.
 - .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
 - .4 Treat material as indicated and as follows:
 - .5 Wood parapet caps, and eaves trough slopes
- .2 Application for Fire-retardant:
- .1 Treat plywood by pressure impregnation with fire-retardant chemicals in accordance with CAN/ULC-S102.
 - .2 Apply fire-retardant by brush, roller or sprayer to 0.8 mm minimum thickness on exposed surface and edges before installation.

3.3 INSTALLATION

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes.
- .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .4 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .5 Countersink bolts where necessary to provide clearance for other work.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 40 00 – Shop Fabricated Architectural Woodwork
- .2 Section 09 91 23 – Interior Painting

1.2 REFERENCES STANDARDS

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.2-16, Medium Density Fibreboard (MDF) for Interior Applications.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Standards (Edition 2) and Errata.
- .3 ASTM International
 - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .4 CSA International
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O121- 17, Douglas Fir Plywood.
 - .3 CSA O141- 05 (R2014), Softwood Lumber.
 - .4 CSA O151- 17, Canadian Softwood Plywood.
 - .5 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001 (version 4-0) EN, FSC Principle and Criteria for Forest Stewardship.
- .6 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2014.
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168- A2005, Adhesives and Sealants Applications.
- .8 Sustainable Forestry Initiative (SFI)
 - .1 SFI- 2015-2019, Standards and Rules.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for MDF plywood and include product characteristics, performance criteria, physical size, finish, and limitations.

- .2 Submit two (2) copies of WHMIS MSDS in accordance with 01 35 43 – Environmental Procedures.
- .3 Shop Drawings:
 - .1 Indicate details of construction, profiles, jointing, fastening, and other related details.
 - .2 Indicate materials, thicknesses, finishes and hardware.
- .4 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into Work.
 - .3 Submit duplicate 100 x 300 mm sample of Maple planks.
- .5 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
- .6 Test and Evaluation Reports: Submit certified test reports for composite wood from approved independent testing laboratories, indicating compliance with Specifications for specified performance characteristics and physical properties.
- .7 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit Project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Regional Materials: Submit evidence that Project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for Project.
 - .3 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants used in building, showing compliance with VOC and chemical component limits or restrictions requirements.
 - .2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, laminate adhesives used in building, stating that they contain no urea-formaldehyde.

1.4 QUALITY ASSURANCE

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

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements with manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood products from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for of pallets, banding, as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 – Construction Waste Management.

Part 2 Products

2.1 MATERIALS

- .1 Softwood Lumber: S4S, moisture content 19% or less in accordance with following standards:
 - .1 CSA O141.
 - .2 CAN/CSA-Z809 or FSC or SFI certified.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
 - .4 AWMAC premium grade, moisture content as specified.
 - .5 Machine stress-rated lumber is acceptable.
 - .6 Hardwood lumber: moisture content 12% or less in accordance:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC premium grade, moisture content as specified.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Panel Material: urea-formaldehyde free
 - .1 CAN/CSA-Z809 or FSC or SFI certified.
 - .2 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .4 Medium density fibreboard (MDF): to ANS/A208.2, density 640-800 Kg m³.

2.2 ACCESSORIES

- .1 Wood screws:
 - .1 Plain, type and size to suit application.
 - .2 Tamperproof screws for millwork in rooms 114 to 132.
- .2 Splines: Metal.
- .3 Adhesive and Sealants: in accordance with Section 07 92 00 – Joint Sealants.
 - .1 Comply with VOC limit SCAQMD Rule 1168 GS-36.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Do finish carpentry to Quality Standards of (AWMAC).
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .3 Form joints to conceal shrinkage.

3.3 CONSTRUCTION

- .1 Fastening:
 - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 08 99 – Rough Carpentry for Minor Works

1.2 ACTION AND INFORMATION SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 0 – Submittal Procedures prior to fabrication; do not fabricate any work until required submittals are reviewed and accepted by the Consultant.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Product Data: Submit product data for each type of product indicated including, but not limited to, the following:
 - .1 Cabinet hardware and accessories
 - .2 Finishing materials and processes
 - .3 Manufactured hardboard, medium density fibreboard
 - .4 High pressure decorative laminate and adhesive for bonding decorative laminate
 - .5 Low pressure decorative laminate
 - .6 Solid surfacing material
 - .2 Shop Drawings: Submit shop drawings indicating location of each item referenced to actual site dimensions, dimensioned plans and elevations, large scale details and thickness of materials, attachment devices, scribe strip locations, locations of exposed fastenings and other components as applicable to the work of this Section.
 - .1 Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
 - .2 Submit shop drawings to the local AWMAC Chapter office for review and commentary before work commences.
 - .3 Samples for Verification: Submit two (2) samples prior to fabrication of casework as follows; accepted samples will form the standard of acceptance for the remainder of the work:
 - .1 High Pressure Decorative Laminate Clad Panel Products: Laid-up on specified core material, 300 mm x 300 mm for each type, colour, pattern, and surface finish.
 - .2 Low Pressure Decorative Overlay (Melamine) Surfaced Panel Products: Laid-up on specified core material, 300 mm x 300 mm for each type, colour, pattern, and surface finish.
 - .3 Solid Surfacing Materials: 150 mm square for each type, colour, pattern, and surface finish.
 - .4 Exposed Cabinet Fasteners, Hardware and Accessories: One unit for each type and finish.

1.3 REFERENCE STANDARDS

- .1 National Electrical Manufacturers Association
 - .1 ANSI/NEMA LD3-2005, High Pressure Decorative Laminates (HPDL).
- .2 CSA International
 - .1 CAN3 A172M79(R1996), High Pressure Paper Base, Decorative Laminates.

1.4 PROJECT CLOSEOUT SUBMISSIONS

- .1 Submit three (3) copies of Project Record Sheet identifying the following:
 - .1 Project title and address
 - .2 Owner, Consultant, Construction Manager, and casework Trade Contractor
 - .3 Materials and finishes used for casework and whether shop finished or site finished and by whom
 - .4 Type and source of cabinet hardware and any specialty items used under casework

1.5 QUALITY ASSURANCE

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Project Quality Standard: Architectural Woodwork Standard (AWS) published by the Architectural Woodwork Manufacturers Association of Canada, together with authorized additions and amendments will be used as a reference standard and forms part of this project specification, and as follows:
 - .1 Modifications made in this Section that change the requirements of the AWS will govern in case of conflict.
 - .2 References to Economy, Custom or Premium Grade in this specification are as defined in the AWS; any item not given a specific quality grade will be Premium Grade as defined in the AWS.
 - .3 Provide a copy of the AWS for reference purposes on the job site.
 - .4 References in this specification to part and item numbers mean those parts and items contained within the AWS.

1.6 MOCK-UPS

- .1 Provide a full size mock-up of standing trim to the job site for review by the Consultant, and as follows:
 - .1 Mock-up shall include all materials, finishes as specified and form part of work once approved.
 - .2 The accepted mock-up shall remain on site under a protective covering and will be used as the standard for the work.

1.7 DELIVERY STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver woodwork materials only when building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period, as follows:
 - .1 Deliver, store, and handle casework in accordance with AWS Section 2 Care and Storage.
 - .2 Delivered materials that are damaged in any way or do not comply with these specifications will be rejected by the Consultant; remove rejected materials from job site and replace with acceptable materials.

1.8 SITE CONDITIONS

- .1 Site Measurements: Verify dimensions by site measurements before fabrication and indicate measurements on Shop Drawings where casework is indicated to fit walls and other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work; locate concealed framing, blocking, and reinforcements that support woodwork by site measurements before being enclosed and indicate measurements on Shop Drawings.
- .2 Established Dimensions: Establish dimensions and proceed with fabricating casework without confirmed site measurements where site measurements cannot be made without delaying the Work; coordinate with the construction to ensure that actual dimensions correspond to established dimensions; allow for trimming and fitting.
- .3 Ambient Conditions: Maintain area or room in which casework is being installed at a uniform temperature and humidity for 24 hours prior to, during and after installation in accordance with AWS for relative humidity and moisture content; provide additional lighting to maintain a minimum of 430 lx on surfaces and areas where casework is being installed.

1.9 WARRANTY

- .1 Special Warranty: Provide AWMAC Guaranty and Inspection Service (GIS) in as follows:
 - .1 Work of this Project will be subject to the AWMAC Guaranty and Inspection Service (GIS) and will be inspected by an AWMAC approved and appointed inspector.
 - .2 Architectural woodwork will be inspected at the plant and at the site; inspector will make recommendations based on the referenced AWS.
 - .3 Replace, rework or refinish casework as directed by the AWMAC inspector at no additional cost to the Owner.
 - .4 Include costs for GIS as a part of the price for this Project.
- .2 Term of Special Warranty: Provide a two (2) year Maintenance Bond *or* an AWMAC Guaranty Certificate as follows:
 - .1 Maintenance Bond: Provide a maintenance bond to the full value of the casework for this Project, certifying that the casework has been manufactured and installed in accordance with the standards incorporated in the AWS.

- .2 Guaranty Certificate: Owner will accept the AWMAC guaranty certificate from AWMAC members in good standing at the time of bidding through to Project completion instead of the maintenance bond.
- .3 The maintenance bond or guaranty certificate shall cover replacing, reworking or refinishing to make good defects in casework arising from faulty workmanship or defective materials supplied that become apparent during a two (2) year period following the date of Substantial Performance for the Project.

Part 2 Products

2.1 MATERIALS

- .1 Use clean stock for each type of woodwork and quality grade specified in accordance with AWS.
- .2 Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 8% moisture content.
- .3 Anchors: Select material, type, size, and finish required for each substrate for secure anchorage:
 - .1 Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance.
 - .2 Provide toothed steel or lead expansion sleeves for drilled-in-place anchors.
- .4 Lumber Materials: Provide lumber materials meeting requirements for moisture content and Premium Grade in accordance with AWS Section 3, and as follows:
 - .1 Non-Exposed Softwood: Fabricator's option, meeting requirements of CAN/CSA O141, kiln dried; dressed 4 sides.
- .5 Panel Materials: Provide panel materials meeting requirements for moisture content and Premium Grade in accordance with AWS Section 4, and as follows:
 - .1 Medium Density Fibreboard (MDF): Meeting ASTM D1037 and ANSI A208.2, Premium Grade for interior use, minimum 700 kg/m³ density; formaldehyde emissions shall be 0.30 ppm or less per 0.424m²/m³ of room volume .
 - .2 Fir Plywood: Meeting CSA O121 or CSA O151, cross-banded, sanded G2S, thickness as indicated.
 - .3 Hardboard: Meeting CAN/CGSB-11.3, Type 2, minimum density 500 kg/m³, tempered hardboard (Masonite), 6 mm nominal thickness unless noted otherwise, one face smooth finish; colour as selected by Consultant from manufacturer's full range.
- .6 Decorative Laminate Finishes: Grades and applications in accordance with AWS Section 4, and as follows:
 - .1 High Pressure Decorative Laminate (HPDL): Meeting CAN3 A172 or ANSI/NEMA LD3 composed of phenolic resin impregnated Kraft paper filler stock for Class 1 Decorative Laminate of Grade required by woodwork quality standard; colour as selected by Consultant and as follows:
 - .1 Self Edging Work: General Purpose Grade, HGS standard duty.
 - .2 Liner Sheet Work: Same as for self edging work.

- .3 Backing Sheet Work: BKL backing material, thickness as recommended by manufacturer to prevent warpage of surfaces, sanded on one side; furniture finish, solid white colour.
- .7 Adhesives: Decorative laminate: polyvinyl acetate or aliphatic resin in accordance with manufacturer's recommendation for curing under pressure for bonding to wood cores, water resistant type.

2.2 ACCESSORIES

- .1 Casework Hardware: Provide cabinet hardware described in this Section in quantity required, with necessary screws, bolts, washers for complete installation.
 - .1 Fasteners: Non-exposed Fasteners: Fabricators choice consistent with quality level specified.
 - .2 Hardware: Bolts, nuts, washers, screws, etc., hot dip heavy zinc-coated.
 - .3 Tamperproof screws for millwork in rooms 114 to 132.
- .2 Sealant: 1 part silicone, non-staining, mould and mildew resistant, colour: clear, refer to Section 07 92 00 – Joint Sealants.

2.3 CASEWORK, CLEAR FINISH

- .1 Finish: AWMAC custom for clear finish.
- .2 Core: combination core plywood to AWMAC Manual.
- .3 Veneer: AWMAC minimum A grade all sapwood (white). Species Birch or Maple.
- .4 Exposed and Semi-exposed Parts: AWMAC grade.
- .5 Edging: minimum 3 mm PVC or 6 mm hardwood: colour to match panel.

2.4 CASEWORK PLASTIC LAMINATE FINISH

- .1 AWMAC Quality Grade: Custom.
- .2 Construction: to AWMAC Manual for flush overlay, except as otherwise detailed on drawings.
- .3 Exposed and Semi-exposed Parts:
 - .1 Panel Products:
 - .1 Core for Doors: plywood or plywood composition. MDF or particle board core is unacceptable.
 - .2 Core for All Other Panel Products: hardwood plywood or plywood composition.
 - .3 Laminate Grade: general purpose grade, standard duty, 1.06 to 1.27 mm thick.
 - .4 Plastic laminate to both sides of doors and drawer fronts.
 - .2 Edge Banding - for Doors and Drawer Fronts: plastic laminate to match faces.
- .4 Semi-exposed Parts:
 - .1 Plastic Laminate Panels:
 - .1 Core: door panels and door fronts – particle board core.

- .2 Colour: White, unless noted otherwise.
- .3 Edge Banding: plastic laminate to match faces.
- .4 Semi-exposed Surface of perimeter of each Millwork Cabinet: 1.0 mm thick plastic laminate, colour to match door faces.
- .2 Semi-exposed Surface of Casework Doors and Frames: same as exposed face.
- .3 Post Formed Grade used on the following:
 - .1 Concealed surface of casework backs.
 - .2 Concealed surfaces, unless specified otherwise.
 - .3 Semi-exposed shelves.
 - .4 Interior portions of case bodies.
 - .5 All surfaces of drawer boxes.
- .4 Laminate Finish/Sheen: suede finish.
- .5 Laminate Colours: Refer to drawings.

2.5 PLASTIC LAMINATE WALL PROTECTION

- .1 Laminate Grade: general purpose, standard duty, 1.06 to 1.27 mm thick.
- .2 Laminate Finish/Sheen: suede finish.
- .3 Laminate Colour and Pattern: refer to drawings.
- .4 Adhered to cementitious backer board as part of wall construction.

2.6 SOLID SURFACE COUNTERTOPS

- .1 Solid surface material (SSM) shall consist of reacted monomers and resins, mineral fillers and pigments manufactured in sheets of nominal thickness. SSM shall be solid, non-porous, homogenous, hygienic, and, when applicable, may feature inconspicuous hygienic seams. SSM shall be free from conspicuous internal strengthening fibres SSM must meet or exceed performance standards set forth in ISSFA-0-2-01.
- .2 Chemical Resistant Surface: Epoxy resin work surface with 3 mm, machined radius, 25 mm thick. Based on Durcon Classic Top. Refer to drawings for colour.
- .3 Quartz Surface: Based on Cambria.
 - .1 High gloss or matte finish.
 - .2 Thickness: 20 mm.
 - .3 Edge Profile: Ridgeline Edge (TR3)
 - .4 Colour: refer to drawings.

2.7 HIGH PRESSURE DECORATIVE LAMINATE COUNTERTOPS AND BACKSPLASH, SELF-EDGE TYPE

- .1 Laminate: horizontal general purpose grade, thickness of 1.2 mm, and laminate backer grade, thickness of 0.76 mm.
 - .1 Laminate finish and surface: matte surface. Refer to drawings for colours.
- .2 Core: veneer core plywood, minimum 19 mm thick with Type 1 glue. Liner grade backer sheet to underside of countertops. No added urea formaldehyde.
- .3 Backing: laminate backer applied to underside of countertops and back of backsplashes.

- .4 Edge Type: High pressure decorative laminate, lumber, no. 1 grade, or 3 mm PVC edge, as detailed on drawings.
- .5 Backsplash: profile as detailed on drawings.

2.8 CASEWORK HARDWARE

Item	Description	Finish
Drawer Slides	124 kg. load capacity; steel track; full extension, steel ball bearings. As per Accuride 3600.	ZINC
Shelf Pilasters and Brackets	Steel standards, zinc coated; 1.3 mm adjustable centres; recess mounted; length as indicated on drawings. K&V 255 and 256.	ZINC
Hinges	125 degree opening; concealed hinge; swing free; self closing; nickel plated steel hinge arm and hinge cup. Based on BLUM Modul.	NICKEL
Pulls	Metal square "D" pull; 96 mm c.c.; 39 mm deep. As per Richelieu 2170296 or approved substitution.	METAL
Drawer Locks	Locks: disk pin tumbler type, Richelieu 313130195 or approved substitution. Keying requirements will be finalized during shop drawing stage.	CHROME
Door Locks/Catches	Locks: disk pin tumbler type, Richelieu 310150195 or approved substitution. Keying requirements will be finalized during shop drawing stage. Provide elbow catch for each pair of lockable doors.	CHROME
Grommet	Oval cable entry plug, 18 mm depth, Richelieu 90060106. Provide to counter top areas where electrical outlets, telephone and data outlets are located below and as detailed on drawings-	BLACK
Wire Management	Richelieu 512490.	BLACK
Coat Rod	Chrome-plated steel tubing, 32 mm dia., minimum wall thickness of 1.2 mm, 76 mm dia., chrome-plated cast brass flanges at each end for attachment.	CHROME
Keyboard Tray	Richelieu 50080190: Classic Series vinyl covered keyboard tray with full length foam palm rest, mouse tray built-in, 685 mm wide x 267 mm deep x 20 mm thick.	BLACK
Cash Drawer	M-S Cash Drawer HP-122N: Manual cash drawer, all steel with stainless steel front, black powder coated finish, security drawer key-lock, 5 coin and 5 bill removable money tray insert, 478 mm x 386 mm x 105 mm, with under counter mounting brackets.	BLACK

Sliding Track	Richelieu 8916605170: Strap mount with flat bar running rail, R-Exact.	STAINLESS STEEL
Extension Track	Richelieu 89166011170: Extension rail-connector, joins two rails.	STAINLESS STEEL
Flush Pulls	Richelieu 89058960EKIT185: Magnetic Handles with front pull, round magnetic flush handles with front pull, satin.	NICKEL
Keyboard Tray	LGC BBAKD27NN, Lacasse, distributed by LaserEdge, P:403-309-6363.	BLACK

Part 3 Execution

3.1 EXAMINATION

- .1 Visit site and note state of completion within various areas in which casework is being installed; verify that surfaces are ready to receive work of this Section and that other work is finished and painted before being built-over or covered in any way by installed casework:
 - .1 Verify that areas in which casework is scheduled are finished and ready to accept work of this Section; with walls painted, ceilings finished, overhead services completed, tested and accepted.
 - .2 Starting work will be considered as acceptance of conditions.

3.2 PREPARATION

- .1 Confirm access is sufficient for large pieces of casework, and that they can be transported easily and safely to final installation location.
- .2 Protect adjacent finished surfaces and materials from damage by work of this Section.
- .3 Back prime casework immediately after delivery to site.

3.3 INSTALLATION

- .1 Install casework plumb, level and true to locations indicated on Drawings and in accordance with AWS.
- .2 Anchor to floor, walls or ceiling using fastening devices and hardware consistent with materials being fastened into and quality of finish, and as follows:
 - .1 Do not use wood plugs
 - .2 Do not use plastic plugs for ceilings or walls
 - .3 Provide wall cleats fastened to wall blocking as required
 - .4 Shim level and square in relation to adjoining surfaces
 - .5 Scribe accurately to adjacent work
 - .6 Provide allowance for finish flooring installation to base by related sections of work
- .3 Scribe neatly and accurately to smooth snug fit with adjoining surfaces and materials to align work properly; mitre corners accurately.

- .4 Perform cutting, fitting, repairing in woodwork as required by other sub-contractors where their Work is connected to or part of this Work.
- .5 Cut out openings for mechanical and electrical fittings and fixtures; coordinate and cooperate with mechanical and electrical work and obtain required templates, cutting locations and dimensions.
- .6 Apply neat bead of sealant between plumbing fixtures countertops and adjoining walls and casework; seal edges of cut out core material before fixtures installed with moisture resistant compound.
- .7 Install countertop to casework units; coordinate schedule and delivery requirements to meet the construction schedule.

3.4 CLOSEOUT ACTIVITIES

- .1 Deficient Work: Replace, rework or refinish work that does not meet AWS requirements as directed by Consultant and as required to obtain AWMAC GIS at no additional cost to Owner.
- .2 Adjusting: Adjust hardware and operating parts during and after installation to provide smooth and proper operation of casework components.
- .3 Cleaning: Clean casework, cabinets, countertops, shelves and fixtures, and remove marks, scratches or marring on exposed and semi-exposed surfaces after work of this Section is complete and prior to Substantial Performance for the project.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 84 00 – Fire Stopping

1.2 DESIGN REQUIREMENTS

- .1 Conform to listed requirements to maintain the continuity of fire separations whether or not shown on the drawings.
- .2 Do not support non-combustible construction on or from combustible construction.
- .3 Firestop openings and joints in fire rated construction with non-combustible material in accordance with Section 07 84 00 – Firestopping, where a fire separation or assembly is required to be of non-combustible construction and terminates at the exterior wall, the underside of floor, ceiling, or roof structures, and at floors.
- .4 Do not use combustible members, fastenings, and similar items to anchor fixtures to fire separations.
- .5 Firestop openings for non-combustible pipes and ducts to prevent the passage of smoke and flame; Subcontractors shall be responsible for installing firestopping where their work passes through a fire separation, the opening shall be plugged with ULC labelled and approved firestopping sealant, insulation or other material approved by local Authorities Having Jurisdiction to maintain the integrity of the fire separations.
- .6 Do not pierce fire separations with electrical or similar service outlets except in accordance with the Building Code.
- .7 Existing fire separations must be maintained as such, and any cutting must be sealed to retain the separation's assembly rating.
- .8 Refer to technical sections for specific requirements for sealing penetrations and joints of smoke and fire separations.

1.3 REFERENCE STANDARDS

1.4 FIRE TEST RESPONSE CHARACTERISTICS

- .1 Provide materials and construction identical to those tested in assembly indicated according to CAN/ULC S101 for assemblies or materials having fire resistance ratings, as verified by an independent testing and inspecting agency acceptable to Authorities Having Jurisdiction for fire resistance ratings of specific assemblies indicated on drawings:
- .2 Fire resistance rated assemblies and materials shall bear a label and proof of acceptance as indicated by design designations from ULC List of Equipment and Materials or Warnock Hersey-Intertek Directory of Listed Products. Where no design designation is provided, use only time assigned to materials listed in the Building Code.
- .3 Fire resistance rated assemblies and materials will only be accepted from an organization recognized by the Authority Having Jurisdiction as being capable of conducting testing and providing labelling for materials, assemblies and systems that include, but are not limited to, the following organizations:

- .1 Underwriters Laboratories of Canada (ULC).
- .2 Underwriters Laboratories Inc. (UL).
- .3 Intertek-Warnock Hersey (I/WH) ETL Semko.
- .4 Acceptance of UL or WHI labels are subject to the following conditions:
 - .1 Fire resistance rated assemblies and materials bearing an Underwriter's Laboratories Inc. (UL) or Intertek-Warnock Hersey (I/WH) label will be acceptable for use on this project provided that the label indicates acceptance under Underwriters Laboratories of Canada (ULC) and having either a cUL, cUL_{US}, cI/WH or cI/WH_{US} marking.
 - .2 Materials that only have a UL, UL_{US}, I/WH or I/WH_{US} marking will not be acceptable.
- .5 Examples of acceptable marks from Recognized Testing Authorities:



END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 21 13.13 – Cement Faced Insulation Board
- .2 Section 07 26 00 – Vapour Retarders
- .3 Section 07 52 00 – Modified Bituminous Membrane Roofing

1.2 REFERENCES STANDARDS

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-14, Standard for Mineral Fibre Thermal Insulation, for Buildings.

1.3 DEFINITIONS

- .1 LTTR (Long Term Thermal Resistance): Defined as using techniques from ASTM C1303 or CAN/ULC S770 predicting a foam's R-Value that has been shown to be equivalent to the average performance of a permeably faced foam insulation product over 15 years.

1.4 ACTION AND INFORMATIONAL 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 insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Regulatory Requirements: Provide insulation products that meet or contain less than the regulated limits for Ozone Depletion Potential compounds listed in the Montreal Protocol adopted by the United Nations Environmental Program.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Handling Requirements:
 - .1 Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply

with manufacturer's written instructions for handling, storing, and protecting during installation.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Above grade insulation: basalt mineral fibre, semi-rigid board insulation, minimum 4.4 lb/ft density, 610 mm x 1219 mm board size, asbestos free, minimum R value of 4.3 per inch, surface burning characteristics when tested in accordance with CAN/ULC-S102, ASTM E84 and UL 723 not to exceed flame spread of 5 and smoke developed of 0. Thickness as indicated. Use one of the following manufacturers:
 - .1 Fibrex CWB 45
 - .2 Rockwool CavityRock.
 - .3 Or substitution accepted by the Departmental Representative.
- .2 Perimeter foundation and under slab insulation in accordance with Section 07 21 13.13 - Cement Face Insulation Board.
- .3 Roof Insulation
 - .1 Extruded polystyrene (XPS) to CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .1 Type: 4.
 - .2 Thickness: as indicated.
 - .3 Size: 405 x 1220.
 - .4 Edges: square.
 - .5 Tapered insulation to provide slope to roof drains. Tapered insulation will not constitute as part of the insulation thickness.
- .4 Spandrel Panel Back Pan Insulation: Fill back pans with the same semi-rigid board insulation as used for above grade insulation.
- .5 Exterior Steel Spray Foam Insulation: Spray Polyurethane Foam Insulation; closed cell, medium density. Based on BASF Walltite ECO v.2 Cold Temperature Grade.
 - .1 Compressive Strength: 186 kPa (27 psi), ASTM D1621.
 - .2 Tensile Strength: 241 kPa (35 psi), ASTM 1623.
 - .3 Water Vapour Permeance, 50 mm: 42 ng/Pasm2 (0.70 Perms), ASTM E96.

- .4 R Value, 50.0 mm: 11.07ft²hrF/BTU
- .5 RSI Value, 50.0 mm: 1.95 m²K/W

2.2 ACCESSORIES

- .1 Insulation Fasteners:
 - .1 Mechanical Fasteners: High quality, impact resistant plastic fastener system specifically designed for installation of board insulation materials; 38 mm diameter, shaft length to suit insulation thickness and hot dipped galvanized fastener to suit substrate, and as follows:
 - .1 Basis-of-Design Materials: Ucan Fastening Systems, Insulation Fasteners; alternates will be considered for this material.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 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. Do not compress insulation.
- .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 CAN/CGA-B149.1 and CAN/CGA-B149.2, Type B L vents.
- .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 reviewed by Consultant.

3.3 EXAMINATION

- .1 Review substrates and immediately inform Consultant in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 ROOF INSTALLATION

- .1 Install boards at face of finished curb roof penetrations as detailed.

3.5 CLEANING

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

3.6 PROTECTION

- .1 Protect installed board insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- .2 Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCE STANDARDS

- .1 Underwriter's Laboratories of Canada (ULC)
- .1 CAN/ULC S102-11, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC S114-05, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
 - .3 CAN/ULC S129—15, Standard Method of Test for Smoulder Resistance of Insulation (Basket Method).

1.3 QUALITY ASSURANCE

- .1 Regulatory Requirements: Provide materials that meet requirements for CAN/ULC S102-10, for flame spread rating of 25 or less; CAN/ULC S114-05, for non-combustibility; and CAN/ULC S129-95 (R2001), for smoulder resistance when using materials in fire resistant rated construction.
- .2 Qualifications: Provide proof of qualifications when requested by Consultant:
- .1 Environmental Performance: Use insulation products listed by manufacturer as using non-urea formaldehyde or non-phenol formaldehyde based binders or having GreenGuardTM Environmental Institute Indoor Air Quality Certification.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Handling Requirements: Protect insulation materials from physical damage and from deterioration by moisture and soiling; store undercover and protect from wetting or moisture.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable Material Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:
- .1 CertainTeed Corporation
 - .2 Johns-Manville Corporation
 - .3 Knauf Insulation
 - .4 Owens-Corning Canada Inc.
 - .5 Roxul Inc.

2.2 MATERIALS

- .1 Mineral Fibre Insulation: Unfaced, preformed mineral slag batt insulation in accordance with CAN/ULC S702, Type 1; having a nominal RSI of 0.67/25 mm; rated non-

combustible in accordance with CAN/ULC S114 and having a flame spread rating of 5 or less in accordance with CAN/ULC S102; density 32 kg/m³; square edges, thickness as required to meet design insulation values indicated on drawings or as required to fill insulated spaces where not indicated, and as follows:

- .1 Acceptable Materials:
 - .1 Fibrex, SAFB Insulation
 - .2 Roxul Inc., Roxul Plus
- .2 Acoustic Batts: Refer to Section 09 21 16 – Gypsum Board Assemblies.

Part 3 Execution

3.1 INSTALLATION

- .1 Exterior Batt Insulation: Install batt insulation where indicated with continuous vapour retarder on the warm side of the insulation in accordance with ASTM C1320, and as follows:
 - .1 Where required to maintain continuity of thermal insulation of the building envelope.
 - .2 Cut and trim insulation neatly to fit spaces; butt ends and edges tight; fit insulation tightly to framing members and around pipes, conduits, and projecting structural members within insulated spaces.
 - .3 Fill stud space of exterior framed walls with insulation full depth of stud only where no insulation/vapour retardant indicated on exterior face of stud walls.
 - .4 Do not compress insulation to fit into spaces.
 - .5 Fill stud space of temporary partitions with insulation.
 - .6 Hold insulation in position with clips, wires or as recommended by manufacturer when insulation is installed in horizontal locations.
- .2 Interior Batt Insulation: Install batt insulation as follows:
 - .1 Where required to maintain STC rating of a partition. Acoustic sealant to be used in accordance with Section 09 21 16 – Gypsum Board Assemblies.
 - .2 Where indicated on drawings to reduce sound transfer between partitions for non-STC rated walls.
 - .3 Cut and trim insulation neatly to fit spaces; butt ends and edges tight; fit insulation tightly to framing members and around pipes, conduits, and projecting structural members within insulated spaces.
 - .4 Fill stud space of interior partition walls with insulation full depth of stud.
 - .5 Do not compress insulation to fit into spaces.
 - .6 Hold insulation in position with clips, wires or as recommended by manufacturer when insulation is installed in horizontal locations.

3.2 PROTECTION

- .1 Protect installed insulation from damage arising from harmful weather exposures, physical abuse, and other causes.

- .2 Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 21 00 – Board Insulation
- .2 Section 07 26 00 – Vapour Retarders
- .3 Section 07 62 00 – Sheet Metal Flashing and Trim
- .4 Section 09 21 16 – Gypsum Board

1.2 REFERENCE STANDARDS

- .1 Reference Standards:
 - .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM A641/A641M-09a(2014) Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
 - .2 ASTM A653/A653M-17 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .3 ASTM C144-17 Standard Specification for Aggregate for Masonry Mortar
 - .4 ASTM C847-18 Standard Specification for Metal Lath
 - .5 ASTM C897-15 Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters
 - .6 ASTM C926-18b Standard Specification for Application of Portland Cement-Based Plaster
 - .7 ASTM C954-18 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84mm) to 0.112 in. (2.84 mm) in thickness
 - .8 ASTM C1063-18b Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
 - .9 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
 - .10 ASTM C1513-18 Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections
 - .2 American Iron and Steel Institute (AISI):
 - .1 AISI S201, Northern American Standard for Cold-formed Steel Framing – Product Data.

1.3 ACTION AND INFORMATION SUBMITTALS

- .2 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta.
- .2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, metal furring, and related work.
- .3 Engineering: Calculations shall be signed and sealed by a Professional Engineer who is licensed to practice in the Province, attesting to the ability of the metal panel assembly to withstand the specified loads, including inward and outward loads and loads under fastenings to the structure. System to equalize in less than 0.08 seconds for rain screen performance.
- .4 Identification: Panels shall be identified on shop drawings as to building location to facilitate panel removal and replacement due to construction and/or occupant damage. Disassembly drawings shall show the location of points at which disassembly may be most easily started so that replacement of panels may be performed efficiently, with the same neat finish as originally installed.
- .5 Samples:
 - .1 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.
- .6 Warranty:
 - .1 Submit manufacturer's standard warranty.

1.5 SCOPE

- .1 Work furnished and included:
 - .1 Stucco system.
 - .2 Associated flashings.
 - .3 Supporting brake metal angles and other required supports for sheathing.
 - .4 Semi-rigid Insulation:
- .2 Related work not included:
 - .1 Structural wall framing.

1.6 PERFORMANCE REQUIRMENTS (DESIGN CRITERIA)

- .1 Design for maximum allowable deflection, normal to the plane of the wall of L/360.
- .2 Design for wind load in conformance with code required.

1.7 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Stucco finish products manufactured under ISO 9001:2008 Quality System and 14001:2004 Environmental Management System.

- .4 Contractor to be licensed, insured and engaged in application of Portland cement stucco for minimum three (3) years.
- .5 Successful completion of minimum of three (3) projects of similar size and complexity to the project.
- .6 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 – Quality Control supplemented as follows:
 - .1 Construct mock-up of stucco construction in accordance with manufacturer’s instruction.
 - .2 Mock-up, if accepted, may become part of the completed work.
 - .3 Illustrate flashing, expansion and control joints, parapet interface, and corner detail.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Cover prefinished components to protect surface finishes from damage and deterioration.
- .2 Store components off ground a minimum of 200 mm to prevent corrosion, twisting, bending and defacement. Slope to shed moisture.

Part 2 Products

2.1 GENERAL

- .1 Sub-girt System: a thermally broke clips system fastened to wall structure, horizontal transfer grid thermally broken assembly to minimize frost transfer.
- .2 Metal framing on sub-girt system designed 16 ga. or heavier. Maximum 41 mm flange width, cold formed steel stud framing in accordance with AISI Standard S201. Maximum stud spacing 400 mm on centre.
- .3 Structural members and sheathing shall be fastened together with interlocking back clips as indicated.
- .4 Sheathing: minimum 19 mm glass mat faced gypsum sheathing in conformance with ASTM C1177.
- .5 Girt and sheathing fasteners: sufficient quantity and size of fasteners for all associated loads.
- .6 Drainage mat: maximum 10 mm thick tangled filament nylon core with fabric facing with flame spread to ASTM E84, less than 25.
- .7 Metal Lath: minimum 1.4 kg/m² self-furred galvanized steel diamond mesh metal lath in conformance with ASTM C847.
- .8 Lath fasteners: corrosion resistant fasteners in conformance with AISI Standard S201 and ASTM C1513 with minimum three (3) thread penetration beyond steel framing members. Spacing maximum 150 mm along studs.

- .9 Stucco: minimum 19 mm portland cement stucco in conformance with ASTM C926 of uniform thickness applied in two coats, scratch and brown coat.
- .10 Primer: Acrylic primer over 28 day or more cured stucco in conformance with ASTM E84 for flame spread.
- .11 Finishes: water and dirt resistant coating:
 - .1 Single component acrylic-based coating, containing acrylic polymer.
 - .2 Application: spray, roller, or brush.
 - .3 Water vapour permeability: 40 perms per ASTM E 96.
 - .4 Tensile strength: 1.25 MPa (182 psi) per ASTM D412.
 - .5 Mold resistant.
 - .6 Colour: Refer to drawings.

2.2 MOISTURE CONTROL

- .1 Prevent the accumulation of water into or behind the stucco.
 - .1 Provide corrosion resistant flashing to protect exposed elements and to direct water to the exterior, including above and below wall openings and projections, roof to wall intersections, and at the base of the wall.
 - .2 Seal stucco terminations and accessory butt joints with appropriate sealant. Seal all penetrations through the stucco wall assembly.

2.2 JOINT ACCESSORIES

- .1 Provide two piece expansion joints in stucco system where building movement is anticipated; at joints in the substrate.
- .2 Provide one piece expansion joints every 13 square meters. Cut and wire tie lath to the expansion joint accessory so lath is discontinuous at or beneath the accessory. Do not exceed length to width ratio of 2:1 in expansion joint layout and do not exceed more than 5.5 m in any direction without an expansion joint.
- .3 Provide one piece expansion joints at through wall penetrations.
- .4 Provide minimum 9 mm wide joints where the system abuts openings and through wall penetrations.
- .5 Provide accessories at stucco terminations and joints.
 - .1 Weep screed, casing bead, corner bead, corner lath, expansion and control joint accessories per ASTM C1063, galvanized per ASTM A653 with G60 coating.
 - .2 Accessories to be perforated or expanded flanges, designed for specific stucco thickness.
 - .3 Install casing beads at stucco terminations. Attach at no more than 150 mm on centre.
 - .4 Inside and outside corners installed over lath. Attach through lath into solid substrate no more than 150 mm on centre.

- .6 Avoid the use of channel reveal accessories which can interfere with drainage and stress release.
- .7 Provide sealant at stucco terminations and at stucco accessory butt joints.

Part 3 Execution

3.1 SURFACE PREPARATION

- .1 Review sheathing surfaces for damage, deterioration, moisture damage. Remove surface contaminants and correct any deficiencies in the surface prior to application of system.
- .2 Sheathing must be clean, dry and free from damages, holes, frost, and bond-inhibiting materials.
- .3 Gaps in sheathing exceeding 3 mm up to 12.7 mm and over-driven screws to be filled with manufacturer accepted fill material.

3.2 INSTALLATION

- .1 Support system shall be attached to the structural as required to transmit load designs.
- .2 Adjustable angles, clips, tees and associated bolts, anchors and other fixings shall be used to compensate for fabrication and erection tolerances of primary structure.
- .3 Framing and other components shall be straight to match plane of sheathing as required to meet manufacturer tolerances with straight, sharply formed edges.
- .4 After their correct position has been determined and allowances for expansion, building movement, uniform joint width and alignment of all parts has been determined, the components shall be permanently fastened.
- .5 Installed sheathing shall not deviate from overall plane or alignment by more than 1:1000. Joints shall not be less than their dimensioned width nor more than five percent greater than their dimensioned width at any location along their full length and shall not be wavy, out of line or of different width from panel to panel.
- .6 Flashings and copings to match finish and colour of wall cladding.
- .7 Install flashing to divert all moisture to the exterior.

- .8 Place drainage mat against sheathing surface and unroll horizontally with the fabric facing out. Hammer-tack or staple into place with corrosion-resistant fasteners as recommended by manufacturer. Do not fasten through flashings. Butt ends of rolls and vertical seams. Trim around wall openings and through penetrations. Cover drainage mat with stucco within 30 days of installation.
- .9 Immediately follow installation of drainage mat with stucco lath installation. Install lath with long dimension at right angles to structural framing. Terminate lath at expansion joints. Do not install continuously at joints. Minimum overlap 12.7 mm. Minimum end seam 25 mm. Stagger end seams. Fasten securely through sheathing to structural framing at 150 mm on centre vertically and 400 on centre horizontally. Wire tie at 225 mm maximum on centre at side laps, accessory overlaps, and end laps between supports.
- .10 Apply the stucco in discrete panels without interruption to avoid cold joints and difference in appearance. Abut wet stucco to set stucco at natural or architectural breaks, such as expansion joints, terminations, and change in plane. Follow manufacturer's installation instructions for environmental restrictions for application.
 - .1 Scratch coat: apply stucco with sufficient pressure to key into and embed the metal lath. Apply material, no less than 6 mm, to cover and completely embed metal lath and to permit scoring the surface. Score the stucco upon completion of each panel in preparation for second coat. Score horizontally.
 - .2 Brown coat: apply the second coat after manufacturer recommended curing time of the first coat. Moist curing the first coat may be acceptable within 48 hours of first coat application. Apply the second coat with sufficient pressure to ensure intimate contact with the first coat and needed to bring the stucco to a uniform thickness that matches the grounds of the accessories. Use rod or straight edge to bring surface to true, even plane. Final thickness of stucco shall be uniform throughout the wall area to 19 mm and shall not exceed 22 mm.
 - .3 After the stucco has become slightly firm float the surface lightly with a darby or wood float to densify the surface and to provide a smooth, even surface.
 - .4 Moist cure after stucco has set by lightly fogging for at least 48 hours. Fog as frequently as required during the 48 hour period to prevent loss of moisture from the stucco. Avoid eroding the stucco surface with excess moisture. Follow manufacturer's written instructions for moisture curing.
- .11 Apply primer after the 48 hour moist cure. Allow stucco to dry and additional 48 hours, then apply primer evenly with brush, roller or spray equipment over clean, dry stucco. Primer to be applied minimum 7 days prior to finish.
- .12 Apply finish to minimum 28 day old primed stucco. Apply finish by spraying or troweling with a stainless steel trowel.
 - .1 Avoid application in direct sunlight.
 - .2 Apply finish in continuous application, and work a wet edge towards the unfinished wall area. Work to an architectural break in the wall before stopping to avoid cold joints.
 - .3 Apply in compliance with weather requirements of manufacturer's instructions.
 - .4 Do not install separate batches of finish side-by-side.
 - .5 Do not apply finish into or over sealant joints. Apply finish to outside face of wall.
 - .6 Do not apply finish over irregular or unprepared surfaces, or surface not in compliance with the requirements of the manufacturer's installation instructions.
 - .7 Do not install finish over high pH (≥ 10) stucco surfaces or surfaces that have not been fully cured.

3.3 PROTECTION

- .1 Provide protection of installed materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Provide protection of installed materials from water infiltration, dust, dirt, precipitation, freezing, continuous high humidity until fully cured.
- .3 Provide sealant and backer material at stucco terminations and at fixture penetrations through the stucco to protect against air, water and insect infiltration.

3.4 CLEANING

- .1 Clean the surface finish in accordance to Section 01 74 11 – Cleaning.
- .2 Clean and maintain the stucco finish for a fresh appearance and to prevent water entry into and behind the stucco. Repair cracks, impact damage, spalls or delamination promptly.

END OF SECTION

Part 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 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.
 - .2 ASTM E283-04(2012), Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .3 ASTM E2178-13, Standard Test Method for Air Permeance of Building Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for vapour retarders and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit electronic copies of WHMIS MSDS in accordance with Section 01 35 43- Environmental Procedures.
- .3 Certificates:
 - .1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that construction wastes were recycled or salvaged.

1.4 QUALITY ASSURANCE

- .1 Mock-Ups:
 - .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up of sheet vapour barrier connection installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.
 - .3 Mock-up will be used to judge quality of work, substrate preparation, and material application.
 - .4 Locate where directed.
 - .5 Allow seventy-two (72) hours for review of mock-up by Consultant before proceeding with vapour barrier work.
 - .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Mock-ups requiring corrections are to be removed and disposed of. Approved mock-up may remain as part of finished work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from air born dusts and wind that will reduce the adhesion and allow tear to membranes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 43 – Environmental Procedures.
- .5 Packaging Waste Management: remove for reuse and return crates, pallets, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 PERFORMANCE CRITERIA

- .1 Vapour barriers must be by same manufacturer as roof air barrier and roof and membranes.

2.2 SHEET VAPOUR BARRIER

- .1 Primer: proprietary to membrane product.
- .2 Air/Vapour Barrier General Use: SBS modified bitumen and high-strength glass mat reinforcement: Based on Soprema Sopraseal Stick 130.

- .1 Self-adhesive membrane.
 - .2 Thickness: 2.5 mm.
 - .3 Reinforcement Type: Glass mat.
 - .4 Top Mat: Sand.
 - .5 Tear Resistance: 25 N.
 - .6 Water Vapour Permeance: to ASTM E96 Procedure B, 0.23 ng/Pa*s*m2.
 - .7 Air Permeability: to ASTM E283 (75 Pa), no measurable air leakage; to ASTM E2178, <0.001 L/s*m2.
- .3 Air/Vapour Barrier mechanically fastened around openings: Based on Soprema Sopraseal Stick 1100T.
- .1 Self-adhesive membrane compatible with air/vapour barrier with 150 mm lap from edge of openings.
 - .2 Thickness: 1.0 mm.
 - .3 Tear Resistance, MD/XD: 535/245 N.
 - .4 Water Vapour Transmission: to ASTM E96/E96M, 2.1 ng/Pa*s*m2 (<0.037 perm).
 - .5 Air Permeability: to ASTM E2178, < 0.0005 L/s*m2.

2.3 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 150 mm wide for lap joints and perimeter seals, 100 mm wide elsewhere.
- .2 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer.
- .3 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.
- .4 Primers: compatible with vapour retarder materials, recommended by vapour retarder manufacturer.
- .5 Pipe flashing sleeves: Wall penetrating piping flashing with a metal sleeve with intrgral flange and EPDM triple pressure grommet seal and EPDM wall seal, constructed of aluminum. Based on Thaler metals product number SJ-35 and SJ-36.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for vapour retarder installation in accordance with manufacturer's written instructions.
 - .1 Visually review substrate in presence of Consultant.
 - .2 The following are unacceptable for applied membrane:
 - .1 Fishmouths and folds,

- .2 Blisters and bulges,
 - .3 Insufficient overlaps,
 - .4 Inadequate adhesion,
 - .5 Punctures, tears, cuts.
 - .6 Other similar defects.
- .3 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .4 Proceed with installation only after unacceptable conditions have been remedied. Work that proceeds with unacceptable conditions will be removed regardless of extent of construction, at no cost to the Owner.

3.2 INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall to form continuous retarder before installation of interior gypsum board.
- .3 Install sheet vapour retarder vertically on walls and continuously down to entire exterior faces to lap 150 mm onto waterproofing of foundation.
- .4 Use sheets of largest practical size to minimize joints.
- .5 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.
- .6 Lap horizontal membrane joints to shed water to exterior.

3.3 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame. 150 mm lap is required from opening vapour retarder to wall vapour retarder.

3.4 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 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 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 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
 - .5 Install joint membrane, minimum 200 mm wide, centred over joints and gaps.
 - .6 Lap ends of joint membranes minimum 150 mm.

.7 Do not loop joint membranes into joints.

3.6 INSTALLATION AT TRANSITIONS TO BUILT-UP ROOFING

- .1 Install transition membrane at transitions to SBS roofing.
- .2 Wall membrane must be by the same manufacturer as the roof membranes for warranty continuity.

3.7 ELECTRICAL BOXES

- .1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
 - .1 Wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.
 - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
 - .1 Remove insulation material spilled during installation and leave work area ready for application of wall board.
- .3 Waste Management: separate waste materials in accordance with Section 01 35 43- Environmental Procedures and 01 74 21- Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 08 99 – Rough Carpentry for Minor Works
- .2 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D882-12, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 - .2 ASTM E84-16, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .3 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.
- .2 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01- Hazardous Materials.
- .3 Submit drawings: stamped and signed by professional engineer registered or licensed in Canada.
- .4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00- Quality Control.
 - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Applicator: company specializing in performing work of this section experience with installation of air/vapour barrier systems.
 - .1 Completed installation must be approved by the material manufacturer.
 - .2 Material must be from the same manufacturer as the adjacent membranes.
- .2 Mock-Up:

- .1 Construct mock-up in accordance with Section 01 45 00- Quality Control.
- .2 Construct typical exterior parapet; illustrating materials interface and seals.
- .3 Locate where directed.
- .4 Mock-up may remain as part of finished work.
- .5 Allow seventy-two (72) hours for inspection of mock-up by Consultant before proceeding with air/vapour barrier Work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .3 Avoid spillage: immediately notify Consultant if spillage occurs and start clean up procedures.
- .4 Clean spills and leave area as it was prior to spill.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.7 AMBIENT CONDITIONS

- .1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00- Temporary Utilities.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.8 WARRANTY

- .1 For sheet materials the twelve (12) months warranty period prescribed in subsection GC 12.3 of General Conditions "C" is extended to 24 months.
- .2 Provide two (2) years warranty under provisions of Section 01 78 00- Closeout Submittals.
- .3 Warranty: include coverage of installed sheet materials which:
 - .1 Fail to achieve air tight and watertight seal.
 - .2 Exhibit loss of adhesion or cohesion.
 - .3 Do not cure.

Part 2 Products

2.1 PERFORMANCE CRITERIA

- .1 Air barriers must be by same manufacturer as roof and vapour barrier membranes.

2.2 MATERIALS:

- .1 Primer: proprietary to membrane product.
- .2 Vapour Permeable Air Barriers: Tri-layer laminated polypropylene facer.
 - .1 Self-adhesive membrane compatible with vapour retarder membrane.
 - .2 Thickness: 0.6 mm (24 mil)
 - .3 Tensile Strength MD/XD: to ASTM D882, 5.95/3.65 kN/m
 - .4 Water Vapour Permeance: to ASTM E96 methods A and B, 629 ng/Pa*s*m2 911 perm) and 972 ng/Pa*s*m2 (17 perm)
 - .5 Air permeability at 75 Pa: to ASTM E2178, 0.0025 L/s*m2.
 - .6 Flame Spread: to ASTM E84, Class A.

2.3 SEALANTS

- .1 Sealants in accordance with Section 07 92 00- Joint Sealants.
- .2 Butyl Sealant Type A: CGSB 19-GP-14M, butyl rubber base, single component, solvent release, non-skinning, Shore "A" Hardness Range of 10 to 30; black colour.
- .3 Sealant Type B: CAN/CGSB-19.13M, single component, chemical curing, capable of continuous water immersion, non-sagging type, Shore "A" Hardness Range of 20 to 35 to black colour.

2.4 ACCESSORIES

- .1 Thinner and cleaner for Butyl Sheet: as recommended by sheet material manufacturer.
- .2 Attachments: galvanized steel bars and anchors.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

- .1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials installation.
- .2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for installation materials.

- .3 Perform Work in accordance with Canadian Urethane Foam Contractor's Association - Professional Contractor Quality Assurance Program and requirements for installation materials.

3.3 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept work of this section.
- .2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.
- .3 Report unsatisfactory conditions to Consultant in writing.
- .4 Do not start work until deficiencies have been corrected.
 - .1 Beginning of Work implies acceptance of conditions.
- .5 The following are unacceptable for applied membrane:
 - .1 Fishmouths and folds,
 - .2 Blisters and bulges,
 - .3 Insufficient overlaps,
 - .4 Inadequate adhesion,
 - .5 Punctures, tears, cuts.
 - .6 Other similar defects.

3.4 PREPARATION

- .1 Remove loose or foreign matter, which might impair adhesion of materials.
- .2 Ensure substrates are clean of oil or excess dust; masonry joints struck flush, and open joints filled; and concrete surfaces free of large voids, spalled areas or sharp protrusions.
- .3 Ensure 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.

3.5 INSTALLATION

- .1 Install materials in accordance with manufacturer's instructions.
- .2 Secure sheet seal to gypsum board materials with self-adhesive.
 - .1 Position lap seal over firm bearing.
- .3 Apply sealant within recommended application temperature ranges.
 - .1 Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11- Cleaning.

- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.7 PROTECTION OF WORK

- .1 Protect finished work in accordance with Section 01 61 00- Common Product Requirements.
- .2 Do not permit adjacent work to damage work of this section.
- .3 Ensure finished work is protected from climatic conditions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 21 00 – Board Insulation
- .2 Section 07 26 00 – Vapour Retarders
- .3 Section 07 62 00 – Sheet Metal Flashing and Trim
- .4 Section 09 21 16 – Gypsum Board

1.2 SYSTEMS DESCRIPTION

- .1 Preformed, prefinished metal pan type modular wall, exterior.

1.3 REFERENCE STANDARDS

- .1 ASTM A446 “Sheet Steel, Zinc Coated (Galvanized) by Hot Dip Process Physical (Structural Quality”.
- .2 ASTM B209 Aluminum Sheet and Plate.

1.4 ACTION AND INFORMATION SUBMITTALS

- .5 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .6 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal siding and include product characteristics, performance criteria, physical size, finish and limitations.
- .7 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta.
 - .2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, metal furring, and related work.
 - .3 Engineering: Calculations shall be signed and sealed by a Professional Engineer who is licensed to practice in the Province, attesting to the ability of the metal panel assembly to withstand the specified loads, including inward and outward loads and loads under fastenings to the structure. System to equalize in less than 0.08 seconds for rain screen performance.
 - .4 Identification: Panels shall be identified on shop drawings as to building location to facilitate panel removal and replacement due to construction and/or occupant damage. Disassembly drawings shall show the location of points at which disassembly may be most easily started so that replacement of panels may be performed efficiently, with the same neat finish as originally installed.
- .8 Samples:
 - .1 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.
- .9 Warranty:

- .1 Submit 20-year toll coaters warranty for prefinished paint application.

1.5 SCOPE

- .1 Work furnished and included:

- .1 Panel profile.
- .2 Associated flashings.
- .3 Supporting brake metal angles and other required supports for panels.
- .4 Semi-rigid Insulation:

- .2 Related work not included:

- .1 Structural wall framing.

1.6 PERFORMANCE REQUIRMENTS (DESIGN CRITERIA)

- .1 Panel: Metal panels shall be designed so that all finishes, support and attachment systems conform to regional building codes. Adequate stiffening shall be provided to prevent wind induced vibrations and fatigue problems.
- .2 Deflection Movement: Maximum deflection not to exceed L/90. The panel shall exhibit no permanent deformation when subjected to these loads. Allowance shall be made in the panel design for movement within the system caused by deflection in the building structure.
- .3 Thermal Movement: Allowance shall be made for expansion and contraction of all parts of the metal panel assembly caused by surface temperatures varying from minus 40 degrees Fahrenheit. Such variation in temperature shall not cause buckling, stresses on enclosed or adjoining materials and fasteners or in any way impair the performance or appearance of the system. Sub system design to incorporate a gridlock to eliminate rocking of bent metal angles on drywall or other support sub-wall systems.
- .4 Weep Drainage: Provide slope and clear internal paths of drainage for support girts and panel system in order to drain any trapped moisture to the exterior, discharging weep water in a manner avoiding staining of architectural finishes, collecting in puddles or formation of icicles.
- .5 Water Tightness: Exterior fascia and wall panels shall be designed to the rain screen principles as published by the National Research Council and Government of Alberta P.E.R.S.I.S.T. Guidelines. Vertical gull wing configuration behind panel joints to incorporate a water diversion gasket to redirect water to the exterior.
- .6 Fastening: Panel assembly shall be fastened to the building structure with concealed fastening in a manner, which transmits all loads to the main structure without exceeding the capacity of any fastener.
- .7 Coordinate with installation of air/vapour membrane and rigid insulation to ensure air tightness and adherence to rain screen principles noted above.

1.7 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Cover prefinished components to protect surface finishes from damage and deterioration.
- .2 Store components off ground a minimum of 200 mm to prevent corrosion, twisting, bending and defacement. Slope to shed moisture.

1.7 MOCK UP

- .1 Provide a mock up wall approximately 3000 mm x 3000 mm illustrating metal cladding, coping, steel vapour barrier flange, glazing frame interface, parapet interface and corner detail.

Part 2 Products

2.1 GENERAL

- .1 Sub-girt System to be a thermally broke clips system fastened to wall structure, horizontal transfer grid thermally broken assembly to minimize frost transfer.
- .2 Panel load transfer grids shall be formed from 16 Gauge full galvanized sheet steel conforming to ASTM A525 Grade A Zinc coating to G90 designation.
- .3 Structural members and panels shall be fastened together with interlocking back clips as indicated.
- .4 Fastening: Girt and finished panel fastening to be concealed at all locations and a sufficient quantity of fasteners of the proper size for fastening of the work shall be provided.
- .5 Openings: Openings shall be provided and coordinated with the work of other installers. Holes to accommodate work of other sections to be provided in the panel prior to finishing. The perimeter of openings greater than 12"x12" shall be reinforced to details shown on the drawing or to manufacturers standard.

2.2 PREFINISHED ALUMINUM PANEL SYSTEM (APS)

- .1 Form modular panels from .0641 (14ga) aluminum sheet. Specification based on Centria panels.
- .2 Fabrication: All work to be fabricated with straight lines, square corners or smooth bends, free from twists or warps, kinks, dents and other imperfections which may affect appearance or serviceability.
- .3 Panel flatness tolerance in all directions across the surface to be a maximum of 0.8%.
- .4 Systems shall have a flush appearance from the exterior with no surface fixings or other irregularities and with no reveal other than the module joint width.
- .5 Panels shall be aligned with no lap or reveal other than joint width to permit expansion and contraction.

- .6 Thickness of metal and details of assembly and support shall provide sufficient strength and stiffness to resist distortion of finished surface. Exposed edges and ends of metal shall be dressed smooth, free from sharp edges. Connections and joints exposed to the weather shall be constructed to exclude water.
- .7 Panels to be constructed with flanges on all sides. Panel corners to have uniform radiused corners to 1.5 times the material thickness. Panel corners to be factory notched and neatly butted. Provision shall be made for individual panel drainage at panel base.
- .8 Sub Girt System: to be engineered fastening system with thermally broken clips.
- .9 Aluminum Panel Finish: PPG finish, Durnar XL, UC106714CL, Vintage Bronze.
- .10 P.V.C. strippable film shall be applied by coil processor to protect coating from damage during fabrication, shipping and installation.

Part 3 Execution

3.1 PREPARATION

- .1 Develop all dimensions from the architectural drawings and coordinate with the contractor and other trades to obtain final panel layout.

3.2 INSTALLATION

- .1 Support system shall be attached to the structural as required to transmit load designs.
- .2 Adjustable angles, clips, tees and associated bolts, anchors and other fixings shall be used to compensate for fabrication and erection tolerances of primary structure.
- .3 Framing and other components shall be straight to match plane of panel as required to meet the installed panel tolerances with straight, sharply formed edges. Radiused formed components shall be bent to a true circular curve.
- .4 After their correct position has been determined and allowances for expansion, building movement, uniform joint width and alignment of all parts has been determined, the components shall be permanently fastened.
- .5 Installed panels shall not deviate from overall plane or alignment by more than 1:1000. Joints shall not be less than their dimensioned width nor more than five percent greater than their dimensioned width at any location along their full length and shall not be wavy, out of line or of different width from panel to panel.
- .6 Flashings and copings to match finish and colour of wall cladding.
- .7 Install flashing to divert all moisture to the exterior.

- .8 Install interior and exterior metal panels to structural supports by hidden mechanical fasteners. Provide miscellaneous flashings as required to cover all gaps and unfinished edges in finish and to conceal all fasteners.
- .9 Remove all excess materials, debris and equipment at completion.
- .10 Clean all panels free of all grime and dirt at time of installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 05 41 00 – Structural Metal Stud Framing.

1.2 REFERENCE STANDARDS

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME B18.6.3-2013, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).
- .2 ASTM International
 - .1 ASTM D2369-10(2015)e1, Test Method for Volatile Content of Coatings.
 - .2 ASTM D2832-92(2016), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-93.2-M91, Prefinished Aluminum Siding, Soffits and Fascia, for Residential Use.
 - .2 CAN/CGSB-93.4-92, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished, Residential.
 - .3 CAN/CGSB-93.5-92, Installation of Metal Residential Siding, Soffits and Fascia.
- .4 CSA International
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings with soffits and support systems stamped and signed by professional engineer registered or licensed in Alberta, Canada.
 - .2 Indicate dimensions, profiles, attachment methods, reflected soffit plan, trim and closure pieces, soffits, wall, metal furring, and related work.
- .4 Samples:
 - .1 Submit duplicate prefinished siding pieces.

1.4 QUALITY ASSURANCE

- .1 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Mayne Coatings Corp. limited warranty against cracking, peeling and gloss/color retention within the guidelines stated by the American Aluminum Manufacturers Association (AAMA).
 - .1 Woodgrains
 - .1 AAMA 2604 (5 Year Florida) 15 Year manufacturer's Warranty.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect metal siding from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- 1.6 Mock up. Provide mock ups for soffits. Mock ups can be used for the finished product if accepted by Consultant.

Part 2 Products

2.1 EXTRUDED ALUMINUM SIDING (EAS) COMPONENTS

- .1 Acceptable Manufacturer: Mayne Coatings Corp., which is located at: 27575-50 Ave.; Langley, BC; Canada V4W 0A2; Tel: 604-607-6630; Fax: 604-607-6680; Email: requestomfp@info@longboardproducts.com; Web: www.longboardproducts.com
- .2 Extruded Aluminum Soffits:
 - .1 Based on Longboard Wood Grain Aluminum Siding and Soffits:
 - .1 Alluminate bonded film finish on extruded aluminum with integrated venting system.
 - .2 Stock# 102311 – 150 mm (6”) V Groove Siding & Soffits, 7315 mm (24') lengths, staggered seams.
 - .3 Colour: Light Fir, 1501/02-716.

2.2 FASTENERS

- .1 Nails: CSA B111.
- .2 Screws: ASME B18.6.3. Purpose made aluminum alloy.

2.3 ACCESSORIES

- .1 Exposed trim: inside corners, outside corners, cap strip, drip cap, under-sill trim, starter strip with fastener holes pre-punched.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Contractor of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 INSTALLATION

- .1 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap as indicated.
- .2 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .3 Install soffit as indicated.
- .4 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
- .5 Attach components in manner not restricting thermal movement.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 61 00 – Sheet Metal Roofing
- .2 Section 07 62 00 – Sheet Metal Flashing and Trim

1.2 REFERENCE STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM 1177/C1177M-17, Standard Specification for Glass Mat Gypsum Substrate for use as sheathing.
 - .2 ASTM D41-05/D41M-11(2016), Standard Specification for Asphalt Primer Used in Roofing, Damp-Proofing, and Waterproofing.
 - .3 ASTM D6162/D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .4 ASTM D6163/D6163M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
 - .5 ASTM D6164/D6164M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .2 Alberta Roofing Contractors Association (ARCA)
 - .1 ARCA Roofing Specifications Manual-1997.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA A123.21-14, Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane-Roofing Systems
 - .2 CSA A231.1-14/A231.2-14, Precast Concrete Paving Slabs/Precast Concrete Pavers.
 - .3 CSA O121-17, Douglas Fir Plywood.
 - .4 CSA O151-17, Canadian Softwood Plywood.
- .4 Factory Mutual (FM Global)
 - .1 FM Approvals - Roofing Products.
- .5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Provide electronic copy of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures, and indicate VOC content for:
 - .1 Primers.
 - .2 Sealers.
- .3 Provide shop drawings:
 - .1 Indicate tapered insulation, flashing and control joints, details.
 - .2 Provide layout for tapered insulation.
- .4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .6 Warranty: Provide warranty as noted in article 1.8.

1.4 QUALITY ASSURANCE

- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems approved by manufacturer.

1.5 FIRE PROTECTION

- .1 Fire Extinguishers:
 - .1 Maintain one stored pressure rechargeable type with hose and shut-off nozzle,
 - .2 ULC labelled for A, B and C class protection.
 - .3 Size as indicated on roof per torch applicator, within 6m of torch applicator.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions, Section 01 61 00- Common Product Requirements.
- .2 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
 - .2 Provide and maintain dry, off-ground weatherproof storage.
 - .3 Store rolls of membrane in upright position. Store membrane rolls with salvage edge up.
 - .4 Remove only in quantities required for same day use.

- .5 Place plywood runways over completed Work to enable movement of material and other traffic.
- .6 Store sealants at +5 degrees C minimum.
- .7 Store insulation protected from weather and deleterious materials.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.
 - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
 - .2 Fold up metal banding, flatten and place in designated area for recycling.

1.7 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Do not install roofing when temperature remains below -18°C for torch application.
 - .2 Minimum temperature for solvent-based adhesive is -5°C.
- .2 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.

1.8 WARRANTY

- .1 Provide the Owner, through ARCA a written five (5) year ARCA Warranty stating that the roofing system has been constructed in accordance with the plans and specification and that the workmanship has followed the requirements of the membrane manufacturer.
- .2 The certificate must state that the roofing system will remain weather tight and free from imperfections for a minimum of five (5) years from the date of construction completion certificate and that any and all damage resulting from failure to provide above stated performance shall be repaired to the satisfaction of the Owner at no additional cost.
- .3 Provide the Owner, through the Membrane Manufacturer, an additional five (5) year material guarantee stating this roofing system shall remain watertight and free from material defects for a total of ten (10) years after the final completion date and that all repairs and/or replacement shall be carried out at no additional cost to the Owner.
- .4 Non-ARCA member bidders must include proof of fire-safety training, including successful completion of the roofer certification program for crew members.
- .5 Non-ARCA member bidders must supply a five (5) year Bond worth 20% or \$500,000, whichever is less, of the value of the project for five (5) years upon completion of deficiency stage of contract. The bond must come complete with a total of two (2) inspections by ARCA Warranty Ltd. accredited roofing inspector at two (2) year and four (4) year marks. The costs of the bond and inspections are the responsibility of the contractor and shall be added to the value of the bond. The bond must be responsible for any deficiencies or warranty work immediately following the inspections. The bond must be continuous for five (5) years. Two (2) year bonds with options to renew will not be acceptable.

1.9 DESCRIPTIONS OF ROOFS

- .1 System R1: Provide roof assembly on metal deck.
 - .1 Auxiliary leveling surface
 - .2 Self-adhering vapour retarder
 - .3 Insulation
 - .4 Urethane adhesive
 - .5 Insulation cover panels (Soprasmart 180)
 - .6 Primary membrane
 - .7 Accessories
 - .8 Fire Guard membrane, self -adhering
- .2 System R3: Provide roof assembly on metal deck.
 - .1 Deck covering.
 - .2 Self-adhering vapour barrier
 - .3 Sloped Insulation
 - .4 Urethane Adhesive
 - .5 Insulation cover panels (Soprasmart 180)
 - .6 Primary membrane

Part 2 Products

2.1 PERFORMANCE CRITERIA

- .1 Roof membranes must be by same manufacturer as air barriers and vapour retarder membranes.
- .2 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. Roof membranes must be by same manufacturer as air barrier and vapour retarder membranes.
- .3 Roofing System: to CSA A123.21 for wind uplift resistance.

2.2 DECK COVERING

- .1 Glass mat Gypsum board sheathing: to ASTM C1177/C1177M, 12.7 mm thick.

2.3 DECK PRIMER

- .1 Asphalt primer: to CGSB 37-GP-9Ma.

2.4 VAPOUR RETARDER

- .1 SBS Modified Bitumen Membrane, to CGSB 37-GP-56, 2.2mm thickness, reinforced with 95m² glass fleece, lightly sanded top surface and thermofusible film on underside.
- .2 Soprema SopraVap R or IKO MVP, fully adhered with primer.

2.5 ADHESIVE

- .1 Adhesive for securing overlay board and insulation: asphalt extended vulcanized adhesive, two-component unit, consisting of two liquids mixed on site to produce pourable adhesive. Soprema Duotack or acceptable substitute.

2.6 FLEXIBLE FLASHING AND AIR SEAL MEMBRANE

- .1 Provide Sopralene Flam Stick or accepted substitution, 3.0 mm self-adhesive base sheet membrane with SBS Modified Bitument reinforced with a composite or polyester and glass reinforcement.

2.7 POLYISOCYANURATE INSULATION

- .1 To CAN/ULC-S704-03, Type 2, Class 3, thickness 150mm, HCFC-free construction; minimum LTTR of 1.04 RSI (5.6 R) value per 25mm thickness; with inorganic fibre-reinforced facer; minimum 138kPa compression strength. Less than 500 unrated.

2.8 EXPANDED POLYSTYRENE INSULATION (BACKSLOPES AND CRICKETS)

- .1 Expanded polystyrene (EPS) insulation to CAN/ULC-S701, Type 2, thickness as indicated, square edges.

2.9 TAPERED SUMP INSULATION AT DRAINS

- .1 Provide the following:
 - .1 Polyisocyanurate: to CAN/ULC S704-03, Type 2, Class 3; HCFC-free construction; minimum LTTR of 0.99 RSI (5.6R) value per 25mm thickness; with inorganic fibre-reinforced facer; minimum 138 kPa compression strength.

2.10 LAMINATED PRIMARY MEMBRANE BASE SHEET

- .1 Soprema Sopraply Traffic Cap 560 or accepted substitution.
- .2 Install over insulation to provide torch safe surface.

2.11 CAP SHEET:

- .1 Soprema Sopralene Stick HR GR or accepted substitution.

2.12 FLEXIBLE FLASHING AND AIR SEAL MEMBRANE (TRANSITION)

- .1 Provide minimum 2.5 mm thick, SBS modified bitumen pre-manufactured sheet, with manufacturer's standard internal reinforcement, compatible with substrates. Sopremalene Flam Stick or accepted substitution.

2.13 SEALERS

- .1 Plastic cement: Rubberized asphalt as per ARCA Requirements

2.14 WALKWAYS

- .1 Walkways to consist of SBS modified bitumen traffic cap sheet, 1 m wide x 4 mm thick, with thermofusible plastic film underface, heat welded application. Based on Soprema

Soprafix Traffice Cap 660. Colour to be different from field membrane as selected by Consultant.

2.15 CARPENTRY

- .1 Refer to Section 06 10 00.01- Rough Carpentry.

2.16 FASTENERS

- .1 Covering to steel deck: No. 10 flat head, self tapping, Type A or AB, cadmium plated screws. Recommend FM Approved screw and plate assemblies.

Part 3 Execution

3.1 QUALITY OF WORK

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual, ARCA Roofing Specification Manual.
- .2 Do priming in accordance with manufacturers written recommendations.
- .3 The interface of the walls and roof assemblies will be fitted with durable rigid material plywood providing connection point for continuity of air barrier.
- .4 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

- .1 Verification of Conditions:
 - .1 Review with Consultant deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.
- .2 Evaluation and Assessment:
 - .1 Prior to beginning of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
 - .2 Curbs have been built with vapour retarder below.
 - .3 Roof drains and overflow drains have been installed at proper elevations relative to finished roof surface.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover walls, walks and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of Work.

- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage.
- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.
- .7 Metal connectors and decking will be treated with rust proofing or galvanization.

3.4 DECK SHEATHING

- .1 Mechanically fasten to steel deck Glass Mat Gypsum Board with screws reversible mechanical attachments to steel deck's upper rib surfaces, spaced 400mm on centre each way, in accordance with FM190.
- .2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.5 PRIMING AUXILLARY LEVELING SURFACE

- .1 Apply deck primer to gypsum board roofing substrate at the rate recommended by manufacturer.

3.6 INSTALLATION OF VAPOUR RETARDER ON GYPSUM BOARD SHEATHING- TORCH APPLIED

- .1 Install fireguard tape to exposed joints in gypsum board sheathing, including joints between it and up-stands.
- .2 Prime existing surfaces prior to installing new vapour retardant. Let the primer flash prior to installing the membrane.
- .3 Torch apply the new membrane to the existing vapour retardant.

3.7 FLEXIBLE FLASHING AND AIR SEAL MEMBRANE INSTALLATION

- .1 Install flexible flashing as indicated on detail drawings.
- .2 Fully adhere air seal membrane and flexible flashing to substrates and seal laps with adjoining roof vapour retarder assemblies and wall sheet membrane air and vapour seals.
- .3 Lap joints minimum 150 mm and seal laps.

3.8 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

- .1 Insulation: fully adhered, adhesive application:
 - .1 Adhere insulation to laminated vapour barrier using foam adhesive.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
 - .4 Apply adhesive in accordance to Manufacturer and ARCA
 - .5 Separate the membrane and insulation with a drainage layer or slip-sheet.

- .2 Tapered insulation application:
 - .1 Mop insulation to vapour retarder and top layer of insulation to bottom layer with hot asphalt at rate of 1 kg/m².
 - .2 Install tapered insulation as first insulation layer, accept as detailed otherwise, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.
- .3 Laminated Primary Membrane Base Sheet Overlay Board: adhesive application:
 - .1 Adhere overlay board to insulation with vulcanized adhesive at the rate of 1 litre per m².
 - .2 Place boards in parallel rows with end joints staggered. Cap joints approximately 25 mm.
 - .3 Cut ends to suit and apply adhesive in continuous ribbons at 300 mm on centre.
- .4 Cap sheet application:
 - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
 - .3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
 - .4 Application to be free of blisters, fish mouths and wrinkles.
 - .5 Do membrane application in accordance with manufacturer's recommendations.
- .5 Flashings:
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Install base sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by or torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
 - .5 Provide 75 mm minimum side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
 - .7 Do work in accordance with manufacturer's recommendations and Section 07 62 00 - Sheet Metal Flashing and Trim.

3.9 WALKWAYS

- .1 Install walkway membrane in accordance with manufacturer's instructions as indicated.
 - .1 Apply primer to cap sheet membrane and torch apply, ensuring selvage edge is removed.
- .2 Install pavers on insulation at rainwater leaders, level on insulation pads, and for ice fall protection as indicated on drawings.

3.10 FIRE SAFETY

- .1 Inform Owner of unforeseen fire hazards and obtain instructions before proceeding or continuing with torch application.
- .2 An onsite safety person shall be employed by the Contractor and be on site at all times during the roofing process and shall remain on site two (2) hours after torching has stopped. During this period, the safety person shall scan perimeter and roof penetration details with a hand held infrared gun. Localized hot spots to be investigated for potential fire hazards by cut tests.
- .3 The safety person shall ensure and enforce all safety requirements of the site, as required by Workers' Compensation safety department. Before proceeding with the work, advise the local fire authority of the nature of the work to be undertaken and dates of construction.
- .4 There shall be one fire extinguisher per torch system used on the roof. Failure to provide or not having one available will result in immediate job shut-down.
- .5 Keep suitable fire extinguishers within 10 m of each torch in use.
- .6 Do not use torches near wall cladding
- .7 Take additional precautions against fire as needed to provide adequate fire safety.
- .8 Install fire protection tape over cracks, voids and openings in substrate where a torch applied membrane will be installed.

3.11 FIELD QUALITY CONTROL

- .1 Inspections:
 - .1 Inspection and testing of roofing application will be carried out by a third-party inspection agency certified to perform ARCA inspections.
 - .2 Third-party inspector to be scheduled for up to seven (7) inspections in different phases of construction from start to finish.
 - .3 Inspection costs to include travel, living allowance, site inspections, testing and reports. Refer to section 01 21 00 – Allowances.
 - .4 Contractor to schedule inspections with inspection agency according to construction schedule and so all areas of the roof are inspected.
 - .5 If additional inspections and testing are required Contractor to send request in writing to Owner prior to the final two (2) inspections are completed.

3.12 CLEANING

- .1 Remove bituminous markings from finished surfaces.
- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.
- .4 Waste Management: separate waste materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

- .1 Place materials defined as hazardous or toxic in designated containers.
- .2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
- .3 Ensure emptied containers are sealed and stored safely.
- .4 Divert unused aggregate materials from landfill to local facility for reuse as reviewed by Consultant.
- .5 Unused coating material must be disposed of at official hazardous material collections site.
- .6 Unused adhesive, sealant and asphalt materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .7 Dispose of unused adhesive material at official hazardous material collections site.
- .8 Dispose of unused sealant material at official hazardous material collections site.
- .9 Dispose of unused asphalt material at official hazardous material collections site.
- .10 Divert unused gypsum materials from landfill to recycling facility.

3.13 FIRE SAFETY PROCEDURE FOR THE PROTECTION OF COMBUSTIBLE SUBSTRATE VOIDS

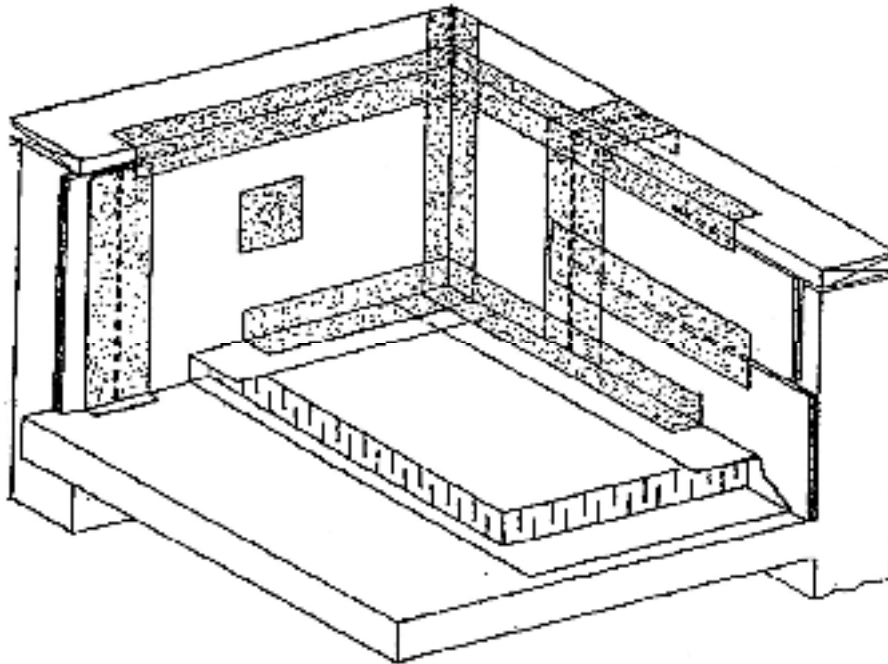


FIG. 1

- .1 Self-adhering S.B.S. modified bitumen fire prevention tape can significantly reduce the risk of flame entering at building elements. Fire safety procedures are to be followed to ARCA Standards.
- .2 Fire prevention tape must be adhered to combustible substrate gaps, cracks, joints and openings prior to the torch application of any modified bitumen membrane. The self adhering tape shall be centered over voids and formed at the angle transitions located at the bases and corners of parapets, curbs, roof/wall junctions and other roof penetrations, see Fig. 1. Leave nothing to chance, always cover all voids prior to lighting the torch. It is recommended that the membrane flashing base sheet be applied the same day as the primary membrane base sheet.
- .3 Self-adhering fire prevention tape be used for every torch adhered modified bitumen project.

3.13 BASE FLASHING INSTALLATION PROCEDURE WITH FIRE PREVENTION
TAPE

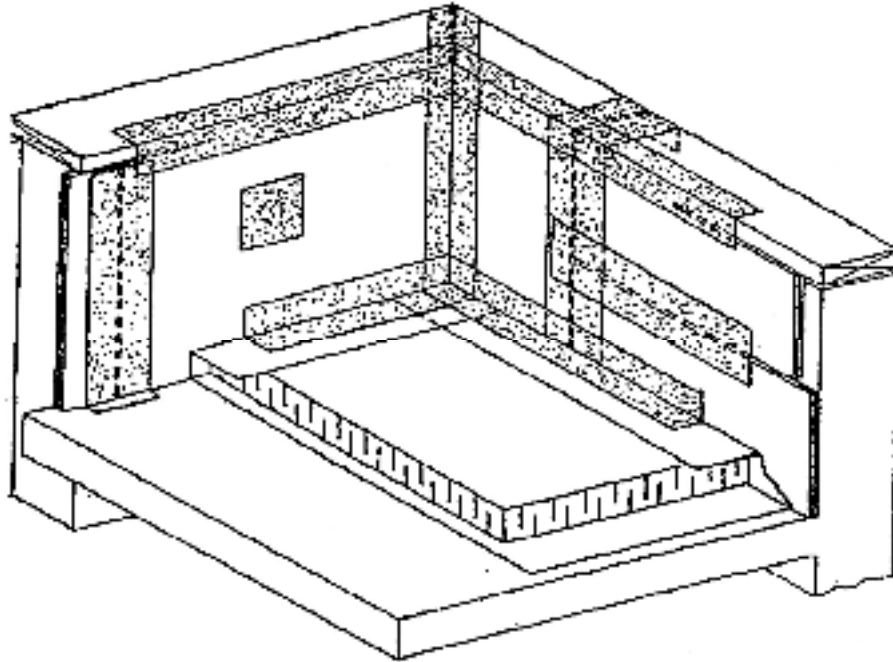


FIG. 2

- .1 The vapour retarder membrane shall wrap the exposed insulation edges at vertical junctions found at parapets, curbs, walls and roof openings. The vapour retarder wrap shall extend a sufficient horizontal distance to permit the primary membrane base sheet to be fully adhered to it. The vapour retarder extension shall be fully adhered to the top surface of the insulation.
- .2 Prior to application of primary membrane base sheet, protect all angle transitions with the vertical substrate by applying a minimum 150mm (6") wide strip of a self adhering fire prevention tape centered over the angle transition.
- .3 Adhere the primary membrane base sheet by overlapping the fire prevention tape at the base of the vertical transition.
- .4 Cover all substrate gaps, cracks, joints or openings at corners and penetrations with self-adhering fire prevention tape prior to torch adhering flashing base sheet.
- .5 Adhere flashing base sheet to vertical substrate and across the top of the wood blocking. Do not torch adhere flashing base sheet to exterior face of the blocking. At the exterior face turn the flashing base sheet down dry to cover the top of the wall finish and mechanically fasten it to the wood blocking.
- .6 Install cap sheet membranes.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 52 00 – Modified Bituminous Membrane Roofing
- .2 Section 07 62 00 – Sheet Metal Flashing and Trim
- .3 Section 07 92 00 – Joint Sealants

1.2 INTENT

- .1 Provide insulated and uninsulated sheet metal roofs, to form a pre-designed roof system.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M-10(R2015), Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
 - .3 ASTM D523-14 Standard Test Method for Specular Gloss.
 - .4 ASTM D822-D822M-13, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)
 - .1 CCMC-2011, Registry of Product Evaluations.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for sheet metal roofing and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Canada.

- .4 Samples:
 - .1 Submit two (2) 300 x 300 mm samples of sheet metal material.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating construction wastes were recycled or salvaged.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages of recycled content materials and products, showing their costs and percentages of post-consumer and pre-consumer content, and total cost of materials for project.
 - .3 Regional Materials: submit evidence that project incorporates regional materials and products, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.5 QUALITY ASSURANCE

- .1 Mock-ups:
 - .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Fabricate sample roofing panel using identical project materials and methods to include typical seam.
 - .3 Mock-up may be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
 - .4 Locate where directed.
 - .5 Allow 24 hours for review of mock-up by Consultant before proceeding with sheet metal flashing work.
 - .6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.
 - .7 Accepted mock-up may remain as part of finished Work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect sheet metal roofing from nicks, scratches, and blemishes.

- .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse of pallets, and/or crates, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.7 DESCRIPTION OF ROOFS

- .1 Roof Type R2 - Uninsulated:
 - .1 Board and batten metal panels.
 - .2 Purpose made clips to fasten through to metal deck.
 - .3 Roof membrane: Grace Ultra Ice and Water Shield or accepted substitution.
 - .4 Gypsum based sheathing.
 - .5 Metal deck.
- .2 Roof Type R4 - Uninsulated:
 - .1 Standing seam metal panels.
 - .2 Purpose made clips for standing seam panels.
 - .3 Roof membrane: Grace Ultra Ice and Water Shield or accepted substitution.
 - .4 Gypsum based sheathing.
 - .5 Metal deck.
- .3 Roof Type R5 – Insulated
 - .1 Standing seam metal panels.
 - .2 Purpose made clips for standing seam panels.
 - .3 125 Z-bars with drainage holes at 600 mm on centre.
 - .4 Roof membrane: Grace Ultra Ice and Water Shield or accepted substitution.
 - .5 Gypsum based sheathing.
 - .6 Metal deck.

Part 2 Products

2.1 BOARD AND BATTEN ROOFING PANELS

- .1 Prefinished aluminum with factory applied finish.
 - .1 Colour: QC2899, Medium Bronze.
 - .2 Coating thickness:
 - .1 2 coat system based on A4-Coat Kynar 500 resin system from Arkema. Acceptable substitution: Hylar 5000 from Solvay Solexis.
 - .2 Metallic Series
 - .3 Metal panel: 0.61 (24 gauge) thick, grade 40 to ASTM A653. Seam size 38 mm high spacing 400 mm.

- .4 Profile: Agway Board and Batten, Profile 103, 356 mm spacing with 51 mm x 35 mm profile 1540 square batten and profile 1530 ridge.

2.2 STANDING SEAM ROOFING PANELS

- .1 Prefinished steel with factory applied silicone modified polyester.
 - .1 Class F2S.
 - .2 Colour: Match Vicwest, Stone Grey - 16071
 - .3 Specular gloss: 30 units +/-5 to ASTM D523.
 - .4 Coating thickness: 25 micrometres minimum.
 - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:
 - .1 Outdoor exposure period 1000 hours minimum.
 - .2 Humidity resistance exposure period 1000 hours minimum.
 - .6 Metal panel: 0.61 (24 gauge) thick, grade 40 to ASTM A653. Seam size 38 mm high spacing 400 mm.
 - .7 Profile: Vicwest Tradition 150 with T-style side lap and seam cap at 400 mm spacing.

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB-37.5.
- .3 Sealant: Asbestos-free sealant, compatible with systems materials, recommended by system manufacturer Caulking see Section 07 92 00 - Joint Sealants.
- .4 Fasteners: concealed.
- .5 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .6 Touch-up paint: as recommended by sheet metal roofing manufacturer.
- .7 Snow Control System:
 - .1 UV-stabilized polycarbonate, clear.
 - .2 Adhered to sloped metal roof in accordance to manufacturers standards and manufacturers recommended adhesive.
 - .3 125 x 125 mm, Sno Gem Original.
 - .4 Based on Oringinal Polycarbonate, a division of Sno Gem.

2.4 FABRICATION

- .1 Fabricate sheet metal panels in accordance with AA ASM-35.
- .2 Factory formed individual pieces in 2400 mm maximum lengths on Out Building and lengths to suit of clerestory roof. Make allowances for expansion at joints.
- .3 Hem exposed edges on underside 12 mm, mitre and seal.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

- .5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections are acceptable for sheet metal roofing installation in accordance with manufacturer's written instructions.
 - .1 Visually review 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.

3.2 INSTALLATION

- .1 Use concealed fastenings except where accepted in writing by Consultant before installation.
- .2 Install sheet metal roof panels using cleats spaced according to material.
- .3 Secure cleats with 2 fasteners each and cover with cleat tabs.
- .4 Transverse seams in adjacent panels.
- .5 Flash roof penetrations with material matching roof panels and make watertight.
- .6 Form seams in direction of water-flow and make watertight.
- .7 Clean and flux metals before soldering.
- .8 Follow sheet metal manufacturer's recommendations for soldering procedures.

3.3 STANDING SEAM ROOFING

- .1 Use 400 mm wide by lengths of sheets to suit for the clerestory roof and 2400 mm for Out Building roof to make roofing with standing seams 400 mm on centre without straight run of standing seam exceeding 10 m.
- .2 Fold lower end of each pan under 20 mm.
 - .1 Slit fold 25 mm away from corner to form tab where pan turns up to make standing seam.
 - .2 Fold upper end of each pan over 50 mm.
 - .3 Hook 20 mm fold on lower end of upper pan into 50 mm fold on upper end of underlying pan.
- .3 Apply sheet metal roofing beginning at eaves. Loose lock pans to valley flashing and edge strips at eaves and gable rakes.
- .4 Finish standing seams 25 mm high on flat surfaces. Bend up one side edge 40 mm and other 45 mm.
 - .1 Make first fold 6 mm wide single fold and second fold 12 mm wide, providing locked portion of standing seam with 5 plies in thickness.

- .2 Fold lower ends of seams at eaves over at 45 degrees angle.
- .3 Terminate standing seams at ridge and hips by turning down in tapered fold.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 70 00 – Stone Veneer
- .2 Section 07 24 23 – Cement Stucco
- .3 Section 07 42 13 – Modular Panel System
- .4 Section 07 52 00 – Modified Bituminous Membrane Roofing
- .5 Section 07 61 00 – Sheet Metal Roofing
- .6 Section 08 11 00 – Metal Doors and Frames
- .7 Section 08 36 13.02 – Sectional Metal Doors
- .8 Section 08 44 13 – Glazed Aluminum Curtain Walls and Aluminum Windows

1.2 REFERENCES STANDARDS

- .1 The Aluminum Association Inc. (AAI)
 - .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
 - .2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A606/A606M-15, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .2 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM B32-08(2014), Standard Specification for Solder Metal.
 - .4 ASTM D822/D822M-13, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual 1997.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.
 - .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .6 Green Seal Environmental Standards
 - .1 Standard GS-03-93, Anti-Corrosive Paints.

- .2 Standard GS-11-97, Architectural Paints.
- .3 Standard GS-36-00, Commercial Adhesives.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .8 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule #1113-16, Architectural Coatings.
 - .2 SCAQMD Rule #1168-05, Adhesives and Sealants.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
 - .1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Canada.
- .4 Samples:
 - .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.
- .5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.4 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section on-site installation, with contractor's representative Consultant in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

- .2 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2

2.1 PREFINISHED STEEL SHEET

- .1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, chemically treated for unpainted finish.
- .2 Prepainted Galvanized Steel: commercial quality to ASTM A653/A653M with Z275 zinc coating prepainted with baked on enamel with colours of proven durability for exterior exposure, to CSSBI Technical Bulletin No. 7, 5000 series, 0.76 mm thick (22 ga).
- .3 Colours to be from manufacturer's standard range.

2.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Sealants:
 - .1 Maximum VOC limit compliant with SCAQMD Rule 1168.
 - .2 One component, elastomeric, chemical curing, VOC compliant with SCAQMD Rule #1168.
- .3 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .4 Fasteners: of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.
- .5 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .6 Solder: to ASTM B32, alloy composition Sn50-Zn49.
- .7 Flux: commercial quality as recommended by sheet metal manufacturer.
- .8 Touch-up paint: as recommended by prefinished material manufacturer.
 - .1 Maximum VOC limit compliant with Standard GS-11 or SCAQMD Rule 1113.
- .9 Flashing anchor clips: 0.80 mm thick galvanized steel.

2.3 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work as indicated.
- .2 Hem exposed edges on underside 12 mm.
 - .1 Mitre and seal corners with sealant.
- .3 Form end dams for sill flashings to be tied into jamb flashings.
- .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.
- .6 Construction flashing joints to allow for flashing movement, using flat “S” lock seams.
- .7 Maintain minimum of 22 mm lap at all joints. Provide 25 mm anchor projection of “S” locks.
- .8 Maintain minimum 1:5 slope on horizontal surfaces of flashings, parapets and control joints.
- .9 Fabricate cap flashings to have drip leg minimum 110 mm high.
- .10 Fabricate cap and counter flashings to lap 100 mm over base flashings.

2.4 METAL FLASHINGS

- .1 Form flashings, copings, and fascia to profiles indicated of 0.70mm thick prefinished steel.

2.5 EAVES TROUGHS AND DOWNSPOUTS

- .1 Form eaves troughs and downspouts from prefinished steel sheet metal.
- .2 Sizes: 100 mm square, 24 ga steel.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install sheet metal work as detailed.
- .2 Use concealed fastenings except where accepted before installation.
- .3 Lock end joints and caulk with sealant.
- .4 Install surface mounted reglets true and level, and caulk top of reglet with sealant.

3.3 EAVES TROUGHS AND DOWNSPOUTS

- .1 Install eaves troughs and secure to building at 750 mm on centre with eaves trough spikes through spacer ferrules.
 - .1 Slope eaves troughs to downspouts.
 - .2 Seal joints watertight.
- .2 Install downspouts back to wall.
 - .1 Secure downpipes to wall with straps at 1800 mm on centre; minimum two straps per downpipe.
- .3 Manufacturer's Field Services:

- .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 81 01 – Hazardous Materials
- .2 Section 04 22 00 – Concrete Unit Masonry
- .3 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-14e5, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S115-11 (R2016), Standard Method of Fire Tests of Firestop Systems.

1.3 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted: (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.
 - .1 Words "tightly fitted" indicates the integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
 - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
 - .2 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures and.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company specializing in fire stopping installations approved by manufacturer.
- .2 Section 01 32 16.07 - Construction Progress Schedule - Bar (GANNTT) Chart to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .2 Storage and Protection:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
 - .1 Asbestos-free materials and systems capable of maintaining 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 specified special requirements described in PART 3.
 - .2 Fire stop system rating: as noted on drawings.
- .2 Service penetration assemblies: systems tested to CAN-ULC-S115.
- .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.
- .4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .9 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.
- .10 Sealants for vertical joints: non-sagging.
- .11 Repenetrable fire stopping at communication and data cabling.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
 - .1 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.

3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .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 neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.4 FIELD QUALITY CONTROL

- .1 Notify Consultant when ready for review and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.6 SCHEDULE

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Top and bottom of fire-resistance rated masonry and gypsum board partitions.
 - .3 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .6 Openings and sleeves installed for future use through fire separations.
 - .7 Around mechanical and electrical assemblies penetrating fire separations.
 - .8 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
 - .9 Data and Communication Cabling: penetrations to use repenetrable fire stop systems.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 22 00 – Concrete Unit Masonry
- .2 Section 06 40 00 – Shop Fabricated Architectural Woodwork.
- .3 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C919-12(2017), Standard Practice for Use of Sealants in Acoustical Applications.
 - .2 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Manufacturer's product to describe:
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
 - .3 Submit WHMIS MSDS in accordance with Section 01 35 43- Environmental Procedures.
- .3 Manufacturer's Instructions:
 - .1 Submit instructions to include installation instructions for each product used.
- .4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Testing to be provided by an independent inspection agency to confirm assemblies field test to STC 46.

1.4 MOCK-UPS

- .1 Provide a mock-up for the following applications:
 - .1 Acoustic sealant between gypsum board perimeter panels and under floor track.
 - .2 Acoustic sealant between concrete block wall and gypsum board ceiling.
 - .3 Epoxy sealant around steel fixtures with high build coating finish.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Operation and Maintenance Data: submit assembly test information and maintenance data for incorporation into manual.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect joint sealants
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse by manufacturer of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21- Construction Waste Management and Disposal.

1.7 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Proceed with installation of joint sealants only when:
 - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 5°C.
 - .2 Joint substrates are dry.
 - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions:
 - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:

- .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.

Part 2 Products

2.1 MANUFACTURERS

- .1 Subject to compliance with requirements, manufacturer's products that may be incorporated into the Work include, but are not limited to, the following:
 - .1 GE Silicones Limited
 - .2 ChemRex Inc., Sonneborn
 - .3 Chemtron Manufacturing Ltd.
 - .4 Dow Corning Canada Inc.
 - .5 Sika Chemical of Canada Ltd.
 - .6 Tremco Ltd.

2.2 MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas, which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.
- .4 Provide joint sealants, backings, and other related materials that are compatible under conditions of application, as demonstrated by sealant manufactured based on testing and site experience.
- .5 Colours of exposed joint sealants will be selected by the Consultant from the manufacturer's complete range to match existing finish materials.
- .6 Joint sealants to be paintable grade for exposed interior applications.

2.3 SEALANT MATERIAL DESIGNATIONS

- .1 Epoxy Sealant:
 - .1 Rigid, two-part, high solids, high modulus epoxy resin compound, no substitutions. Acceptable products:
 - .1 Sika AnchorFix 3001.
 - .2 DynaPoxy EP-1200, Pecora Corporation.

- .3 Sika AnchorFix 2001.
- .4 Sika AnchorFix 2Arctic.
- .2 Multi-Component Sealant:
 - .1 Chemical curing, non-sag, Shore A Hardness 20-35, conforming to ASTM C920, Grade NS, Class 25, use NT, M and A.
- .3 Silicone Sealant Exterior 1:
 - .1 Exterior weatherproofing sealant, one-part, low modulus, neutral cure, conforming to ASTM C920, Type S, Grade NS, Class, 25, use NT, M, G, A and O, colour selected by Consultant.
- .4 Silicone Sealant Exterior 2:
 - .1 Air-seal sealant: One part, silicone, conforming to ASTM C920, Type S Grade NS, Class 25, use NT, M, G, A and O.
- .5 Silicone Sealant Structural Glazing:
 - .1 Shore A hardness 15-25, conforming to CAN/CGSB-19.13-M, Classification C-1-40-B-N and C-1-25-B-N, and ASTM C920, Type S, Grade P, Class 25, use T, M.
- .6 Silicone Sealant Interior:
 - .1 One-part, conforming to ASTM C920, Type S, Grade NS, Class 25, mould and mildew resistant, transparent finish.
- .7 Interior Acoustic Sealant:
 - .1 Non-skinning, non-hardening, single component synthetic rubber sealant, conforming to ASTM E90, with antifungal additive.
- .8 Polyurethane Sealant:
 - .1 Two-component, self-levelling, polyurethane elastomeric sealant, conforming to ASTM C920, Type M, Grade P, Class 25.
- .9 Butyl Sealant Type A: Butyl rubber base, single component, solvent release, non-skinning, Shore "A" hardness range 10 to 30.
- .10 Sealant Type B: single component, chemical curing, capable of continuous water immersion, non-sagging type, Shore 'A' hardness range of 20 to 35.
- .11 Preformed compressible and non-compressible back-up materials:
 - .1 Polyethylene, urethane, neoprene or vinyl foam:
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Neoprene or butyl rubber:
 - .1 Round solid rod, Shore 'A' hardness 70.
 - .3 High density foam:
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore 'A' hardness 20, tensile strength 140 to 200 kPa,

extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.

- .4 Bond breaker tape:
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.4 SEALANT SELECTION

- .1 Control and expansion joints on the exterior of exterior surfaces of unit masonry walls: sealant type: Silicone Sealant Exterior 1.
- .2 Control and expansion joints on the interior of exterior surfaces of unit masonry walls: sealant type: Epoxy Sealant between Gridlines 7 to 10 and B to G.
- .3 Perimeters of exterior penetrations: sealant type: Silicone Sealant Exterior 2.
- .4 Perimeters of interior frames, as detailed and itemized: sealant type: Silicone Sealant Interior.
- .5 Interior masonry vertical control joints (block-to-block, block to concrete, block to steel, and intersecting masonry walls): sealant type: Epoxy Sealant within gridlines 7 to 10 and B to G and Multi-component Sealant outside gridlines 7 to 10 and B to G.
- .6 Joints at tops of non-load bearing masonry walls at the underside of poured concrete: sealant type: Epoxy Sealant.
- .7 Perimeter of bath fixtures and millwork (e.g. sinks, tubs, urinals, stools, water closets, basins, vanities): sealant type: Silicone Sealant Interior.
- .8 Acoustic separations: sealant type: Acoustic sealant.
- .9 Concrete slab control joints: sealant type: Polyurethane Sealant.

2.5 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
- .2 Primer: in accordance with sealant manufacturer's written recommendations.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.
 - .1 Visually review 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.

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

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

3.3 PRIMING

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

3.4 BACKUP MATERIAL

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

3.5 MIXING

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

3.6 APPLICATION

- .1 Sealant:
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.

3.7 FIELD QUALITY CONTROL

- .1 Inspections:

- .1 Inspection and testing of acoustic application will be carried out by a third-party inspection agency certified to perform inspections to confirm Sound Transmission Class (STC) ratings of designated acoustic rooms.
- .2 Contractor will pay for inspections at completion of acoustic rooms, prior to Substantial Completion. Inspection costs to include travel, living allowance, site inspections, testing and reports.
- .3 If acoustic rooms perform lower than the noted STC ratings, Contractor to pay for all remediation to construction and retesting by the same inspection agency until STC levels are met.
- .4 Rooms 102, 103, 104, 109, 116, 131, 132, 148, 168, 169, 170, 171 are to be testing to STC 50. Rooms 131 and 132 are considered one room. Rooms 169, 170, and 171 are considered one room.
- .5

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean adjacent surfaces immediately.
 - .3 Remove excess and droppings, using recommended cleaners as work progresses.
 - .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

3.9 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 08 71 00 – Door Hardware
- .2 Section 08 81 00 – Glass and Glazing
- .3 Section 09 96 00 – High Build Coating

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A653/A653M-15e1, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B29-14, Standard Specification for Refined Lead.
 - .3 ASTM B749-14, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
 - .4 ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .3 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2006.
 - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.
- .4 National Fire Protection Association (NFPA)
 - .1 NFPA 80-2016, Standard for Fire Doors and other Opening Protective.
 - .2 NFPA 252-2017, Fire Tests of Door Assemblies.
- .5 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-16, Architectural Coatings.
 - .2 SCAQMD Rule 1168-05 Adhesives and Sealants Applications.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702-14, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .3 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .4 CAN4-S104-15, Standard Method for Fire Tests of Door Assemblies.

- .5 CAN4-S105:2016, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.3 SYSTEM DESCRIPTION

- .1 Design Requirements:
 - .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
 - .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
 - .3 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
 - .4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, NFPA 252 and listed by nationally recognized agency having factory inspection services.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for block masonry and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Canada.
 - .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed arrangement of hardware fire rating and finishes.
 - .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings reinforcing fire rating finishes.
 - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .4 Samples:
 - .1 Submit one 300 x 300 mm corner sample of each type of frame.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .2 Recycled Content:

- .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer, post-industrial content, and total cost of materials for project.

- .3 Regional Materials: submit evidence that project incorporates regional materials.

1.5 SUSTAINABLE REQUIREMENTS

- .1 Materials and products in accordance with Section 01 35 43 – Environmental Procedures.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

- .2 Waste Management and Disposal:

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653M, ZF75.

2.2 DOOR CORE MATERIALS

- .1 Provide evidence that the project incorporates minimum percentage (20%) of recycled materials/products.
- .2 Honeycomb Construction:
 - .1 Structural small cell, 24.5 mm maximum Kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness.
- .3 Stiffened: face sheets laminated and insulated core.
 - .1 Insulation:
 - .1 Expanded polystyrene: CAN/ULC-S701, Type D, density 16 to 32 kg/m³.

2.3 ADHESIVES

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
 - .1 Adhesive: maximum VOC content compliant with SCAQMD Rule 1168.

- .2 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMER

- .1 Factory prime paint doors and frames after fabrication and cleaning in one uniform coat, free of streaks and sags.
- .2 Use an epoxy high-build coating primer compatible with final high build epoxy finish coats where noted in door schedule. Doors and frames noted to receive both high-build coating and paint are to have primer compatible with both finish coats or provide an intermediate coating between primer and finish coats to create a compatible system.
- .3 Provide small quantities of primers and intermediate coating for door and frame priming at factory for site applied touch-up prior to finished top-coat application.

2.5 PAINT

- .1 Field paint steel doors and frames in accordance with Sections 09 91 23 - Interior Painting, 09 91 13 - Exterior Painting. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.
 - .1 Maximum VOC emission level compliant with GS-11, GC-03 and SCAQMD Rule 1113.

2.6 ACCESSORIES FOR DOORS

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior, top and bottom caps: steel.
- .3 Glazing stops: 20 ga. Cold rolled steel frame. Mitred and welded corners, beveled return, continuous glass retainer, countersunk mounting holes. Screws fasten from room side into pre-punched mounting holes. Based on STK-Thermal Kit.
- .4 Door bottom seal: Refer to Hardware Section 08 71 00.
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal riveted.
- .7 Sealant:
 - .1 Seal interior frames at wall connections with translucent silicone sealant.
 - .2 Seal fire rated frames with paintable, fire sealant.
- .8 Glazing:
 - .1 Make provisions for glazing as indicated and provide necessary glazing stops.
 - .2 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws dry glazing of snap-on type.
 - .3 Design exterior glazing stops to be tamperproof.
 - .4 Glazing to be in accordance with Section 08 81 00 – Glass and Glazing.

2.7 DOOR AND METAL WINDOW FRAMES - FABRICATION GENERAL

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 1.6 mm welded type construction. Design framing members to withstand their own weight, weight of glass, loads imposed by motion of operable elements, and design wind and suction loads to a maximum allowable deflection of 1/175 of span, when tested to ASTM E330.
- .4 Interior frames: 1.6 mm welded type construction.
- .5 Blank, reinforce, drill and tap frames for mortised, templated hardware, electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cut-outs with steel guard boxes.
- .7 Prepare frame for door silencers, three (3) for single door, two (2) at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.
- .12 Provide a 1.2 mm steel extension trim welded to pressed steel frame, as detailed.

2.8 FRAME ANCHORAGE

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide two (2) anchors for rebate opening heights up to 1,520 mm and one (1) additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm on centre maximum.

2.9 FRAMES: WELDED TYPE

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.

- .6 Weld in two (2) temporary jamb spreaders per frame to maintain proper alignment during shipment.
- .7 Fabricate frame products in one piece except where shipping limitations requires frames to be spliced. Notify Consultant of these frames prior to manufacturing.

2.10 DOOR FABRICATION GENERAL

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: insulated, hollow steel construction. Interior doors: honeycomb construction.
- .3 Fabricate doors with longitudinal edges locked seamed, adhesive assisted. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .4 Blank, reinforce, drill doors and tap for mortised, templated hardware electronic hardware.
- .5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 Reinforce doors where required, for surface mounted hardware. Provide flush steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in conformance with CAN4-S104, NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .9 Manufacturer's nameplates on doors are not permitted.

2.11 DOORS: HONEYCOMB CORE CONSTRUCTION

- .1 Form face sheets for exterior doors from 1.6 mm sheet steel with polystyrene core laminated under pressure to face sheets.
- .2 Form face sheets for interior doors from 1.6 mm sheet steel with honeycomb core laminated under pressure to face sheets.

2.12 HOLLOW STEEL CONSTRUCTION

- .1 Form face sheets for exterior doors from 1.6 mm sheet steel.
- .2 Form face sheets for interior doors from 1.6 mm sheet steel.
- .3 Reinforce doors with vertical stiffeners, securely laminated to face sheets at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with polystyrene core.
- .5 Fill voids between stiffeners of interior doors with honeycomb core.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION GENERAL

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

3.3 FRAME INSTALLATION

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air/vapour barriers.

3.4 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
 - .1 Hinge side: 1.0 mm.
 - .2 Latch-side and head: 1.5 mm.
 - .3 Finished floor, top of carpet non-combustible sill and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvres.

3.5 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.6 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

3.7 CLEANING

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking; clean doors and frames.
- .3 Clean glass and glazing materials with approved non-abrasive cleaner.
- .4 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .6 Waste Management: separate waste materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

3.8 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 40 00 – Shop Fabricated Architectural Woodwork
- .2 Section 08 11 00 – Metal Doors and Frames
- .3 Section 08 71 00 – Door Hardware

1.2 REFERENCE STANDARDS

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
 - .1 Quality Standards for Architectural Woodwork (Edition 2) and Errata.
- .2 Canadian Standards Association (CSA International).
 - .1 CSA A440.2-14/A440.3-14, Fenestration Energy Performance.
 - .2 CSA O115-M1982(R2001), Hardwood and Decorative Plywood.
 - .3 CAN/CSA O132.2 Series-90(R1998), Wood Flush Doors.
 - .4 CAN/CSA-O132.5-M1992(R1998), Stile and Rail Wood Doors.
 - .5 CAN/CSA-Z808-96, A Sustainable Forest Management System: Guidance Document.
- .3 National Fire Protection Association (NFPA).
 - .1 NFPA 80-16, Standard for Fire Doors and Other Opening protectives.
 - .2 NFPA 252-17, Fire Tests of Door Assemblies.
- .4 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN4-S105:2016, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet.
 - .2 Submit electronic copies of WHMIS MSDS - Material Safety Data Sheets.
Indicate VOC's:
 - .1 For caulking materials during application and curing.
 - .2 For door materials and adhesives.
- .3 Shop Drawings:
 - .1 Shop drawings to indicate door types and cut-outs for lights, sizes, core construction, transom panel construction and cut-outs.
- .4 Samples:
 - .1 Submit one 300 x 300 mm corner sample of each type wood door.

- .2 Show door construction, core, glazing detail and faces.
- .5 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.
 - .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- 1.5 DELIVERY, STORAGE, AND HANDLING**
 - .1 Storage and Protection:
 - .1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.
 - .2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.
 - .3 Protect doors from scratches, handling marks and other damage. Wrap doors.
 - .4 Store doors away from direct sunlight.
- 1.6 WASTE MANAGEMENT AND DISPOSAL**
 - .1 Remove from site and dispose of packaging materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .2 Dispose of corrugated cardboard, and plastic packaging material in accordance with site Waste Management Plan.
- Part 2 Products**
 - 2.1 WOOD FLUSH DOORS**
 - .1 Solid core: to CAN/CSA-O132.2.1.
 - .1 Construction:
 - .1 Solid particleboard core: stile and rail frame bonded to particleboard core with wood lock blocks, 7-ply construction.
 - .2 Face Panels:
 - .1 Hardwood; veneer grades: Grade I (Premium).
 - .2 Finish: Prefinished Birch.
 - .3 Adhesive: Type II (water resistant) for interior doors.
 - 2.2 FABRICATION**
 - .1 Vertical edge strips to match face veneer.
 - .2 Bevel vertical edges of single acting doors 3 mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Unwrap and protect doors in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Install doors and hardware in accordance with manufacturer's printed instructions.
- .3 Adjust hardware for correct function.
- .4 Secure transom and side panels by means of concealed fasteners or countersunk screws concealed by means of wood plugs matching panel in grain and colour.

3.3 ADJUSTMENT

- .1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

3.4 CLEANING

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking; clean doors and frames.
- .3 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .5 Waste Management: separate waste materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 22 00 – Concrete Masonry
- .2 Section 07 05 80 – Common Work Results of Fire Rated Separations and Assemblies
- .3 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM A568/A568M-15, Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
 - .2 ASTM A653/A653M-15, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements for.
 - .3 ASTM A1008/A1008-16, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - .4 ASTM B221/B221M-14, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .5 ASTM C1396/C1396M, Standard Specification for Gypsum Board.

1.3 ADMINISTRATION REQUIREMENTS

- .1 Coordination: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified below, and as follows:
 - .1 Coordinate locations of all access panels in gypsum board ceilings with Consultant for size and location prior to installation, making every effort to locate outside of gypsum board ceilings.
 - .2 Coordinate acceptable locations and sizes with Architectural Reflected Ceiling Plans; no access panels are allowed in public corridors or feature ceilings.
 - .3 Coordinate closely with mechanical and electrical sections for size and locations of access panels in walls and ceilings; provide access doors and panels required for project.

1.4 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 – Submittals.
 - .1 Product Data: Submit product data for each type of door and frame indicated, including construction details relative to materials, individual components and profiles, finishes, and fire ratings required for access doors and frames.
 - .2 Shop Drawings: Submit coordination drawings and reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:
 - .1 Method of attaching door frames to surrounding construction.

- .2 Ceiling mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.
- .3 Samples: Provide complete door and frame schedule, including types, general locations, sizes, construction details, latching or locking provisions, and other data pertinent to installation.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: Provide fire rated access doors and frames in accordance with NFPA 80 or ULC S104, and labelled and listed by UL, ULC or ITS/Warnock Hersey, or another testing and inspecting agency acceptable to authority having jurisdiction and Section 07 05 80 – Common Work Results for Fire Rated Separations and Assemblies.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, off ground, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect toilet and urinal compartments from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.
- .5 Packaging Waste Management: remove for reuse and return of packaging materials, padding, and pallets, as specified in[Construction Waste Management Plan in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NON-RATED ARCHITECTURAL ACCESS PANELS

- .1 Flush doors and trimless frames, fabricated as follows:
 - .1 Aluminum Extrusions: ASTM B221/B221M, alloy 6063-T6.
 - .2 Door: Extruded aluminum frame with gypsum board inlay and structural nylon corner elements:
 - .1 Gypsum Board: to ASTM C1396/C1396, 16 mm thickness to match adjacent construction.
 - .2 Size: Square or rectangular sized to suit access requirements for fan coil filters.
 - .3 Latch: Flush cam latch operated by tamper-resistant torx drive.
 - .4 Hinge: Concealed, two-point pin hinge, non-corroding, allowing door to open 120° and allowing door to be removed.

- .5 Edge Bead: Recessed extruded aluminum frame edge bead providing surface that can be finished to adjacent gypsum board.
- .6 Accessories: Fibreglass reinforced nylon, zinc plated screws, stainless steel springs and retaining wire to manufacturer's standard.
- .7 Finish: Aluminum frames, gypsum board, nylon and aluminum cam latch to receive the same finish and paint as the surrounding surface.
- .8 Acceptable materials:
 - .1 Access Panel Solutions, BaucoPlus Architectural Access Panel.

2.2 FIRE RATED ACCESS PANELS IN GYPSUM BOARD

- .1 Flush, fire rated access doors and trimless frames, fabricated from zinc coated steel sheet, and as follows:
 - .1 Cold-Rolled Steel Sheets: ASTM A1008/A1008M, Commercial Steel (CS), or ASTM A1008/A1008M, Drawing Steel (DS), Type B; stretcher-levelled standard of flatness; with minimum thickness indicated representing specified nominal thickness according to ASTM A568/A568M.
 - .2 Galvanizing: Electrolytic zinc-coated steel sheet, complying with ASTM A591/A591M, Class C coating or ASTM A653/A653M Z180 (G60) mill phosphatized zinc coating, at fabricator's option.
 - .3 Door: Flush panel, minimum thickness of 0.95 mm.
 - .4 Latch: Self-latching bolt operated by standard screwdriver with interior release.
 - .5 Hinge: Concealed, two-point pin hinge, non-corroding, allowing door to open 120° and allowing door to be removed.
 - .6 Automatic Closer: Spring type.
- .2 Edge Beads: Edge trim formed from 0.80 mm nominal thickness zinc coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.
- .3 Door Frame: Minimum 1.6 mm thick sheet metal with gypsum board bead.
 - .1 Acceptable materials: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - .1 Acudor Products, Inc., FB-5050-DW
 - .2 Nystrom Building Products Co., UW Series

2.3 FABRICATION

- .1 Provide access door assemblies manufactured as integral units ready for installation.
- .2 Provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness for metal surfaces exposed to view in the completed Work.
- .3 Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
- .4 Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed based on size of door or panel opening.

- .5 Apply manufacturer's standard protective coating on aluminum that will come in contact with concrete after fabrication.

2.4 FINISHES

- .1 Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- .2 Finish metal fabrications after assembly.
- .3 Steel Finishes:
 - .1 Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. For galvanized surfaces, apply, after cleaning, a conversion coating suited to the organic coating to be applied over it. For zinc coated surfaces, clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A780.
 - .2 Factory Priming for Field-Painted Finish: Apply shop primer immediately after cleaning and pre-treating, as follows:
 - .1 Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
 - .2 Shop Primer for Zinc Coated Steel: Organic zinc-rich primer complying with SSPC-Paint 20 and compatible with topcoat.
 - .3 Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

Part 3 Execution

3.1 PREPARATION

- .1 Advise installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

3.2 INSTALLATION

- .1 Installation shall be completed by Section 04 22 00 – Concrete Masonry and Section 09 21 16 – Gypsum Board Assemblies.
- .2 Comply with manufacturer's written instructions for installing access doors and frames.
- .3 Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- .4 Install access doors with trimless frames flush with adjacent finish surfaces, unless noted otherwise.
- .5 Install non-rated architectural access panels recessed to receive finish material in areas 101, 168 and 172. Other access panels to be as per

3.3 ADJUSTING

- .1 Adjust doors and hardware after installation for proper operation.
- .2 Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

3.4 FINISHING

- .1 Paint access panels in the field to match adjacent paint colour.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning, supplemented as follows.
 - .1 Progress Cleaning: Leave Work area clean at the end of each day.
 - .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 12 – Masonry Mortar and Grout
- .2 Section 04 22 00 – Concrete Unit Masonry
- .3 Section 07 92 00 – Joint Sealants
- .4 Section 09 96 60 – High Build Coating

1.2 REFERENCES STANDARDS

- .1 Aluminum Association (AA)
 - .1 Aluminum Standards and Data 2017.
- .2 American National Standard (ANSI), National Association of Architectural Metal Manufacturers (NAAMM), Hollow Metal Manufacturers Association (HMMA).
 - .1 ANSI H35.2-2017, Dimensional Tolerance for Aluminum Mill Products.
 - .2 ANSI/NAAMM HMMA 863-04 Fifth Edition-05, Guide Specifications for Detention Security Hollow Metal Doors and Frames.
 - .3 ANSI/SDI A250.8-2014, Specifications for Standard Steel Doors and Frames (SDI-100)
- .3 ASTM International Inc.
 - .1 ASTM A307-14a1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
 - .2 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM F1450-12a, Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities.
 - .4 ASTM F1643-05(2012), Standard Test Methods for Detention Sliding Door Locking Device Assembly.
 - .5 ASTM F1758, Standard Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors.
 - .6 ASTM F1915, Standard Test Methods for Glazing for Detention Facilities.
- .4 The Coating Society (SSPC)
 - .1 SSPC-SP 6/NACE No.3, Commercial Blast Cleaning.
- .5 CSA International
 - .1 CAN/CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .6 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1115-16, Architectural Coatings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for block masonry and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .4 Manufacturer's Instruction:
 - .1 Submit manufacturer's installation instructions.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

1.4 QUALITY ASSURANCE

- .1 Doors and frames that exhibit rusting or distortion or surface irregularities due to improper fabrication or handling will be rejected.
- .2 Door slabs to be tested and certified to meet a minimum Level 3 ANSI/NAAMM 863, ASTM F1450 testing requirement for all static load, rack, door impact and glazing impact tests. Provide copy of test results along with shop drawings.
- .3 Door installation to be by qualified installers, approved by Manufacturer, with a minimum ten (10) years experience in installation of detention doors. Provide Consultant with proof of installer qualifications prior to commencing installation.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Packaging Waste Management:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 SITE CONDITIONS

- .1 Provide in accordance with Section 04 05 00 - Common Work Results for Masonry.

1.7 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for cleaning, re-glazing and maintenance of doors for incorporation into manual in accordance with Section 01 78 00 – Closeout Submittals.
- .2 Warranty Documentation: submit warranty documents specified.

Part 2 Products

2.1 MANUFACTURED PRODUCTS

- .1 Approved details and specification for sliding detention doors identified as appended to this section.
- .2 Manufactured products and installation must meet the details and specifications without deviation. No changes or substitutions will be accepted without prior written approval by the Owner.
- .3 Details contained in the bid documents that supersede the following drawings are to be reviewed with Consultant prior to any procurement, fabrication or installation to ensure compliance.

2.2 MATERIALS

- .1 Sheet Steel: commercial zinc-coated quality to ASTM A653/A653M, wipe coat designation.
- .2 Steel Plates and Shapes: to CAN/CSA-G40.20/21, Type 250W.
- .3 Insulation: 50 mm thick rigid fibreglass AF-545.
- .4 Hardware: tracks, hangers, guides, pulls, locks and hinges, to Owner standard.
- .5 Security Glass and Gaskets: 6 mm thick Lexan Margard to corridor side, 6 mm air space, 6 mm thick Lexan Margard to cell side.
- .6 Security Screws: flat head chip-off type and tamper resistant pin Torx for glass stops, sized to suit.
- .7 Anchor Bolts: to ASTM A307
- .8 Hardware: locks, double escutcheons, lock buckets and paracentric keys by door supplier. All doors to be keyed alike, provide three (3) keys total.
 - .1 Acceptable locks:
 - .1 Folger Adams 32D
 - .2 Southern Steel 1030 AD-1
 - .2 Primer: Product compatible with epoxy finish topcoat accepted by high build coating manufacturer and in accordance to Section 09 96 59 – High-build Glazed Coatings.
- .9 Epoxy Sealant: to gaps 2 mm or larger.

2.3 FABRICATION

- .1 Fabricate sliding steel doors, swinging steel doors and associated frames to sizes and configuration detailed on reviewed shop drawings.
- .2 Fabricated units square and true, free of distortion and twists. Accurately form and fit corners and interconnecting sections, to close fitting tolerances.
- .3 Full-weld together all corners and interconnecting joints. Grind welds smooth to a flat plane flush with component surfaces.

- .4 Fabricate doors allowing for adequate clearance from frames on all sides, with a maximum permissible warp of 3 mm when measured diagonally across doors.
- .5 Fabricate doors using one-piece sheet for each side.
- .6 Weld reinforcement to door face sheets in a manner that will not distort or telegraph through face sheets.
- .7 Reinforce, drill and tap doors and frames for hardware, glass stops and fitments.
- .8 Rabbet the door viewport glazing to be flush with interior door skin.
- .9 Incorporate door pulls into the viewport frame.
- .10 Food pass-through must be flush with inside door skin when closed.
- .11 Rail assembly to have anti-lift feature.
- .12 Hinges to be heavy-duty capacity with non-removable pins.
- .13 Door frame to have mitred corners and 50 mm drop at header to prevent access to top of door.
- .14 Receiver/Guide Rail to be cut 300 mm from top and bottom. Provide inspection port for hook bolt engagement.

2.4 SURFACE PREPARATION

- .1 Remove welding slag and spatter from exposed surfaces. Grind exposed welds smooth and evenly. Fill surface depressions with metallic filler and sand to uniform smooth finish.
- .2 Remove rust, scale, oil and other foreign substances to SSPS-SP 6 to provide clean surfaces. Light sand blast or etch the surface in accordance with high-build coating manufacturer's recommendations or minimum of SSPC SP 6, whichever is more stringent.
- .3 From factory, prime paint doors and frames after fabrication and cleaning in one uniform coat, free of streaks and sags using an epoxy high-build coating primer compatible with final high build epoxy top coat.
- .4 Provide a small quantity of primer used for door priming at factory for site applied touch-up prior to finished top-coat applications.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify surfaces and conditions are ready to accept work of this Section.
- .2 Commencing installation means acceptance of existing substrates.

3.2 PREPARATION

- .1 Protect finished materials from damage due to adjacent masonry work.

3.3 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.

3.4 INSTALLATION

- .1 Coordinate installation of anchors being cast into masonry work.
- .2 Install sliding doors, swinging doors and frames plumb and square, in accordance with detail drawings and with maximum diagonal distortion of 3 mm.
- .3 Final installed gap between door and frame must not exceed 3mm.
- .4 Final installed gap between door and frame must be a consistent 3mm.
- .5 No gap will be permitted to narrow downward so as to provide a potential hanging point for materials wedged into gap.
- .6 Final gap, door, frame and all other installed component tolerances and adjustments, are to be completed as requested and subject to acceptance by both the Consultant and Owner.
- .7 Rigidly anchor frames in place.
- .8 Install sliding doors complete with hardware so as to slide freely with undue effort.
- .9 Install swinging doors complete with hardware so that doors open and close freely with undue effort.
- .10 Epoxy sealant applied to door glazing, food tray and any gaps 2 mm or larger in accordance with Section 07 92 00 – Joint Sealants.
- .11 Site finish and spray with applied epoxy paint in accordance with Section 09 96 59 – High Build Glazed Coatings.

3.5 GROUT PLACEMENT

- .1 Place grout in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- .2 Grout fill frame in accordance with the following drawings.

3.6 PROTECTION

- .1 Protect primed finish of doors and frames during the course of construction in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Cover doors and frames with temporary, non-staining, heavy-duty, flexible board until ready to apply finish. Cover material to be fastened or adhered to doors and frames without damaging the primed finish.

3.7 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning, supplemented as follows.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste Management.

END OF SECTION

Hollow Metal Door & Pressed Steel Frame Shop Drawings - DRAFT

Project: SLIDING AND SWINGING CELL DOORS
LEVEL 3 NAAMM 863-98 ASTM F1450-97 PERFORMANCE CRITERIA

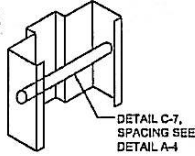
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GENERAL NOTES: PLEASE READ

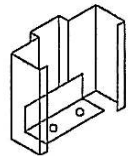
- 1) FABRICATION OF HOLLOW METAL DOORS & FRAMES WILL NOT COMMENCE UNTIL THE FOLLOWING IS RECEIVED:
 - A) APPROVED HARDWARE SCHEDULE
 - C) ALL NECESSARY HARDWARE TEMPLATES
 NOTE: LEAD TIMES VARY SO THIS INFORMATION IS CRITICAL
- 2) THESE DRAWINGS ARE FOR OWNER USE ONLY. OWNER WILL NOT ACCEPT ANY RESPONSIBILITY DUE TO ERRORS CAUSED BY THE USE OF THESE DRAWINGS BY OTHER TRADES.
- 3) DOORS AND FRAMES TO BE REINFORCED FOR SURFACE MOUNTED HARDWARE AS REQUIRED. DRILLING AND TAPPING FOR ATTACHING OF SURFACE MOUNTED HARDWARE BY OTHERS. DOORS AND FRAMES WILL BE BLANKED, REINFORCED, DRILLED AND TAPPED FOR MORTISED TEMPLATED HARDWARE. TRIM MOUNTING HOLES AND ALL HOLES $\varnothing 1/2"$ [13 mm] & LESS, BY OTHERS.
- 4) MAXIMUM ALLOWABLE DISTANCE BETWEEN THE SLIDING DOOR AND THE FRAME MUST BE LIMITED TO 1/8" [3 mm]. FIELD SHIMMING MAY BE REQUIRED ON SITE BY THE INSTALLATION CONTRACTOR TO OBTAIN THE DESIRED CLEARANCES.
- 5) ALL DOORS AND FRAMES TO BE MARKED WITH THE DOOR MANUFACTURER'S NAME AND PRODUCT NUMBER ON THE SECOND HINGE FROM THE TOP UNLESS SPECIFIED OTHERWISE.
- 6) ALL HOLLOW METAL FRAMES SHALL BE OF WELDED CONSTRUCTION UNLESS NOTED OTHERWISE.
- 7) ALL SWING TYPE FRAMES TO BE PREPARED FOR PUSH-IN TYPE SILENCERS, 3 PER STRIKE JAMB FOR SINGLE FRAMES OR 2 PER HEAD FOR DOUBLE FRAMES.
- 8) ALL HARDWARE LOCATIONS ON THE DOORS & FRAMES TO BE AS PER THE FOLLOWING DRAWINGS, UNLESS ADVISED OTHERWISE.
- 9) GENERAL CONTRACTOR IS RESPONSIBLE TO ENSURE THAT FRAMES AND DOORS ARE SET PLUMB, SQUARE, LEVEL AND THAT WALLS AND FRAME ARE FULLY GROUTED. THE MANUFACTURER OF HOLLOW METAL DOORS AND/OR PRESSED STEEL FRAMES CAN NOT CONTROL THE QUALITY OF EITHER THE HARDWARE, THE FIELD INSTALLATION OF HARDWARE, OR THE PROPER ERECTION OF FRAMES IN THE WALL.
- 10) ALL BURRS AND SHARP EDGES MUST BE REMOVED AFTER INSTALLATION.
- 11) THE FOLLOWING SHOP DRAWINGS REFLECT A STANDARD 195 mm BLOCK WALL CONSTRUCTION, SITE CONDITIONS MAY VARY.

REVISIONS:	NOTES:		JOB:
	<p style="font-size: small;">THIS DRAWING IS THE EXCLUSIVE PROPERTY OF THE OWNER. NO USE WHATSOEVER OF THE INFORMATION CONTAINED HEREIN, NOR REPRODUCTION IN WHOLE OR IN PART MAY BE MADE WITHOUT EXPRESSED WRITTEN PERMISSION. THIS DRAWING REMAINS THE PROPERTY OF THE OWNER AND MUST BE RETURNED ON DEMAND.</p>		CONTRACTOR:
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			PG.#:

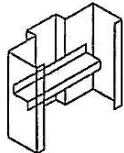
A-3 ANCHOR TYPES



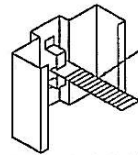
WELDED ROD ANCHOR



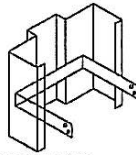
STANDARD FIXED BASE ANCHOR



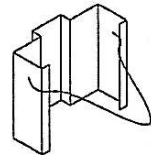
STEEL STUD ANCHOR



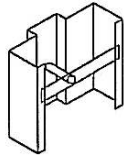
CORRUGATED TAIL ANCHOR



WOOD STUD ANCHOR



CONCRETE BLOCK WALL WIRE ANCHOR



EXISTING WALL ANCHOR

B-3 DOOR AND FRAME HANDING CHART TO DETERMINE HAND(SWING) OF DOOR AND FRAME STAND OUTSIDE - FACING DOOR

<p>INSIDE</p> <p>OUTSIDE RIGHT HAND</p>	<p>INSIDE</p> <p>OUTSIDE LEFT HAND</p>
<p>INSIDE</p> <p>OUTSIDE RIGHT HAND REVERSE</p>	<p>INSIDE</p> <p>OUTSIDE LEFT HAND REVERSE</p>
<p>INSIDE INACTIVE</p> <p>OUTSIDE PAIR OF DOORS LH ACTIVE</p>	<p>INSIDE INACTIVE</p> <p>OUTSIDE PAIR OF DOORS RH ACTIVE</p>
<p>INSIDE INACTIVE</p> <p>OUTSIDE PAIR OF DOORS LHR ACTIVE</p>	<p>INSIDE INACTIVE</p> <p>OUTSIDE PAIR OF DOORS RHR ACTIVE</p>

* KS IS THE KEY SIDE OF DOOR (PLEASE CHECK ALL SWINGS TO ENSURE KEY IS ON PROPER SIDE OF DOOR)

FIRE RATING LABELS

- A - 3 HOUR
- B - 1 1/2 HOUR
- C - 45 MINUTE
- 20M - 20 MINUTE

DOOR MATERIALS

- HM - HOLLOW METAL DOOR - HONEYCOMB
- IHM - INSULATED HOLLOW METAL DOOR - POLYSTYRENE
- SLH - STEEL STIFFENED (LAMINATED-HONEYCOMB)
- SLP - STEEL STIFFENED (LAMINATED-POLYSTYRENE)
- SWF - STEEL STIFFENED (WELDED-FIBREGLOSS)
- SCW - SOLID CORE WOOD DOOR
- HCW - HOLLOW CORE WOOD DOOR
- PLM - PLASTIC LAMINATED

REMOVABLE STOPS

- PL - PULL SIDE OF DOOR
- PS - PUSH SIDE OF DOOR

ANCHOR TYPES

- SS - STEEL STUD ANCHOR
- CT - CORRUGATED TAIL ANCHOR
- WS - WOOD STUD ANCHOR
- EWA - EXISTING WALL ANCHOR
- CB - CONCRETE BLOCK WIRE ANCHOR
- BA - BASE ANCHOR
- WR - WELDED ROD ANCHOR

HARDWARE

- PP - PUSH & PULL
- RIM - RIM PANIC
- VR - VERTICAL ROD
- FB - FLUSH BOLT
- R/F - REINFORCE
- CVR - CONCEALED VERTICAL ROD

DOOR SWINGS

- LH - LEFT HAND
- LHR - LEFT HAND REVERSE
- RH - RIGHT HAND
- RHR - RIGHT HAND REVERSE

REVISIONS:

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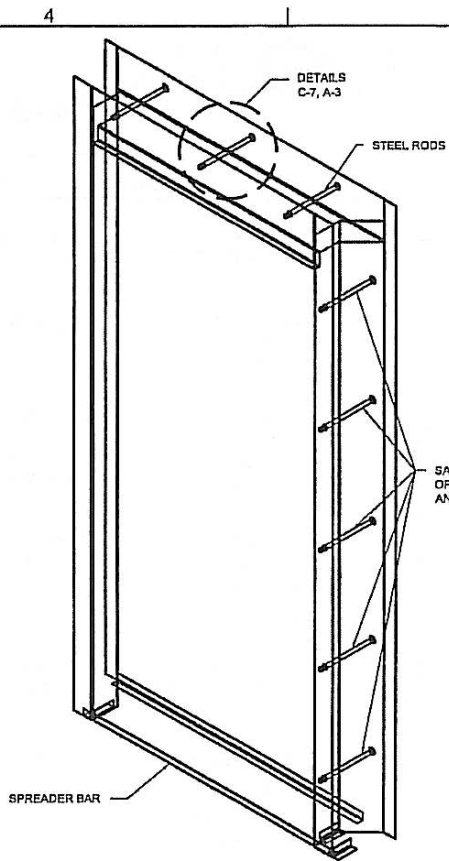
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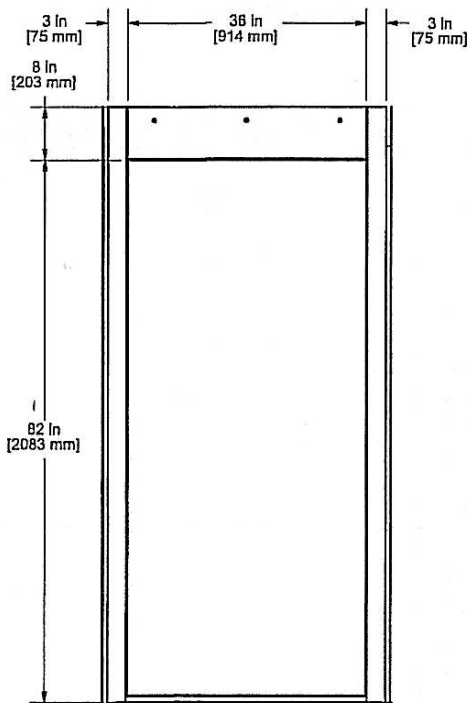
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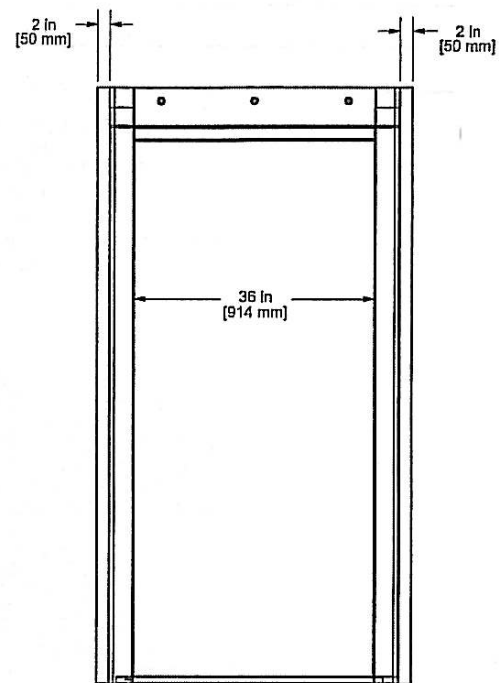
12GA. FRAME FOR SLIDING DOOR



A-4 ISOMETRIC VIEW



B-4 CORRIDOR SIDE



C-4 ROOM SIDE

REVISIONS:

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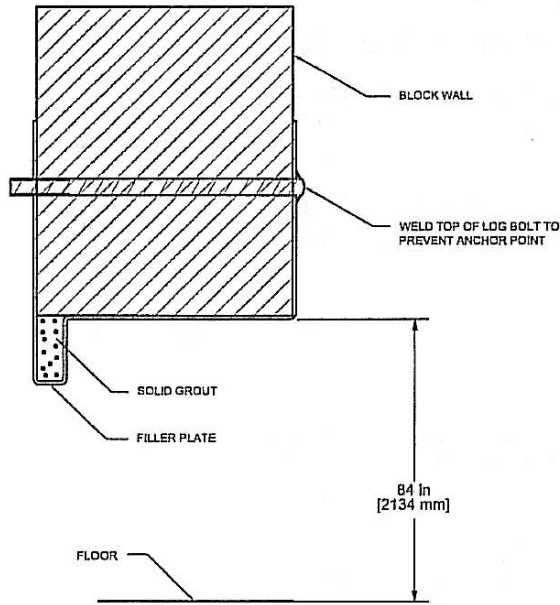
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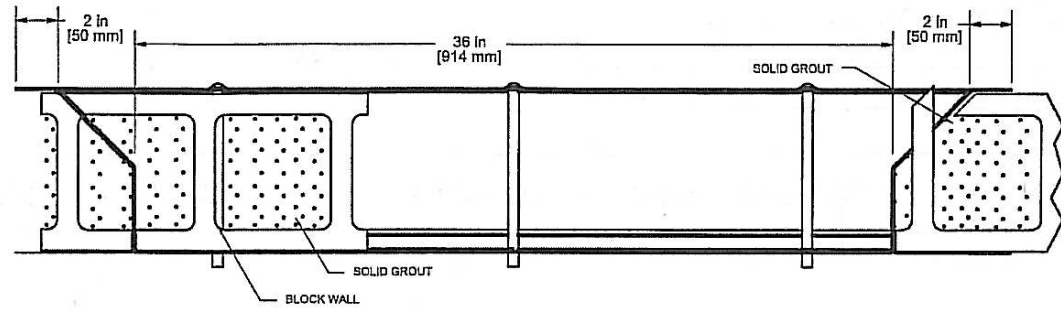
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NOTE: FRAME MUST BE FULLY GROUTED FOR PROPER SLIDING ASSEMBLY INSTALLATION

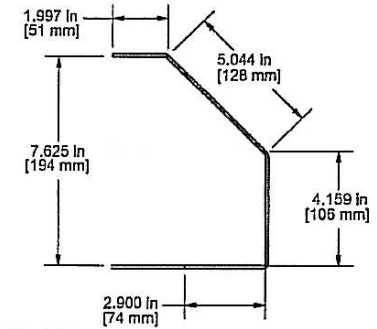
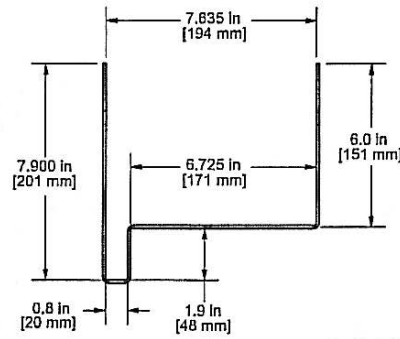
NOTE: OPTIONAL 2" LENGTH X 3/16" [51 x 5 mm] FILLER PLATE CONTINUALLY WELDED TO HEADER AND SIDES OF FRAME.



A-5 SECTION THROUGH FRAME



B-5 CROSS SECTION THROUGH JAMBS & HEADER

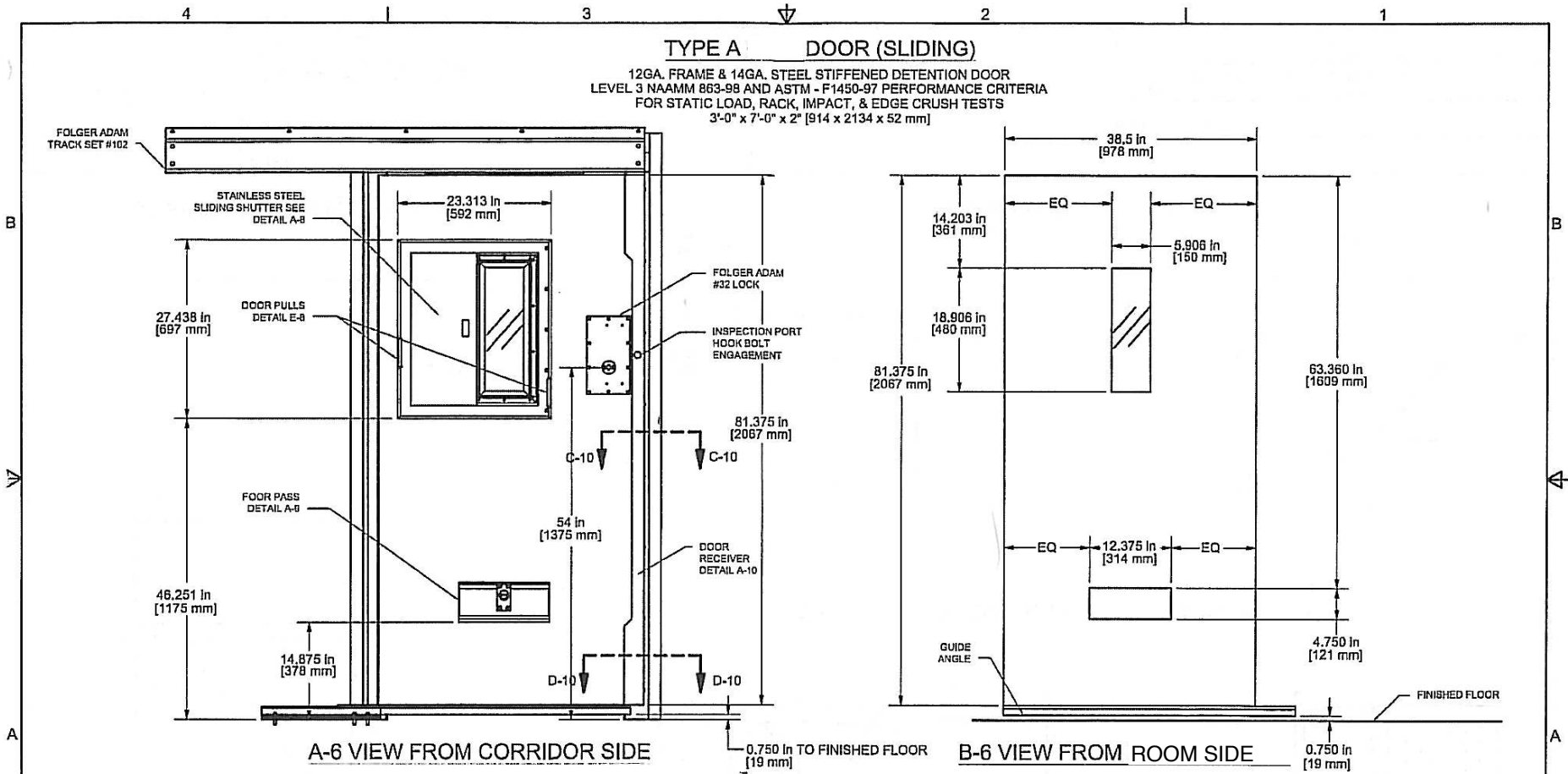


C-5 JAMB PROFILES FOR BENDING

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TYPE A DOOR (SLIDING)

12GA. FRAME & 14GA. STEEL STIFFENED DETENTION DOOR
 LEVEL 3 NAAMM 863-98 AND ASTM - F1450-97 PERFORMANCE CRITERIA
 FOR STATIC LOAD, RACK, IMPACT, & EDGE CRUSH TESTS
 3'-0" x 7'-0" x 2" [914 x 2134 x 52 mm]



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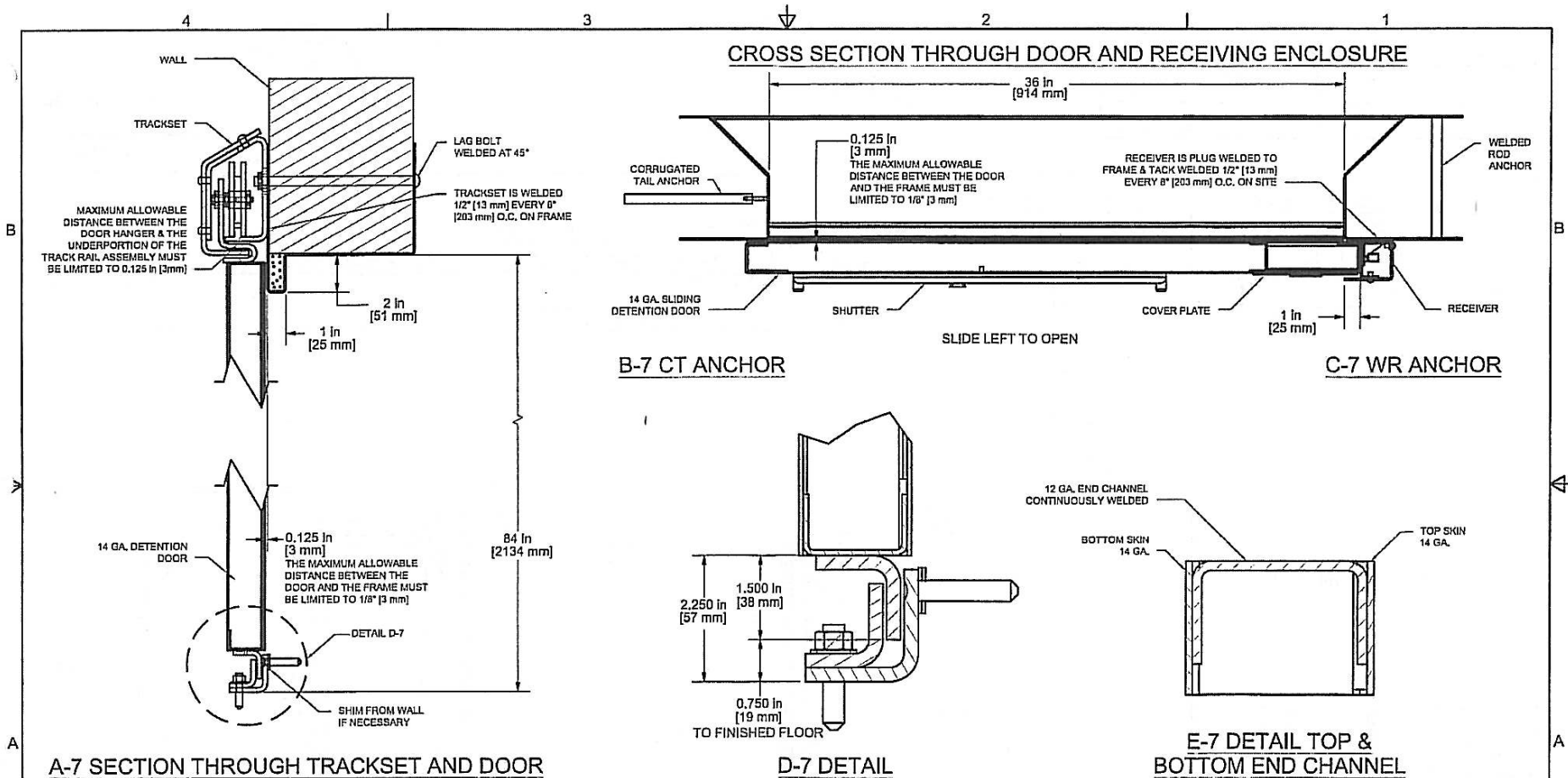
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REVISIONS:

NOTES:
SEE A-3 FOR ADDITIONAL ANCHOR OPTIONS

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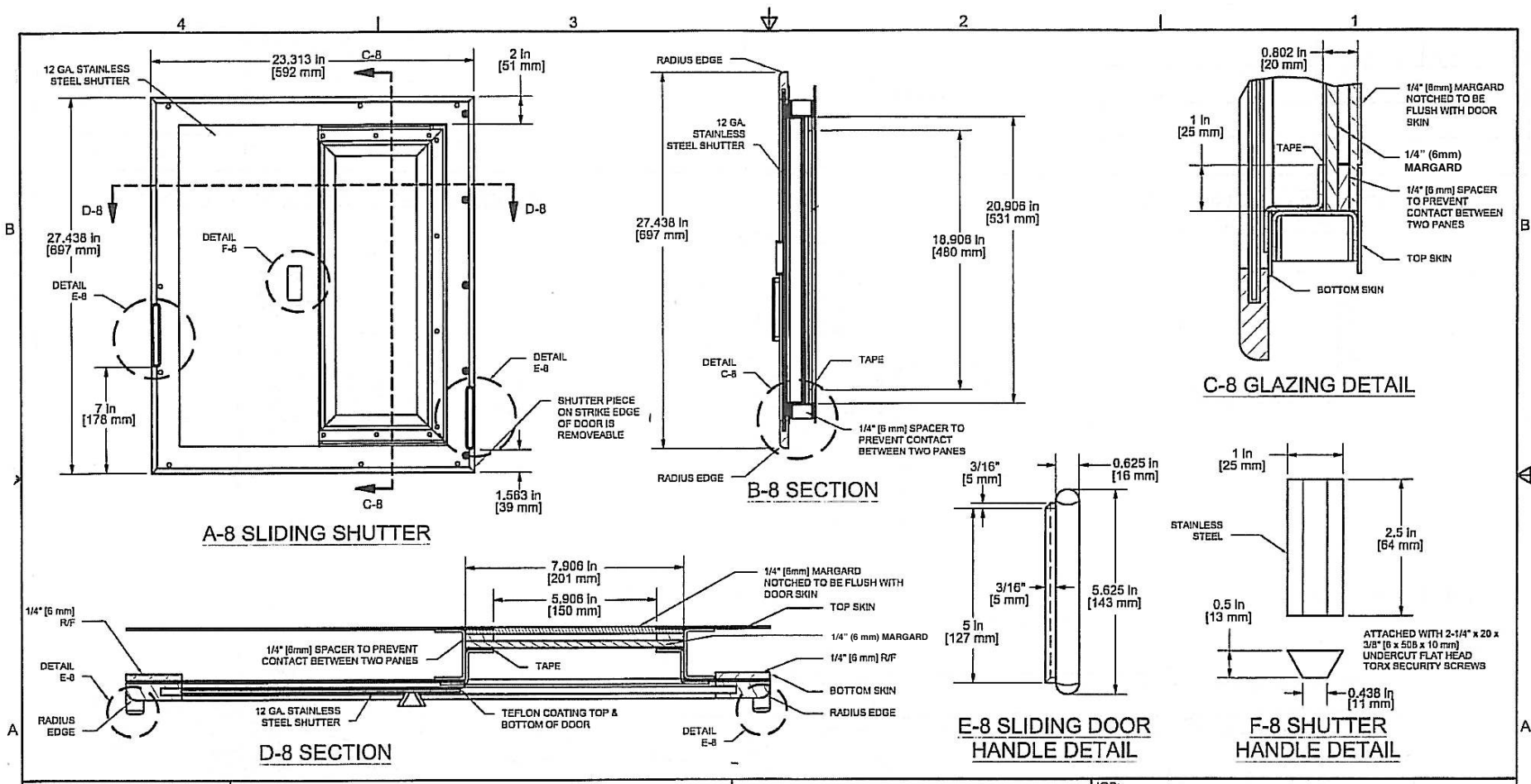
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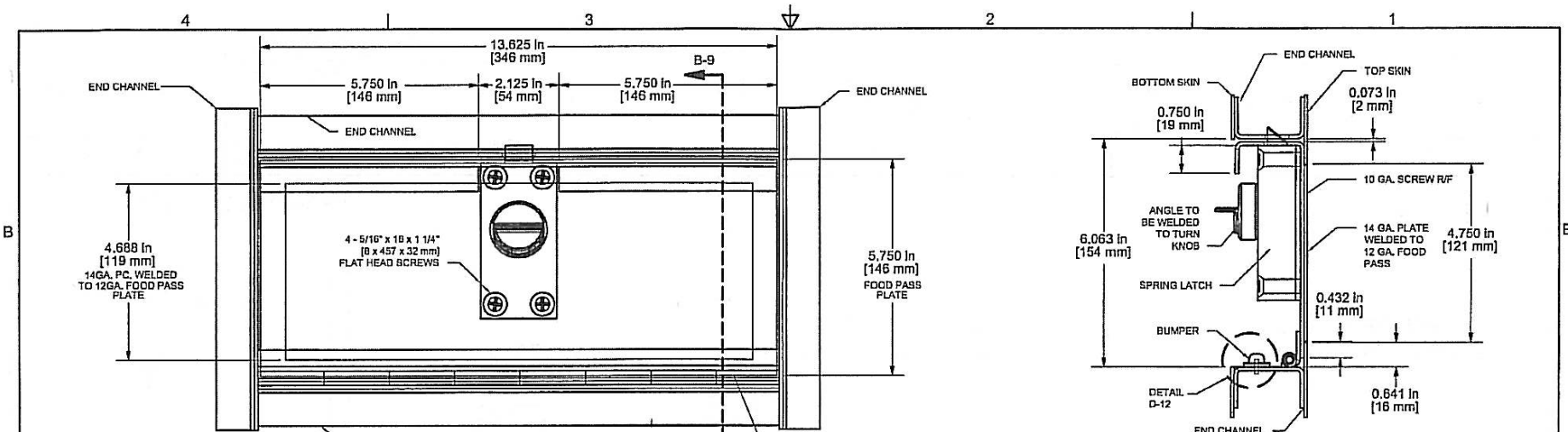
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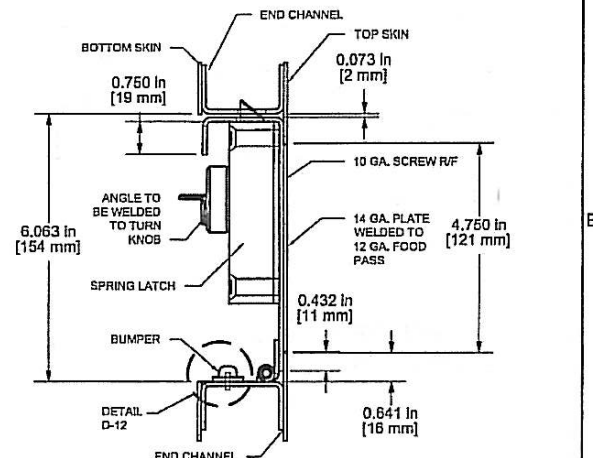
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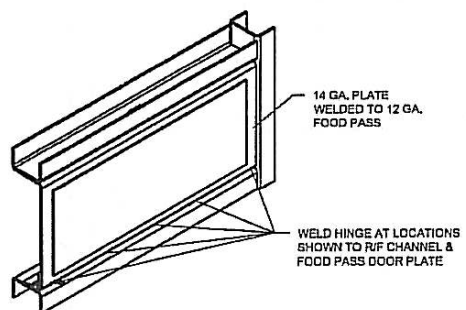
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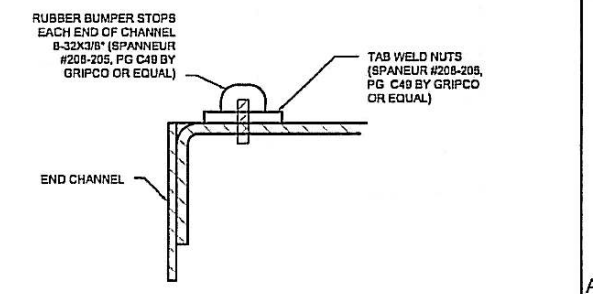
A-9 FOOD PASS THROUGH DETAIL



B-9 SECTION



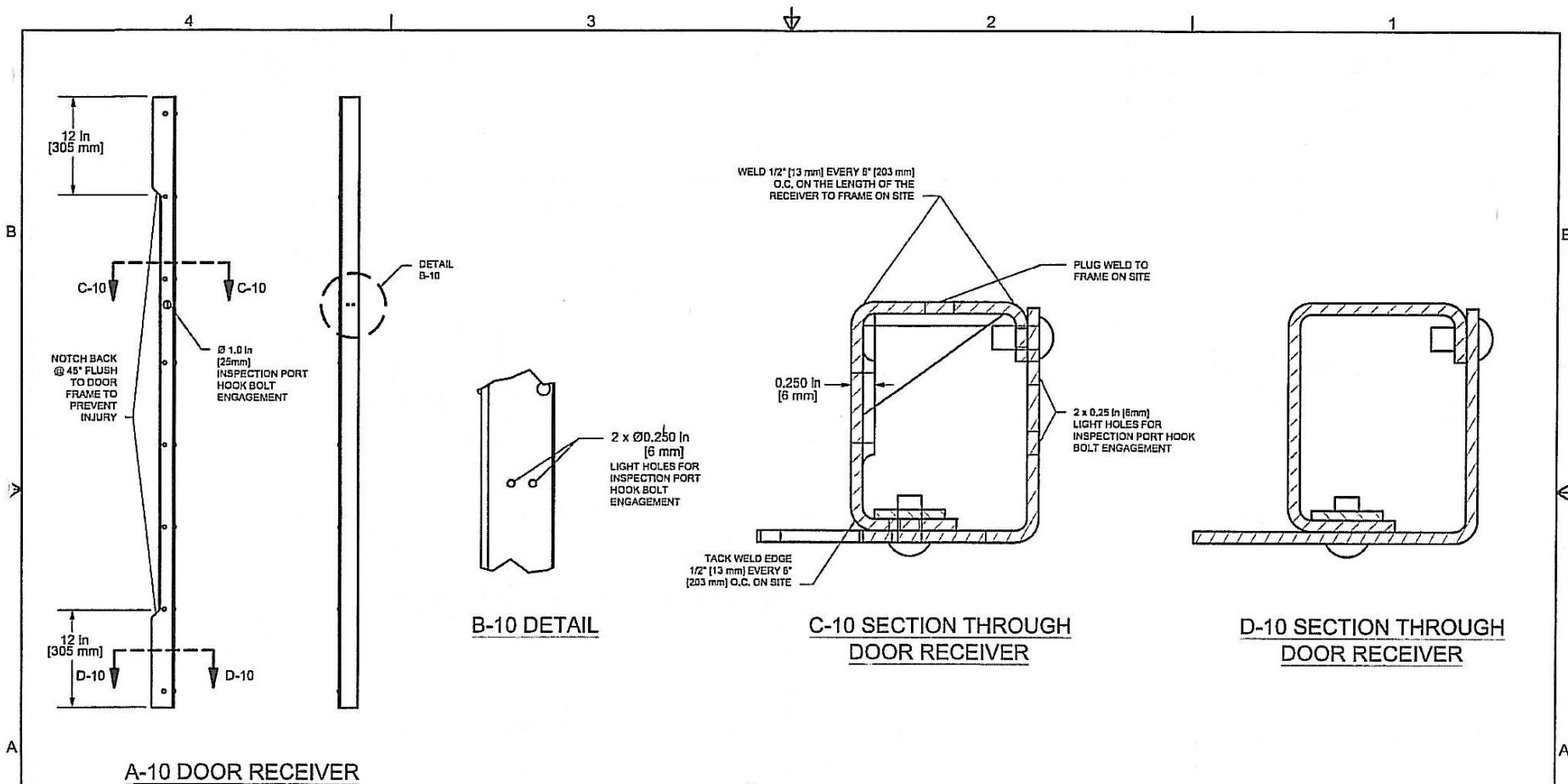
C-9 FOOD PASS THROUGH DETAIL



D-12 BUMPER DETAIL

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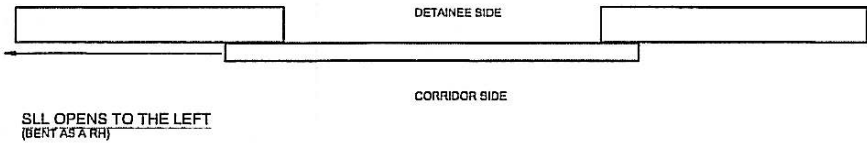
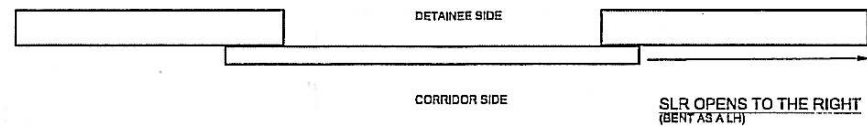
NOTES:
 REMOVE ALL BURRS AND SHARP EDGES AFTER WELDING

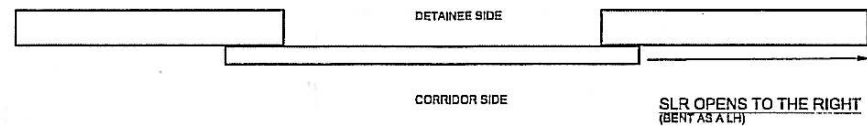
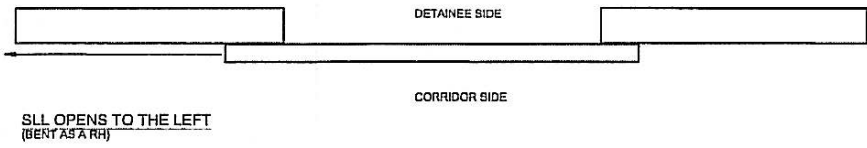
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A-11 SLIDING HANDING SHEET



4	3	2	1
B	<p align="center"><u>A-11 SLIDING HANDING SHEET</u></p> 		B
A			A
4	3	2	1

REVISIONS:

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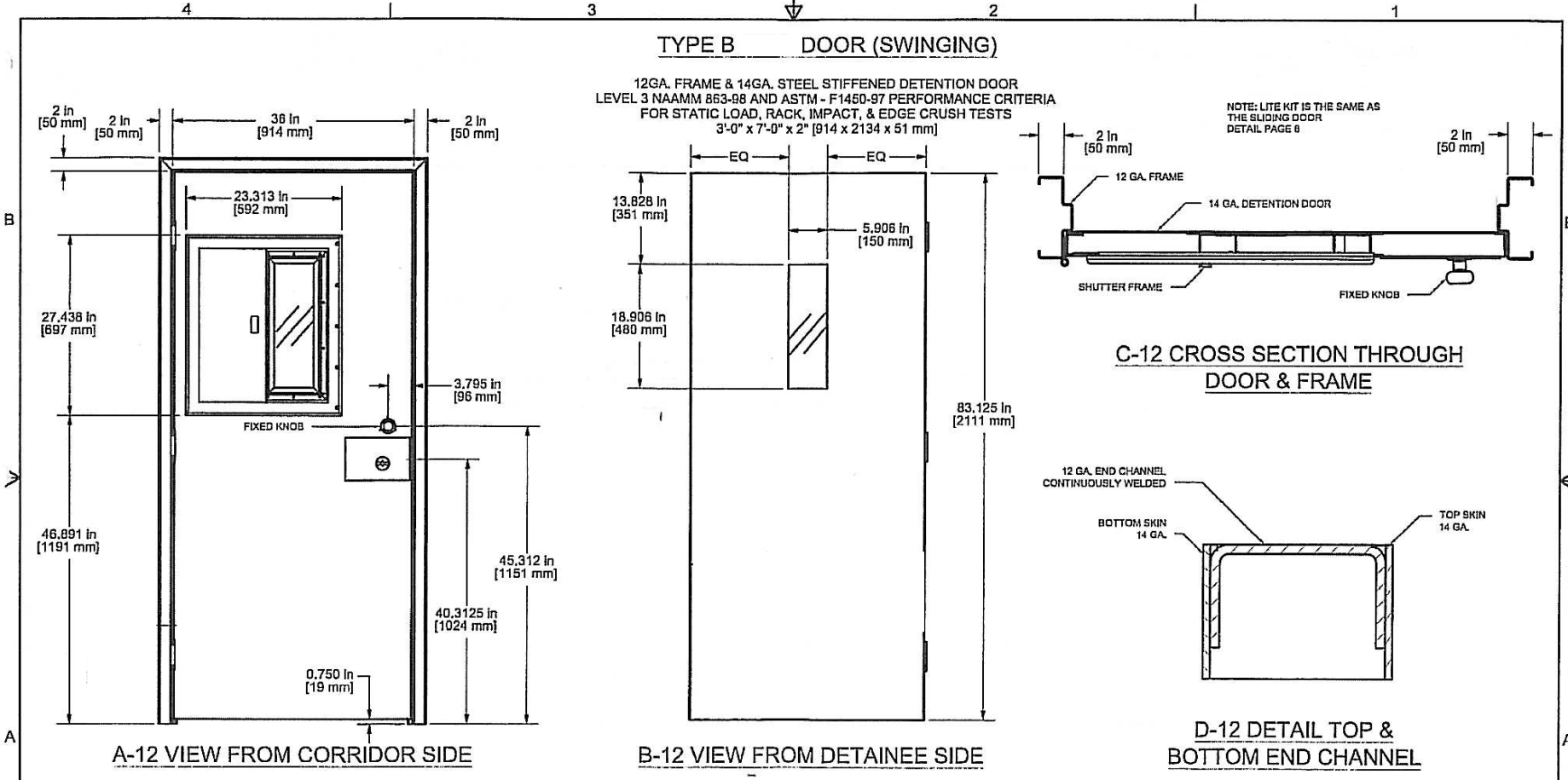
CONTRACTOR:

DRAWN BY:	DATE:
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TYPE B DOOR (SWINGING)

12GA. FRAME & 14GA. STEEL STIFFENED DETENTION DOOR
 LEVEL 3 NAAMM 863-88 AND ASTM - F 1450-97 PERFORMANCE CRITERIA
 FOR STATIC LOAD, RACK, IMPACT, & EDGE CRUSH TESTS
 3'-0" x 7'-0" x 2" (914 x 2134 x 51 mm)

NOTE: LITE KIT IS THE SAME AS
 THE SLIDING DOOR
 DETAIL PAGE 8

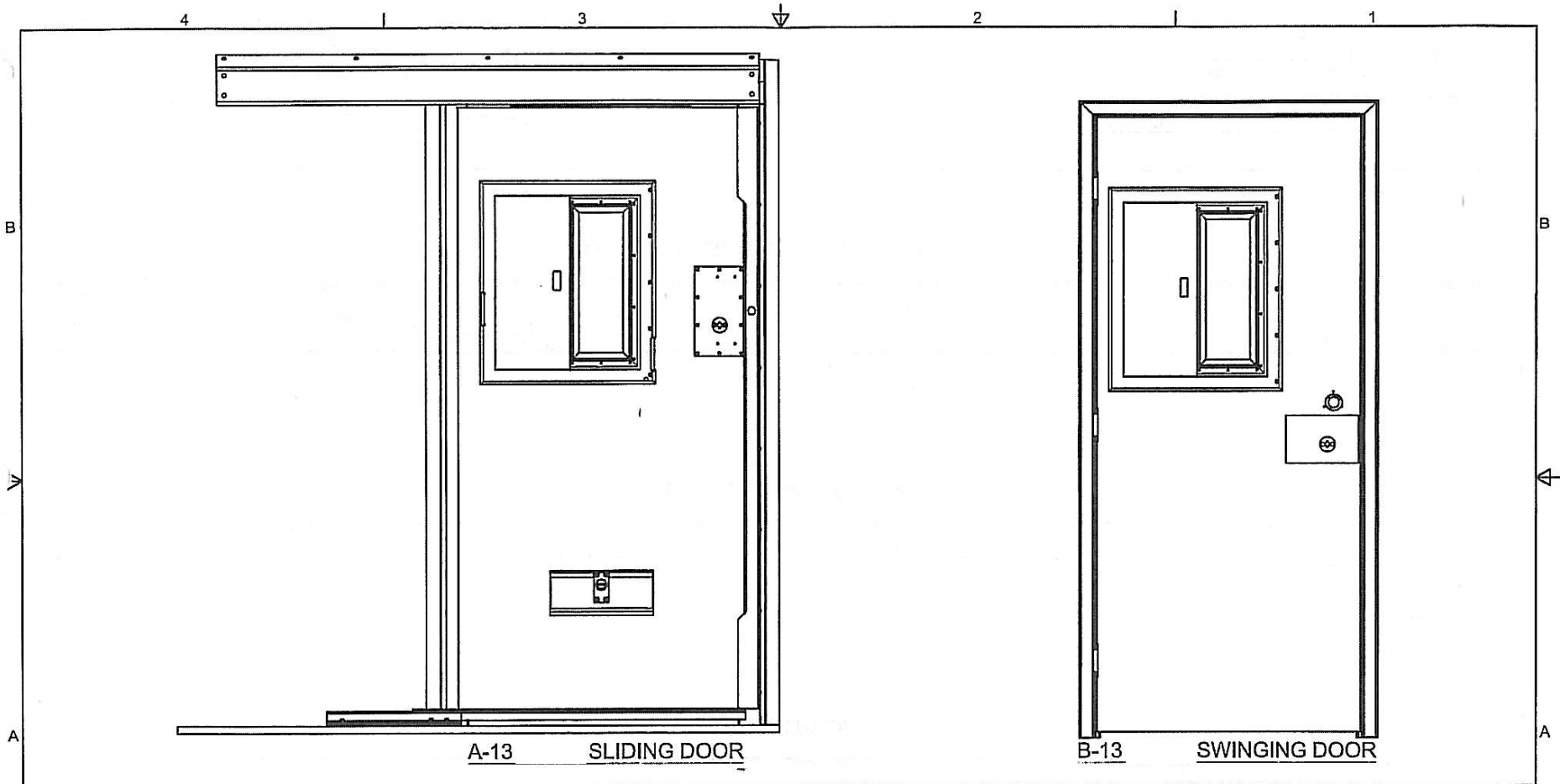


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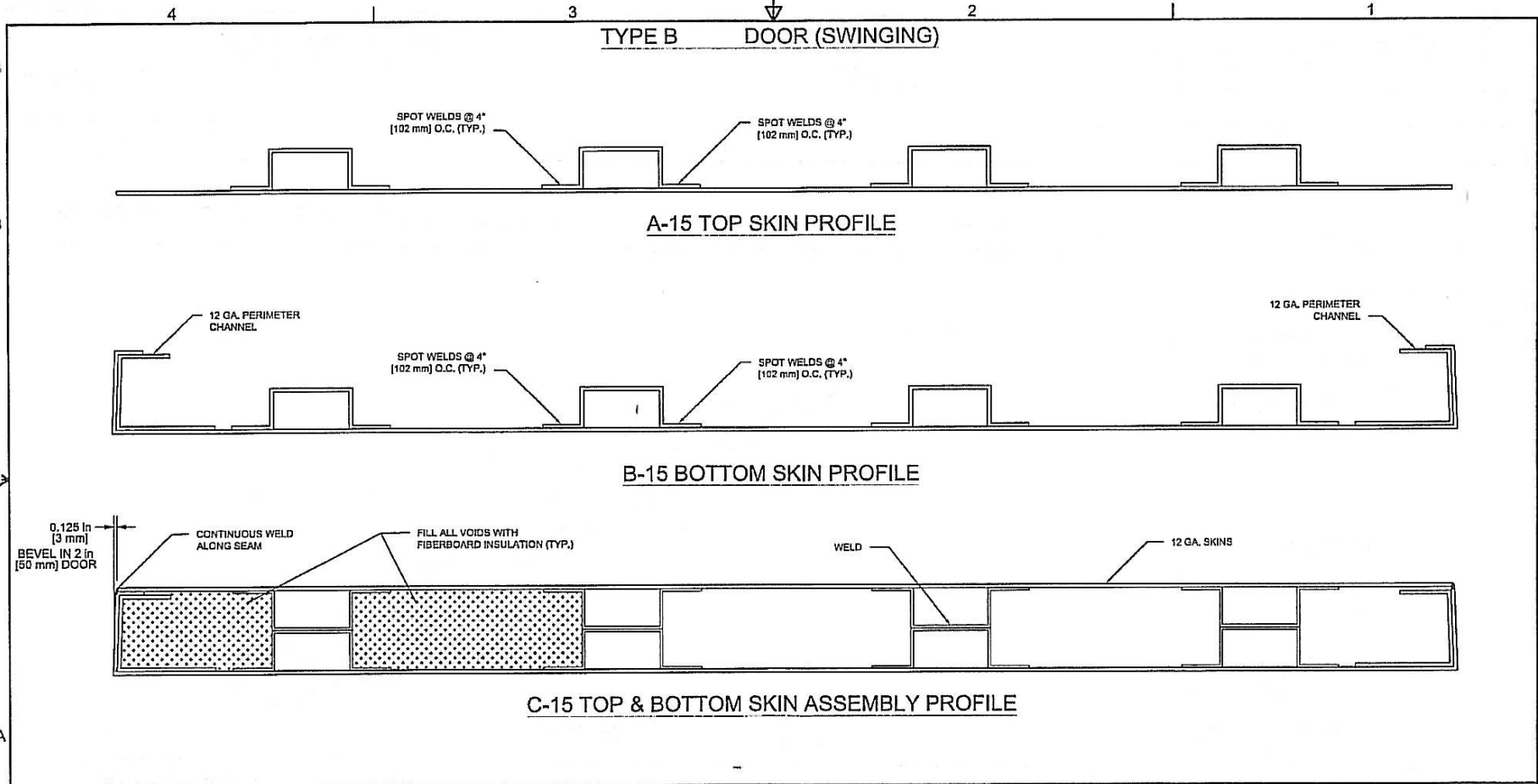
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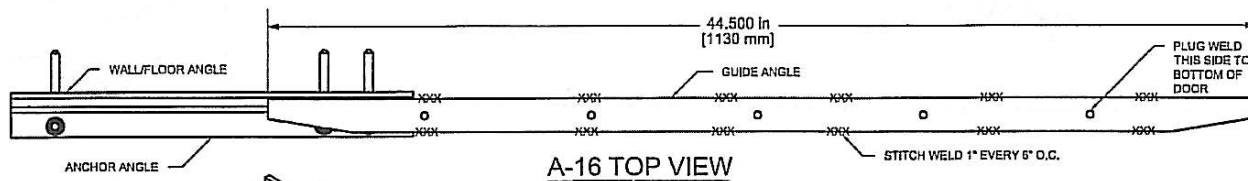
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NOTES:

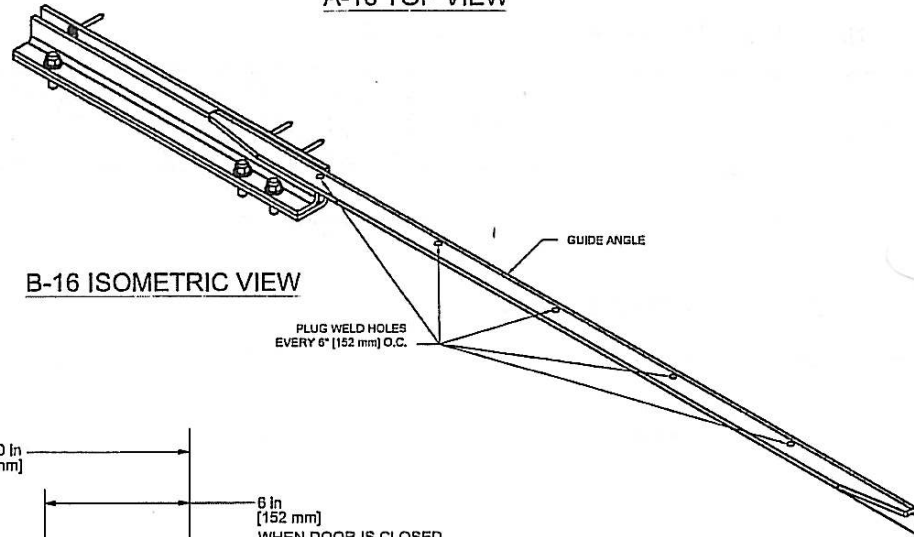
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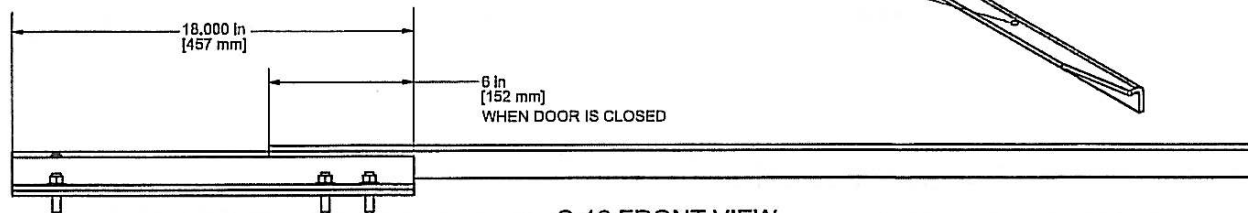
INSTALLATION OF WALL/FLOOR & ANCHOR ANGLE & GUIDE ANGLE



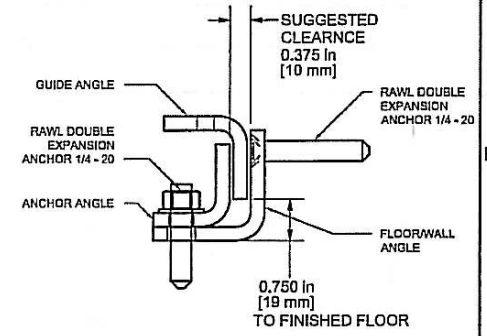
A-16 TOP VIEW



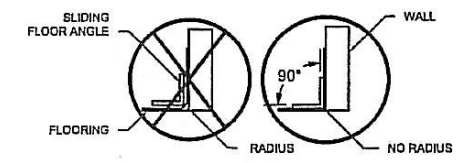
B-16 ISOMETRIC VIEW



C-16 FRONT VIEW



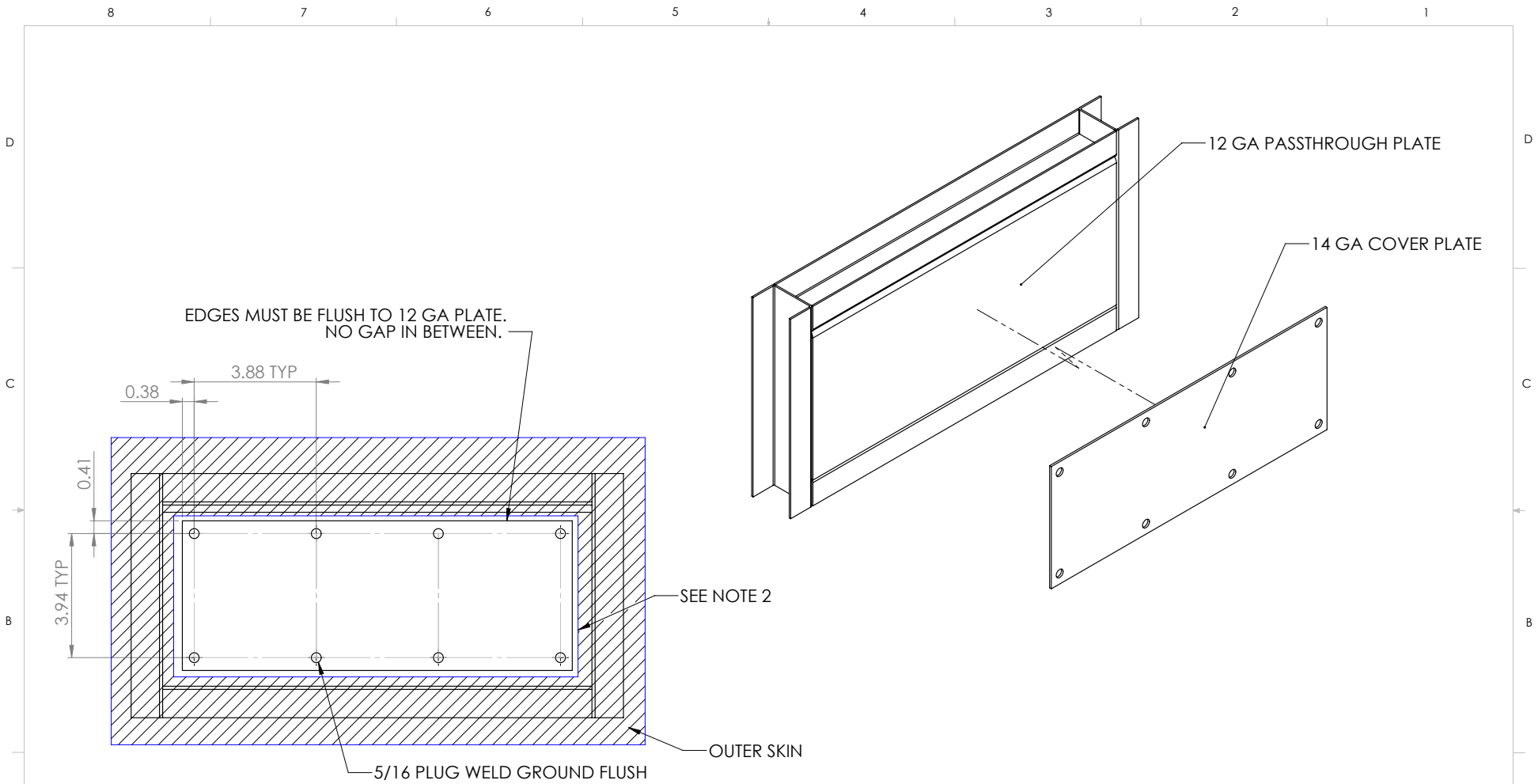
D-16 DETAIL



NOTE: FLOORING IS NOT TO HAVE A RADIUS WHERE IT MEETS THE WALL, FOR SLIDING UNITS.

E-16 FLOORING DETAIL

REVISIONS:	NOTES: THIS DRAWING IS THE EXCLUSIVE PROPERTY OF THE OWNER. NO USE WHATSOEVER OF THE INFORMATION CONTAINED HEREIN, NOR REPRODUCTION IN WHOLE OR IN PART MAY BE MADE WITHOUT EXPRESSED WRITTEN PERMISSION. THIS DRAWING REMAINS THE PROPERTY OF THE OWNER AND MUST BE RETURNED ON DEMAND.	JOB:		
		CONTRACTOR:		
		DRAWN BY:	DATE:	
		W.O.#:	FILE NUMBER:	PG.#:



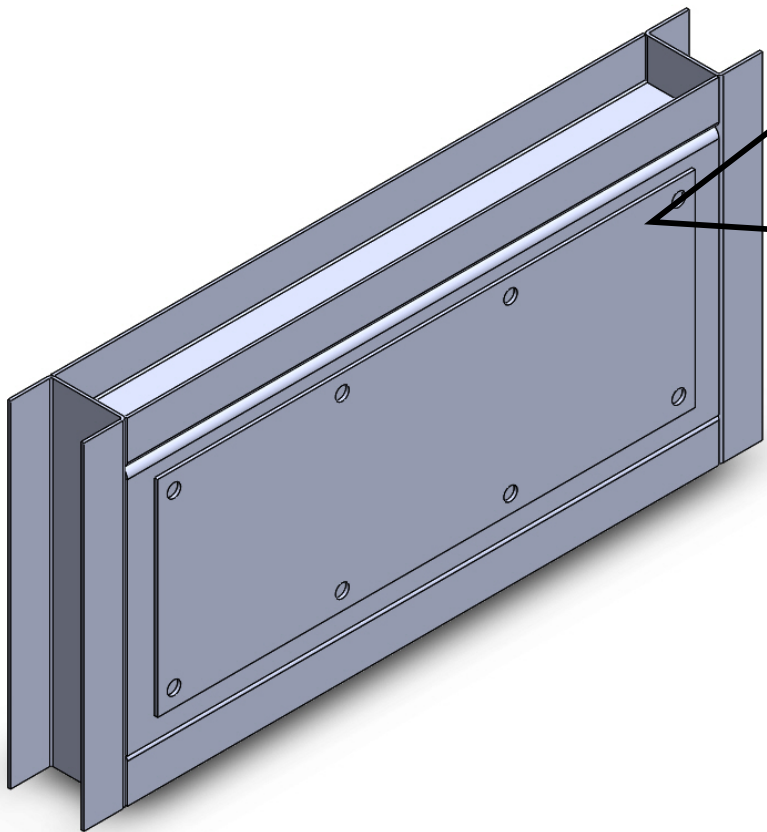
- NOTES:
1. ALL WELDS MUST CONFORM TO BEST INDUSTRY PRATICE.
 2. GAPS BETWEEN THE FOOD PASS-THROUGH COVER PLATE AND OUTER SKIN MUST BE LESS THAN 2MM ALL AROUND.

FOR ILLUSTRATION PURPOSES ONLY
REFER TO SEPT. 26, 2007 OWNER DOOR DRAWING PACKAGE

PROPRIETARY AND CONFIDENTIAL
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DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND MILLIMETERS TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005	APPLICATION:		TITLE: PASSTHROUGH COVER PLATE WELD DETAIL	
		NAME	DATE	SIZE
	DRAWN	09-09-2016	09-09-2016	DWG. NO. B 28012710
	CHECKED	MM	09-09-2016	REV 1
SPECIFICATION:			SCALE: 1:5	WEIGHT:
				SHEET 1 OF 1



Fill gap with approved security sealant if bigger than 2 mm (0.079 inches).

Illustration: 28012710-200
Food Pass-Through Door Finishing Plate Gap
Verification

Part 1 General

1.1 REFERENCE STANDARDS

- .1 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA 609/610-15, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
- .2 ASTM International
 - .1 ASTM A167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - .2 ASTM A276-17, Standard Specification for Stainless Steel Bars and Shapes.
 - .3 ASTM A480/480M-18, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
 - .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings indicating each type of coiling counter door, arrangement of hardware, track with fasteners, operating mechanism and required clearances.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.4 QUALITY ASSURANCE

- .1 Regulatory Agency Approvals:
 - .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada to CAN/ULC-S104 and CAN/ULC-S105 for ratings specified or indicated.
 - .2 Fabricate and install fire rated coiling metal counter doors in accordance with NFPA 80 to suit fire protection rating required.

- .2 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect coiling counter doors from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Coiling doors:
 - .1 Slat configuration:
 - .1 Stainless Steel: No. 1F interlocked flat-faced slats, 38 mm high x 13 mm deep, minimum 22 ga. AISI type 304 #4 finish stainless steel with stainless steel bottom bar and vinyl astragal.
 - .2 Guides:
 - .1 Stainless Steel: minimum 12 gauge formed shapes, type 304 #4 finish.
 - .3 Gaskets:
 - .1 Provide rubber gasket on the bottom edge of the coiling door to create seal with in closed position.

2.2 COILING COUNTER DOORS

- .1 Rivet continuous end locks to slat ends.
- .2 Assemble coiling counter door curtain of interlocking slat sections.
- .3 Provide bottom bar of extruded aluminum section angles.
- .4 Form guides for face wall installation.
- .5 Construct counterbalance assembly consisting of torsion spring with 25% overload factor. Enclose spring in steel pipe to support door curtain and counterbalance mechanism with maximum deflection of 1/360th of opening width. Provide ball bearings at rotating points. Provide spring tension adjusting wheel, accessible for setting.
 - .1 Enclose spring in steel pipe to support door curtain and counterbalance mechanism with maximum deflection of 1/360th of opening width.

- .2 Use ball bearings at rotating points.
- .3 Use spring tension adjusting wheel, accessible for setting.
- .6 Support counterbalance assembly on 5 mm minimum thickness steel plate brackets, forming end enclosures.
- .7 Enclose counter balance assembly with stainless steel sheet formed hood.

2.3 OPERATION

- .1 Equip coiling counter doors for operation by:
 - .1 Crank operator with removable hand crank.
- .2 Install fusible link activated automatic closing device to cause door to close at controlled slow even speed in case of fire.
- .3 Connect automatic closing device to smoke detection equipment.

Part 3 Execution

3.1 INSTALLATION

- .1 Install coiling counter door in accordance with manufacturers' printed instructions.
- .2 Adjust operable parts for correct function and smooth operation.
- .3 Test coiling counter doors for proper operation by activating fusible link.
 - .1 Test shutters in presence of Consultant and Owner.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Remove traces of primer, caulking; clean doors and frames.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.3 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 05 50 00 – Metal Fabrications

1.2 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
 - .1 ASTM A1008/A1008M-16, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - .2 ASTM D523-14, Standard Test Method for Specular Gloss.
 - .3 ASTM D822/D822M-13, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
 - .4 ASTM E283-04(2012), Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
 - .5 ASTM E547-00(2016), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.105-M91, Quick-Drying Primer.
 - .2 CAN/CGSB-1.213-2004, Etch Primer (Pre-treatment Coating or Tie Coat) for Steel and Aluminum.
 - .3 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coatings.
- .4 CSA International
 - .1 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 Environmental Choice Program (ECP)
 - .1 CCD-016-97(R2005), Thermal Insulation Materials.
 - .2 CCD-047-88(R2005), Architectural Surface Coatings.
- .6 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for doors, hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate sizes, service rating, types, materials, operating mechanisms, glazing locations and details, hardware and accessories, required clearances and electrical connections.
- .4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.
 - .2 Low-Emitting Materials:
 - .1 Submit listing of primers, paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit maintenance data for cleaning and maintenance of doors for incorporation into manual in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Warranty Documentation: Submit documents for a ten (10) year warranty against perforation due to rusting, five (5) year warranty against delamination, and one (1) year general warranty from date of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect sectional metal doors, hardware and accessories from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Waste Management Plan related to Work of this Section and in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

- .5 Packaging Waste Management: remove for reuse of crates, pallets, as specified in Waste Reduction Workplan, Construction Waste Management Plan in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Design exterior door assembly to withstand wind load of 1kPa with a maximum horizontal deflection of 1/240 of opening width.
- .2 Design door panel assemblies with thermal insulation factor 1.2 RSI.
- .3 Design door assembly to withstand minimum 100,000 cycles per annum, and 20 years total life cycle.

2.2 MANUFACTURERS

- .1 Approved Manufacturer/Model: Thermostop, Sentinel Series, St. Hubert, Quebec (Contact 1-866-678-0123, info@thermostop.com). No substitutions permitted.

2.3 MATERIALS

- .1 Galvanized steel sheet: commercial quality Z275 zinc coating.
- .2 Steel sheet: commercial quality to ASTM A1008/A1008M, exposed (E), shop painted.
- .3 Primer: to CAN/CGSB-1.105 for steel CAN/CGSB-1.181, for galvanized steel surfaces.
 - .1 VOC limit compliant with AS-11 SCAQMD Rule 1113.
 - .1 VOC limit: 150g/L maximum to CCD-047.
 - .2 Primer not to exceed toxicity concentrations.
- .4 Insulation: Isocyanurate or rigid polyurethane, full thickness of panel.
- .5 Cable: multi-strand galvanized steel aircraft cable.

2.4 DOORS

- .1 Main Floor Plan O/H Doors: Fabricate 75 mm thick insulated doors flush sections of interlocking steel roll formed sections.
- .2 Out Building O/H Doors: Fabricate 50 mm thick insulated doors flush sections of interlocking steel roll formed sections.
- .3 Fabricate panel frames from 1.6 mm CRS in a continuous box frame with 1.6 thick (16ga) vertical stiles at 300mm centres or hat channel stiffeners across the back of each panel.
- .4 Overlap edge of door openings by 100mm each side and top.
- .5 Bottom door section to have T-bar full length of panel.
- .6 Assemble components by means of coated rivet system or adhesive and self-tapping screws to manufacturer's recommendations. No exterior fasteners permitted.
- .7 Apply shop coat of anti-corrosive primer after fabrication of door.

- .1 VOC limit 250g/L maximum to SCAQMD Rule 1113 GS-11.

2.5 HEAVY DUTY INDUSTRIAL HARDWARE

- .1 Track: standard lift hardware with 75mm size 2.50 mm core thickness galvanized steel track; tapered and mounted for wedge closing reinforced as required.
- .2 Bearing Plates: designed by manufacturer with minimum 3.40 mm thick plates.
- .3 Track Supports: 2.3 mm core thickness vertically continuous galvanized steel angle track supports bolted to doorframe.
- .4 Spring counter balance: heavy duty oil tempered torsion spring with manufacturers standard brackets.
 - .1 Drum: 200 mm diameter die cast aluminum.
 - .2 Shaft: 32 mm diameter galvanized steel.
- .5 Top roller carrier: galvanized Steel 2.10 mm (13 ga.) thick adjustable.
- .6 Rollers: full floating grease packed hardened steel, ball bearing 75mm diameter solid steel tire.
- .7 Roller brackets: adjustable, minimum 2.5 mm galvanized steel.
- .8 End-Hinges: heavy duty, 2.90 mm (11ga) thick galvanized, bolted and spaced to door frame at 750mm per section.
- .9 Counterbalance: duplex torsion spring system with precision pollard bearing.
- .10 Cable: 6 mm diameter galvanized steel aircraft cable.

2.6 ACCESSORIES

- .1 Overhead horizontal track and operator supports: galvanized steel, type and size to suit installation.
- .2 Track guards: 5mm thick formed sheet 1500mm high track guards. Supply complete with Hilti-Hit Floor fastening, minimum 3 per guard.
- .3 Pusher springs: 50,000 cycle rated.
- .4 Two horizontal sliding side lock bolts on interior.
- .5 Weatherstripping:
 - .1 Sills: double contact bulb type full width extruded neoprene weatherstrip adhered to "T" bar across bottom of door.
 - .2 Jambs and head: extruded aluminum and arctic grade vinyl weatherstrip to manufacturer's standard.
- .6 Finish ferrous hardware items with minimum zinc coating of 300 g/m² to CAN/CSA-G164.
- .7 All other fasteners, brackets and miscellaneous hardware required for a complete installation to the scheduled opening and to provide details shown on drawings. No exposed fasteners on exterior face of door sections.

2.7 FINISH

- .1 Pre-finish door sections in factory after fabrication to custom colour selected by Consultant.
 - .1 Interior: 0.2 mil white polyester wash coat.
 - .2 Exterior: two-coat system consisting of 0.2 mil epoxy primer coat and 0.7 mil acrylic finish coat.
 - .3 Specular gloss: 30units +/- in accordance with ASTM D523.
 - .4 Resistance to accelerated weathering for chalk rating of 8, colour 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.

2.8 ELECTRICAL OPERATOR

- .1 Electrical jack shaft side mounted type operator: Heavy-duty motor XTRA-HHD
- .2 Electrical motors, controller units, remote pushbutton stations, relays and other electrical components: to CSA approval.
- .3 Power supply: 575V phase, 60 Hz.3 phase.
 - .1 Motor: 1 HP high starting torque, class A, insulated.
- .4 Controller units with integral motor reversing starter, solenoid operated brake 3 heater elements for overload protection, including pushbuttons and control relays as applicable.
- .5 Standard garage operation:
 - .1 Interior Operation:
 - .1 Remote pushbutton station: NEMA 1, flush mounted, adjacent to each door, with "OPEN-STOP-CLOSE" "SECURITY LOCKOUT" designations on pushbuttons in English. 24V
 - .2 Exterior Operation:
 - .1 Remote pushbutton station: NEMA 4, mounted on exterior concrete pedestal with steel control post, with "OPEN-STOP-CLOSE" "SECURITY LOCKOUT" designations on pushbuttons in English. Key operated Model Camden CI-1KX. Abloy CY403 Cylinder to be provided in accordance with Section 08 71 00 Hardware.
- .6 Operation Room 130:
 - .1 Pushbutton Operator: Schneider Electrical, mounted on exterior concrete pedestal with steel control post, with "OPEN-CLOSE" with stop button designations on pushbuttons in English. Type B 30 mm, Control Stations, Type KY293 Security Control Station. One Class 9007 AO2 snap switch for open position and one snap switch for close position. One Class 9001 Type KA1 contact block for stop button. Schlage cylinder, chrome finish.
- .7 Safety switch:
 - .1 Safety switch mechanism complete with two (2) sets of photo eyes and reflector. One set located 150 mm above floor. One set located 400 mm above floor.

- .8 For jack shaft operators:
 - .1 Provide floor level disconnect device to allow for manual operation in event of power failure.
 - .2 Equip Operator with:
 - .1 Electrical interlock switch to disconnect power to operator when in manual operation.
 - .2 Built-in chain hoist for manual operation in event of power failure.
 - .3 Cable fail safe device:
 - .1 Solenoid brake able to stop door immediately if cable breaks on door free fall. Braking capacity 500 kg.
- .9 Automatic illumination complete with time delay, self-extinguishing.
- .10 Door speed: 300mm per second.
- .11 Control transformer: for 24 VAC control voltage.
- .12 Mounting brackets: galvanized steel, size and gauge to suit conditions.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Install doors and hardware in accordance with manufacturer's instructions.
- .3 Rigidly support rail and operator and secure to supporting structure.
- .4 Scope nominally horizontal track 1:50, or to manufacturer's slope recommendations, upwards from curved track at doors equipped with jackshaft operator.
- .5 Touch-up steel doors with primer where finish damaged during fabrication.
- .6 Install operator including electrical motors, controller units, pushbutton stations, relays and other electrical equipment required for door operation. Secure housing using Pin Torx fasteners.
- .7 Lubricate and adjust door operating components to ensure smooth opening and closing of doors.
- .8 Adjust weatherstripping to form a weather tight seal.

- .9 Adjust doors for smooth operation.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written reports from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product within three (3) days of review.
 - .2 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Upon completion of Work, after cleaning is carried out.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
 - .1 Remove traces of primer; clean doors and frames.
 - .2 Clean glass and glazing materials with approved non-abrasive cleaner.
- .3 Waste Management: separate waste materials for reuse in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

3.5 PROTECTION

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

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

- .1 Section 08 71 00. Door Hardware.
- .2 Section 09 91 23. Interior Painting.

1.2 PRODUCT OPTIONS AND SUBSTITUTIONS

- .1 Refer to Division 01 for requirements pertaining to product options and substitutions.

1.3 REFERENCE DOCUMENTS

- .1 ASTM A1008/A1008M, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- .2 ASTM A1011/A1011M, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- .3 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM B 117, Standard Practice for Operating Salt Spray (Fog) Apparatus.
- .5 ASTM D 1735, Standard Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.
- .6 ASTM E 90, Standard Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions.
- .7 ASTM E 336, Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.
- .8 ASTM E 413 - Classification for Rating Sound Insulation.
- .9 HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames; Hollow Metal Manufacturers Association.

1.4 SYSTEM DESCRIPTION

- .1 Design requirements: Acoustical door assemblies to include doors, frames, and door hardware to include gasketing systems, retainers and retainer covers, fixed door bottoms, cam-lift hinges, thresholds, and sills, and all other door components required to meet or exceed field tested performance as scheduled for all sound doors supplied using the ASTM E336 Standard Test Method for Measurement of Airborne Sound Insulation in Building.
- .2 Design Specification: Provide doors with a Sound Transmission Coefficient rating as Scheduled, for installed assembly, when tested as operable door assembly in accordance with ASTM E 90 and ASTM E 413.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Division 01.
- .2 Clearly indicate each type of door, frame, material, metal thicknesses, mortises, reinforcements, location and sizes of seals, glazing, exposed fasteners and special features and accessories.
- .3 Provide manufacturer cut sheets indicating manufacturer name, sizes, materials and characteristics of all door seal accessories.
- .4 Reference door and frame types to door schedule. Indicate door numbers where applicable.
- .5 Provide independent test data from recognized licensed laboratory indicating compliance with requested Sound Transmission Class (STC). Provide this for each sound control door type specified.
- .6 Quality assurance submittals:
 - .1 Test Reports:
 - .1 Certified laboratory reports, performed in accordance with ASTM E90 and ASTM E 413, from independent testing laboratory qualified under the National Voluntary Laboratory Accreditation Program (NVLAP) supporting compliance of assemblies to specified requirements.
 - .2 Minimum five (5) field tests, performed in accordance with ASTM E 336 and ASTM E 413 by five separate independent testing agencies, substantiating acoustical performance of FSTC to meet values scheduled.
 - .3 Field performance for values scheduled as required in Section 1.6 Quality Assurance.
 - .2 Certificates:
 - .1 Contractor's certification that:
 - .1 Products of this section, as provided, meet or exceed specified requirements.
 - .2 Manufacturer of products of this section meet specified qualifications.
 - .3 Acoustical Door manufacturer's certification that the installing contractor has been trained and certified to install and adjust all components of the door assembly.
 - .3 Manufacturer's instructions: Printed installation instructions for each component.
- .7 Closeout submittals:
 - .1 Warranty documents, executed by manufacturer in Owner's name.

- .2 Operation and maintenance data for assembly components.
- .3 Certified statement of manufacturer's authorized representative, as specified in FIELD QUALITY CONTROL Article of PART 3 of this section.
- .4 Installation of doors and hardware including single source responsibility to achieve field ratings within 5 dbs of laboratory tested assemblies. Frames to be grouted and installed by others in accordance with Krieger instructions.
- .5 Certified test reports of independent testing agency, as specified in FIELD QUALITY CONTROL Article of PART 3 of this section.

1.6 QUALITY ASSURANCE

- . 1 Qualifications:
 - . 1 Manufacturer: Minimum five (5) years documented experience producing systems specified in this section.
 - . 2 Installer: Certified and factory trained by acoustical door manufacturer.
- . 2 Performance: Manufacturer and Distributor to guarantee field tested performance meeting values scheduled when field tested according to ASTM E336 Standard Test Method for Measurement of Airborne Sound Insulation in Buildings. Manufacturer and Distributor are required to accordingly undertake all coordination, steps, measures and remedial work necessary to provide this performance standard.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Store frames in accordance with requirements of HMMA 840.
- .2 Store steel doors in accordance with requirements of HMMA 840.
- .3 Remove wraps or covers from doors and frames upon delivery at the building site; clean and touch-up scratches or disfigurement caused by shipping or handling promptly with rust inhibitive primer.
- .4 Store units on planks or dunnage in a dry location; store doors in a vertical position spaced by blocking.
- .5 Store units covered to protect them from damage but permitting air circulation.

1.8 SCHEDULING

- .1 Furnish manufacturer's mounting templates for door hardware provided by others to manufacturer of products of this section in time for factory preparation for door hardware.

2. Products

2.1 MANUFACTURERS

- .1 Krieger Specialty Products, 4880 Gregg Road, Pico Rivera CA 90660; Telephone 562-695-0645, FAX 562-692-0146.

- .2 Ambico, 1124 Cummings Avenue, Gloucester, Ontario K1J 7R8; Telephone 613-746-4663.
- .3 Overly Door Company, 574 West Otterman Street, Greensburg, PA 15601; 1-800-979-7300.
- .4 Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.

2.2 MATERIALS

- .1 Steel sheet: One (1) of the following:
 - .1 A 60 Galvanized
 - .2 Galvanized steel sheet: ASTM A 653/A 653M, commercial quality, minimum A60 zinc coating.
 - .3 Acoustical material: Manufacturer's standard for required STC rating.
 - .4 Primer: Meeting ASTM B 117 salt spray for 150 hours, and ASTM D 1735 water fog test for organic coatings for 200 hours.
 - .5 Acoustic Sealants: as required and recommended by manufacturer.
 - .6 Glazing: specified in section 08 81 00 – Glass and Glazing.

2.3 FABRICATION/COMPONENTS

- .1 Steel doors: Fabricate in accordance with Architect-approved shop drawings, 45 mm (1-3/4 inches) minimum thickness, and as follows:
 - .1 Face sheets:
 - .1 Doors for interior use: Galvanized, minimum 1.6 mm (16ga) sheet thickness.
 - .2 Visible seams on face sheets not permitted.
 - .2 Core:
 - .1 Stiffen face sheets with continuous vertical steel sections.
 - .2 Fill spaces between stiffeners with acoustical material.
 - .3 Manufacturer's standard "non-coupling" core to prevent vibration.
 - .3 Vertical edges:
 - .1 Join face sheets at vertical edges by continuous welding:
 - .1 Join door faces by continuous weld on each edge, extending full door height.

- .2 Grind, fill, and dress welds to provide smooth flush surface.
- .2 Form edge profiles both vertical edges of doors with 3 mm in 50 mm bevel.
- .3 Visible seams on vertical edges not permitted.
- .4 Horizontal edges:
 - .1 Close top and bottom edges of doors with continuous steel channels, 1.6 mm (16ga) minimum; spot-weld channels to both door faces.
 - .2 Provide openings in bottom closure of exterior doors to permit escape of entrapped moisture.
 - .3 Provide additional flush closing channel at top edge of doors; spot-weld channel to both door faces.
- .5 Hardware preparation:
 - .1 Mortise, reinforce, drill, and tap doors at factory for fully templated mortised hardware only, in accordance with approved hardware schedule and supplied templates.
 - .2 Provide reinforcing plates at surface-mounted or non-templated hardware locations.
- .2 Frames: Fabricate in accordance with Architect-approved shop drawings, and as follows:
 - .1 Frames for interior use: Fabricate from galvanized sheet, minimum 2.0 mm (14ga) thickness.
 - .2 Form frame members straight, and of uniform profile through lengths, as welded units with integral trim, of sizes and profiles indicated.
 - .1 Weld contact edges of joints closed tight.
 - .2 Miter perimeter trim faces and weld continuously.
 - .3 When shipping limitations so dictate, fabricate frames for large openings in sections designed for assembly in the field; install alignment plates or angles, of same material and gage as frame, at each joint.
 - .4 Hardware preparation:
 - .1 Mortise, reinforce, drill, and tap frames at factory for fully templated mortised hardware only, in accordance with Architect-approved shop drawings and supplied templates.
 - .2 Provide reinforcing plates at surface-mounted or non-templated hardware locations.

- .5 Floor anchors:
 - .1 Fabricate of same material as frame material; minimum 14-gage.
 - .2 Weld anchors inside each jamb for floor anchorage.
- .6 Jamb anchors:
 - .1 Fabricate of same material as frame material; weld anchors inside each jamb for wall anchorage.
 - .2 Provide anchor types for indicated adjacent wall construction:
 - .1 Frames for installation in masonry walls: Adjustable jamb anchors, 1.6 mm (16ga), T-shape type.
 - .2 Frames for installation in stud partitions: Continuous 16-gage steel channel to surround stud, welded inside each jamb.
- .7 Plaster guards: Fabricate from minimum 0.86 mm (22ga) steel; weld in place at hardware mortises on frames to be set in plaster, masonry, or concrete openings.
- .8 Provide welded frames with temporary steel spreader welded to jamb feet for bracing during shipping and handling.
- .3 Vision Lites:
 - .1 Factory-assemble lites in doors indicated to have lites, using glazing materials and assembly methods indicated on approved shop drawings to match scheduled door STC rating; field assembly not permitted.
 - .2 Fabricate dual-glazed lites permitting individual removal of each glazing pane.
- .4 Loose stops:
 - .1 Fabricate of minimum 2.76 mm (12ga) steel, with factory-drilled and countersunk holes for fasteners.
 - .2 Form stops for mitered corner joints.
 - .3 Supply cadmium-coated or zinc-coated fasteners, size and quantity required for fastener holes.
- .5 Door hardware:
 - .1 Supply gasketing systems, retainers, retainer cover, automatic door bottoms, fixed door bottoms, cam-left hinges, thresholds, and sills as indicated on Architect-approved shop drawings, or specified in manufacturer's product data for project conditions, to achieve specified performance requirements. Standard butt hinges will not be accepted.

- .2 All other door hardware is specified in Section 08 71 00 – Hardware Schedule.

2.4 SILL CONDITION

- .1 Door manufacturer to supply and install a smooth flush stainless steel threshold for the door bottom to seal against when the door is in the closed position. The minimum width of the threshold shall be door thickness plus 100 mm to allow the threshold to extend a minimum of 70 mm beyond the face of the door on both sides of the opening. For openings where floor finishes extends through the opening, the threshold height shall be placed level on the thicker floor material. Thicker floor material is to be the full width of the threshold to maintain level installation.

2.5 FINISH

- .1 Finish: All tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Assemblies shall be treated and shall be coated on all accessible surfaces with a rust-inhibitive primer which meets ASTM B117 salt spray for 150 hours, and ASTM D1735 water fog test for organic coatings for 200 hours, and which is fully cured prior to shipment.

2.6 SOURCE QUALITY CONTROL

- .1 Hardware location on doors and frames:
- .1 Hinges:
 - .1 Top: 127 mm from head of frame to top of hinge.
 - .2 Bottom: 254 mm from finished floor to bottom of hinge.
 - .2 Unit and integral type locks and latches: 38 inches from finished floor to centerline of knob.
 - .3 Deadlocks: 1220 mm from finished floor to centerline of strike.
 - .4 Panic hardware: 965 mm from finished floor to centerline of cross bar, or as indicated on hardware template.

3. Execution

3.1 INSTALLATION

- .1 Remove steel spreaders from welded frames prior to installation; use of spreaders for installation purposes not permitted.
- .2 Install units in accordance with approved shop drawings and manufacturer's printed installation instructions. Installers are required to be trained and certified by acoustical door manufacturer. Other installation forces will not be accepted.
- .3 Installer is responsible for scheduling inspection of surrounding conditions prior to installation. Installer is responsible for time allowance for inspection and potential correction of opening prior to installation commencing.

- .4 Installers must inspect conditions and coordinate construction and reinforcement of openings prior to door installation. Openings must be straight, level rigid and square to manufacturer's tolerances. Where unsatisfactory conditions are found Contractor and Consultant are to be notified. Do not commence until satisfactory conditions are corrected. Commencing installation will constitute acceptance of conditions.
- .5 All materials shall be thoroughly inspected upon receipt and all discrepancies and/or damages shall be immediately reported in writing to the supplier.
- .6 Fill voids between concealed side of frame and adjacent wall construction with lightweight gypsum plaster in accordance with approved shop drawings or manufacturer's printed installation instructions.
- .8 Finish surfaces having abrasion damage smooth; touch-up with rust inhibitive primer.
- .9 Install gasketing systems, retainers, retainer covers, automatic door bottoms, fixed door bottoms, cam-lift hinges, thresholds, and sills in accordance with manufacturer's printed instructions.
- .10 Installation of all other door hardware is specified in Section 08 71 00 – Hardware Schedule.
- .11 Field painting is specified in Section 09 91 23 – Interior Painting.
- .12 Site tolerances: Do not exceed the following installation tolerances:
 - .1 Squareness: Plus or minus 1.6 mm measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
 - .2 Alignment: Plus or minus 1.6 mm measured on jambs on a horizontal line parallel to the plane of the wall.
 - .3 Twist: Plus or minus 1.6 mm measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.
 - .4 Plumb: Plus or minus 1.6 mm measured on the jamb at the floor.
- .13 Adjust operable parts for correct clearances and function.

3.2 FIELD QUALITY CONTROL

- .1 Inspections:
 - .1 Inspection and testing of acoustic application will be carried out by a third-party inspection agency certified to perform inspections to confirm Sound Transmission Class (STC) ratings of designated acoustic rooms.
 - .2 Contractor will pay for inspections at completion of acoustic rooms, prior to Substantial Completion. Inspection costs to include travel, living allowance, site inspections, testing and reports.
 - .3 If acoustic rooms perform lower than the noted STC ratings, Contractor to pay for all remediation to construction and retesting by the same inspection agency until STC levels are met.

- .4 Rooms 102, 103, 104, 109, 116, 131, 132, 148, 168, 169, 170, 171 are to be testing to STC 50. Rooms 131 and 132 are considered one room. Rooms 169, 170, and 171 are considered one room.

3.3 SCHEDULE

- .1 **STC 46 Field Tested Doors:** Provide Manufacturer's door rated for STC 51.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 92 00 - Joint Sealants
- .2 Section 08 11 00 - Metal Doors and Frames
- .3 Section 08 71 00 - Door Hardware

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.10-2017, Power Operated Pedestrian Doors.
 - .2 ANSI/BHMA A156.19-213, Power Assist and Low Energy Power Operated Doors.
- .2 ASTM International
 - .1 ASTM B209M-14, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .2 ASTM B221M-13, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2013, Paints and Coatings.
- .4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2016, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2014, Adhesives and Sealants Applications.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 ULC/ORD C305-72, Panic Hardware.
 - .2 CAN/ULC-S524-14, Standard for the Installation of Fire Alarm Systems.
 - .3 CAN/ULC-S533-15, Egress Door Securing and Releasing Devices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta.

- .2 Indicate layout, dimensions, elevations, materials, finishes, hardware including mounting heights, anchors and reinforcements.
- .3 Identify installation tolerances required, assembly conditions, routing of service lines, locations of operating components, controls and boxes.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Submit project record documents that accurately record locations of concealed equipment, services, and conduit.
- .3 Operation and Maintenance Data: submit operation and maintenance data for door system for incorporation into manual.
- .4 Parts List:
 - .1 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.
- .5 Maintenance Contract:
 - .1 Supply complete service and maintenance of operating equipment for one (1) year from date of substantial performance of the work.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply wrenches and tools required for maintenance of equipment.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions, 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect automatic entrance doors and frames from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Cover exposed metal surfaces with pressure sensitive heavy protection paper or strippable plastic coating.
 - .1 Use materials of type which will not leave residue or become bonded when exposed to sun.
- .5 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 43 - Environmental Procedures

- .6 Packaging Waste Management: remove for reuse by manufacturer and return of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

1.7 WARRANTY

- .1 Warranty: include coverage of repair or replacement of components or entire units which fail in materials workmanship. Failures include but are not necessarily limited to, structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation of operator's speed control and hardware, deterioration of metals, metal finishes, and other materials beyond normal weathering.

Part 2 Products

2.1 SYSTEMS

- .1 Design Requirements:
 - .1 Design automatic entrance doors as emergency exits, as required as means of egress from the building.
 - .2 Design automatic entrances to comply with applicable requirements of ANSI/BHMA A156.10.
 - .3 Design power assist and low energy power operated doors to applicable requirements of ANSI/BHMA A156.19.
- .2 Performance Requirements:
 - .1 Automatic door equipment to accommodate high frequency pedestrian traffic.
 - .2 Operator Equipment: CSA approved.
 - .3 Automatic Locks and Panic Hardware to Non-Fire Rated Exit Doors: ULC listed and labelled.
 - .4 Supply manual operation for opening and closing of doors during electrical power failure and when power is manually switched off. Doors to fail secure.
 - .5 Include fully adjustable operators for hold open time, opening and closing speeds, checking speeds and cancellation on activation of fire alarm and smoke detection system, security system and building door control system.
 - .6 Eliminate possibility of water accumulating and freezing in door power units.
 - .7 Design equipment to operate at ambient temperatures between -40 degrees C and 170 degrees C.

2.2 HARDWARE

- .1 Automatic Door Equipment to be coordinated and installed with hardware in accordance with Section 08 71 00 - Hardware.

2.3 MATERIALS

- .1 Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - .1 Headers 6063-T6.

- .2 Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221M.
- .3 Sheet and Plate: ASTM B209M.
- .2 Sealants and Joint Fillers: Refer to Division 7, Section 07 92 00 - Joint Sealants.
- .3 Header Case: Header case shall not exceed 6" (152mm) square in section and shall be fabricated from extruded aluminum with structurally integrated end caps, designed to conceal door operators and controls. The operator shall be sealed against dust, dirt and corrosion within the header case. Access to the operator and electronic control box shall be provided by a full length removable cover, edge rabbeted to the header to ensure a flush fit. Removable cover shall be secured with tamperproof screws to prevent unauthorized access.
- .4 Door Arms: A combination of door arms and linkage shall provide positive control of door through entire swing; units shall permit use of butt hung, center pivot, and offset pivot-hung doors.
- .5 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
- .6 Signage: Provide signage in accordance with ANSI/BHMA A156.19.

2.4 SWINGING DOOR OPERATORS

- .1 Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
- .2 Electromechanical Operators: Self-contained unit powered by a 3/16 horsepower, permanent-magnet DC motor; through a high torque reduction gear system.
 - .1 Operation: Power opening and spring closing.
 - .2 Operator Type: Low energy; readily convertible to full energy; no tools required to change type.
 - .3 Handing: Non-handed; no tools required to change handing.
 - .4 Capacity: Rated for door panels weighing up to 350 pounds.
 - .5 Mounting: Visible
 - .6 Features:
 - .1 Adjustable opening and closing speeds
 - .2 Adjustable opening and closing force
 - .3 Adjustable back-check
 - .4 Adjustable hold-open time between 0 and 30 second
 - .5 Reverse on obstruction.
 - .6 Variable rate open/closed speed control.
 - .7 Closed loop speed control with active braking and acceleration.
 - .8 Variable obstruction recycle time delay.
 - .9 Optional Switch to open/Switch to close operation.
 - .10 When operators are provided in pairs, adjustable features are independently adjustable for each operator.

- .3 Field Adjustable Spring Closing Operation: The operator shall close the door by spring energy employing the motor, as a dynamic brake closing speed control. The closing spring shall be a helical compression spring, adjustable for positive closing action. The spring shall be adjustable, without removing the operator from the header, to accommodate a wide range of field conditions.
- .4 Independent Adjustable Closing and Latching Speed Control: The operator shall employ a rheostat module to allow for independent field adjustment of closing and latching speeds using the motor as a dynamic brake.
- .5 Field Adjustable Open Stop: The operator shall provide a field adjustable open stop to accommodate opening angles from 80 to 135 degrees without the need for additional components.
- .6 Consistent Cycle: The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open.
- .7 Additionally, the range of the force shall be field adjustable to accommodate a wide range of on-site conditions.
- .8 Quiet Performance: The operator shall be designed to output audible noise ratios less than or equal to 50 dB.
- .9 Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power. The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open.
- .10 Electrical Service to door operators shall be provided in accordance with Electrical scope. Minimum service to 120 VAC, 10 Amps for doors with operators in pairs, 5 Amps for single doors.

2.5 DOOR OPERATOR CONTROL SYSTEMS

- .1 Supply controls with detection patterns and sensitivity, for both operation and safety, of sizes and quantities required to suit project, but not smaller than requirements of ANSI/BHMA A156.10.
- .2 Electrical Control System: Electrical control system shall include a microprocessor controller and position encoder. The encoder shall monitor revolutions of the operator shaft and send signals to microprocessor controller to define door position. Systems utilizing external magnets and magnetic switches are not acceptable.
- .3 Life Cycle Data Counter: The microprocessor control shall incorporate a non-re-settable counter to track door operation cycles.
- .4 Controller Protection: The microprocessor controller shall incorporate the following features to ensure trouble free operation:
 - .1 Automatic Reset Upon Power Up.
 - .2 Main Fuse Protection.
 - .3 Electronic Surge Protection.
 - .4 Internal Power Supply Protection.
 - .5 Resettable sensor supply fuse protection.
 - .6 Software 'watchdog' protection in the case of software malfunction.

- .5 Push Button Interface with LED: The controller shall have push button switches with LED readout to allow for selection or change of the following parameters: timer logic, single door, activation options, normal back check, push-to-open assist on/off.
- .6 Soft Start/Stop: A 'soft-start' 'soft stop' motor driving circuit shall be provided for smooth normal opening and recycling.
- .7 Safety Search Circuitry: Provide system to recycle the swinging panels when an obstruction is encountered during the closing cycle. If an obstruction is detected, the system shall search for that object on the next closing cycle by reducing door closing speed prior to the previously encountered obstruction location, and will continue to close in check speed until doors are fully closed, at which time the doors will reset to normal speed. If obstruction is encountered again, the door will come to a full stop. The doors shall remain stopped until obstruction is removed and operate signal is given, resetting the door to normal operation.
- .8 Programmable Controller: Microprocessor controller shall be programmable and shall be designed for connection to a local configuration tool. Local configuration tool shall be software driven. The following parameters may be adjusted via the configuration tool.
 - .1 Operating speed and forces as required to meet ANSI/BHMA A156.10.
 - .2 Firmware update.
 - .3 Trouble shooting
 - .1 I/O Status.
 - .2 Electrical component monitoring including parameter summary.
 - .4 Entrance profile copy/paste: Software for local configuration tool shall be available as a free download from the automatic door operator's manufacturer's internet site.
- .9 Emergency Breakout Switch: A cam actuated emergency breakout switch shall be provided to disconnect power to the motor when an in-swinging door is manually pushed in the emergency out direction. The operator will then automatically reset, and power will be resumed.
- .10 Control Switch: Automatic door operators shall be equipped with a three-position function switch to control the operator of the door. Control switch shall provide three (3) modes of operation: Automatic, Off and Hold-Open.
- .11 Power Switch: Automatic door operators shall be equipped with a two-position On/Off switch to control power to the door.
- .12 Key Switch surface, jamb mounted, on inside of opening.

2.6 ACTIVATION DEVICES

- .1 Activation for Low Energy Doors:
 - .1 Activation for Low Energy Doors:
 - .1 Push Plates: Provide 14mm (4 1/2") square SPDT push plates with UL-listed switch. Face plates to be stainless steel. Face plates shall be engraved with the international symbol for accessibility and "Push to Open".

- .1 Interior and exterior push plates shall be mounted on wall in single gang electrical boxes and hardwired to door operator controls.
- .2 Card Reader Operators: Where card readers will activate the door operation from the exterior, doors 137B and 191B, face plates are not required.

2.7 ALUMINUM FINISHES

- .1 Comply with NAAMM Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designing finishes. Finish designations prefixed by AA comply with system established by aluminum Association for designing finishes.
- .2 Class II, Clear Anodic Finish: AA-M10C22A31 Mechanical Finish: as fabricated; Chemical Finish: etched, medium matte; Anodic Coating Architectural Call II, clear coating 1.40 mils minimum complying with AAMA 611-98 and the following:
 - .1 AAMA 607.1
 - .2 Applicator must be fully compliant with all applicable environmental regulations and permits, including wastewater and heavy metal discharge.

Part 3 Execution

3.1 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Coordinate operators and controls with the install of doors and frames in accordance with Section 08 11 00 - Metal Doors and Frames.
- .3 Co-ordinate installation of components with related and adjacent work.
- .4 Set work plumb, square, level, free from warp, twist and superimposed loads.
- .5 Securely anchor work in required position. Do not restrict thermal movement.
- .6 Apply isolation coating to separate aluminum and primed or galvanized steel surfaces.
- .7 Install hardware using templates provided. Refer to Section 08 71 00 - Door Hardware for installation requirements.
- .8 Install door operator system in accordance with manufacturer's instructions, including piping controls, control wiring.
- .9 Set header assemblies and operating brackets, level and true to location, with adequate anchorage for permanent support.

3.2 SEALANT APPLICATION

- .1 Install perimeter seal and vapour retarder membrane as detailed.
- .2 Comply with requirements of Section 07 92 00 - Joint Sealants for sealants, fillers and gaskets to be installed during installation of doors and frames.

- .3 Conceal sealant within aluminum work except where exposed use is permitted by Consultant.
- .4 Set sill members in bed of sealant.

3.3 ADJUSTING

- .1 After repeated operation of completed installation equivalent to three (3) days of use by normal traffic (100 to 300 cycles), readjust door operators and controls for optimum, smooth operating condition and safety and for weather tight closure. Lubricate hardware, operating equipment and other moving parts.
- .2 Adjust revolving doors to ensure tight fit at contact points with enclosure.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Remove traces of primer, caulking; clean doors and frames.
 - .3 Clean aluminum surfaces promptly after installation. Exercise care to avoid damage to coatings.
 - .4 Remove protective material from prefinished aluminum surfaces.
 - .5 Wash exposed surfaces with mild solution of detergent and warm water, using soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean.
 - .6 Remove excess sealant by moderate use of solvent, of type acceptable to sealant manufacturer.
 - .7 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Delegated Design Professional Engineer: The professional engineer hired or contracted to the fabricator or manufacturer to produce delegated design submittals and shop drawings to meet the requirements of the Project, and registered in the Province of Alberta, and who is not the Consultant.
- .2 Equal Dimensions: Curtain wall assemblies indicating equal dimensions on the drawings shall be calculated to align with in-place structural elements followed by even division of the space between structural elements. This shall mean that curtain wall materials are evenly spaced between adjacent structural members, not necessarily evenly spaced across the entire wall assembly.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate installation of system with work specified in other Sections to ensure proper placement and installation of vapour barrier, insulation and flashing in order that air, vapour and thermal barrier of building is intact and moisture will be diverted to the exterior, and as follows:
 - .1 Coordinate installation of sealants so that ambient and surface temperatures are greater than 5°C from time of application until sealants have cured.
 - .2 Coordinate connection of curtain wall system structural connections at floor slabs to vertical members.
 - .3 Coordinate design of curtain wall elements to tie into adjacent building envelope elements.
 - .4 Delegated Design Requirements: Coordinate design of glazed curtain wall with glass thicknesses and composition in accordance with referenced standards and requirements of this Section.

1.3 RELATED REQUIREMENTS

- .1 Section 07 21 13 – Board Insulation
- .2 Section 07 84 00 – Fire Stopping
- .3 Section 07 92 00 – Joint Sealants
- .4 Section 08 81 00 – Glass and Glazing
- .5 American Architectural Manufacturers Association
 - .1 AAMA 611-14, Voluntary Specification for Anodized Architectural Aluminum.
 - .2 AAMA 1503-09, Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- .6 American National Standard
 - .1 ANSI H35.1/H35.1M-2017, American National Standard Alloy and Temper Designation Systems for Aluminum, 2017.
- .7 ASTM International

- .1 ASTM B209-14, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .2 ASTM B221-14, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .3 ASTM B308/B308M-10, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- .4 ASTM B429/B429M-10e1, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- .5 ASTM E283-04(2012), Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .6 ASTM E331-00(2016), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- .7 ASTM E783-02(2010), Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
- .8 ASTM E1105-15, 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.
- .9 ASTM E 1300, Determining Load Resistance of Glass in Buildings.
- .8 CSA Group
 - .1 CSA G40.21-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59.2-M1991(R2013), Welded Aluminum Construction.

1.4 SUBMITTALS

- .1 Submit required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Submit the following before starting any work of this Section:
 - .1 Product Data: Submit product data indicating construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated, in addition to the following specific requirements:
 - .1 Mechanical Fasteners: Indicate sizes, shear, and pull over loading capacity where applicable.
 - .2 Corrosion Protection: Indicate thickness and type of corrosion protection coating.
 - .2 Shop Drawings: Submit shop drawings prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of glazed aluminum curtain wall systems clearly indicating all construction details including; but not limited to, the following:
 - .1 Connections and anchor requirements
 - .2 Type, size and spacing of fastening devices
 - .3 Design loads

- .4 Connections to adjacent air and vapour membranes
 - .5 Internal drainage
 - .6 Sealant locations
 - .7 Seal of a professional engineer registered in the Province of the Work for details requiring structural design for load bearing, or life/health safety.
- .3 Samples: Submit samples for each type of exposed finish required, in manufacturer's standard sizes for Consultant's verification of specified finishes including; but not limited to, the following:
- .1 Submit fabricated sample of each vertical to horizontal intersection of specified systems, made from 450 mm lengths of full size components indicating details of the following:
 - .1 Joinery
 - .2 Anchorage
 - .3 Expansion provisions
 - .4 Glazing
 - .5 Flashing and drainage
- .3 Informational Submittals: Provide the following:
- .1 Qualification Statement: Submit evidence of welder qualifications specified in this Section when requested by Consultant.
 - .2 Source Quality Control Submittals: Submit delegated design professional engineer's design notes and calculations upon request of the Consultant.
 - .3 Delegated Design Submittals: Submit letters of commitment and compliance as follows:
 - .1 Provide Letter of Commitment in conjunction with shop drawings, signed and sealed by the professional engineer required by the Work of this Section indicating the following are designed to the intent of the Building Code:
 - .1 Curtain wall connections to building structure
 - .2 Curtain wall reinforcement
 - .3 Deflection of members
 - .4 Glass thickness as it relates to glass area
 - .2 Provide Letter of Compliance, signed and sealed by the professional engineer required by the Work of this Section indicating that connections, reinforcement and deflection criteria, and glass thickness of installed system is in compliance with the intent of the Building Code and reviewed shop drawings before declaration of Substantial Performance

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: Installer shall be capable of assuming delegated design engineering responsibility, performing Work of this Section and who is acceptable to manufacturer for the type of work specified.
 - .2 Delegated Design Professional: Retain a Professional Engineer, registered in the Province of Alberta, to design fabrication and erection of the Work of this Section in accordance with applicable Building Code and Contract Documents requirements including, but not limited to, the following:
 - .1 Seal and signature to shop drawings and design submittals
 - .2 Site review of installed components
- .2 Certifications: Provide the following during the course of the Work:
 - .1 Compliance Certification: Provide certificates from manufacturer indicating tested performance requirements required by Authorities Having Jurisdiction.
 - .2 Letters of Commitment and Compliance: Provide documents prepared by the delegated design professional engineer as recommended by APEGGA's Responsibilities for Engineering Services for Building Projects.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: Deliver, handle and store prefabricated units in accordance with manufacturer's directions.
- .3 Storage and Handling Requirements: Store units at site on raised wood pallets protected from the elements and corrosive materials, and as follows:
 - .1 Do not remove from crates or other protective covering until ready for installation.
 - .2 Store all glass units vertically on end with solid bearing full thickness of sealed units.
 - .3 Store pre-fabricated frame assemblies blocked off the ground to prevent warping, twisting, undue strain on assembly or physical abuse and damage.

1.7 SITE CONDITIONS

- .1 Site Measurements: Verify dimensions of other construction by site measurements before fabrication and indicate measurements on shop drawings where aluminum curtain wall systems are indicated to fit to other construction.
- .2 Established Dimensions: Establish dimensions and proceed with fabricating aluminum curtain wall without site measurements where site measurements cannot be made without delaying the Work, coordinated with other construction to ensure that actual dimensions correspond to established dimensions.
 - .1 Ambient Conditions: Confirm installation requirements for ambient and surface temperatures of sealants with manufacturer and apply sealants when temperatures

are greater than manufacturer's stated minimum from time of application until sealants have cured.

1.8 WARRANTY

- .1 Provide manufacturers written warranty, signed and issued in the name of Owner, to replace the following items for defective material and workmanship for the time stated from date of Substantial Performance:
 - .1 Framing, panels and glazing: Failure of performance requirements specified in item 2.2.3.5 below; Two (2) years.
 - .2 Sealed glass units: misting, dusting and seal failure; as indicated in Section 08 81 00 – Glass and Glazing.
 - .3 Joint sealants, caulking: Failure to maintain seal; Two (2) years.
 - .4 Aluminum brake shapes: oil-canning and delaminations; Two (2) years.
 - .5 Finishes: Failure specified finishes not attributable to normal weathering; Twenty (20) years.

Part 2 Products

2.1 MANUFACTURERS

- .1 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:
 - .1 Alumicor: Alumicor ThermaWall 2600, Standard Triple Glazed System

2.2 DESIGN CRITERIA

- .1 Retain a professional engineer registered in province of Alberta, experienced in structural design in glass and aluminum to design curtain wall units and connections; to ensure the adequacy of the structural aspects of the design, manufacture, and installation of complete assembly; this engineer is called the "delegated design professional engineer" as defined in item 1.1.1 above.
- .2 Design curtain wall framing system capable of withstanding design loads within limits and under design loads indicated in this Section, and as follows:
 - .1 Dead Loads: Account for weights of materials and construction accessories.
 - .2 Structural Loads:
 - .1 Wind Loads: 1.55 kPa as measure to ASTM E 1330.
 - .2 Seismic Loads: to NBC 2015.
 - .3 Deflection of Framing Members:
 - .1 Deflection Normal to Wall Plane: Limited to L/175 of clear span for spans up to 4100 mm, and to L/240 of clear span plus 6 mm or spans greater than 4100 mm or an amount that restricts edge deflection of individual glazing lites to 16 mm, whichever is less.
 - .2 Deflection Parallel to Glazing Plane: Limited to amount not exceeding an amount that reduces glazing bite to less than 75% of design dimension

- and that reduces edge clearance between framing members and glazing or other fixed components to less than 3 mm.
- .3 Limit length of cantilever deflection to 2/175 length of the cantilevered member where framing members overhang an anchor point.
- .3 Performance Requirements: Design, engineer, test, fabricate, deliver, install and guaranty construction necessary to provide and install aluminum curtain wall systems including anchorage capable of withstanding without failure, the effects of the following:
 - .1 Structural loads listed above.
 - .2 Environmental movements and performance criteria listed below.
 - .3 Movements of supporting structure indicated on Drawings including; but not limited to, storey drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - .4 Dimensional tolerances of building frame and other adjacent construction.
 - .5 Failure of the system will be considered as:
 - .1 Deflection exceeding specified limits.
 - .2 Thermal stresses transferred to building structure.
 - .3 Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
 - .4 Noise or vibration created by wind and thermal and structural movements.
 - .5 Loosening or weakening of fasteners, attachments, and other components.
 - .6 Sealant failure.
 - .4 Environmental Conditions: Design curtain wall systems to account for the following environmental conditions:
 - .1 Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient temperatures, accounting for surface temperatures of materials due to both solar heat gain and night time sky heat loss:
 - .1 Temperature Change (Range):
 - .1 Exterior Ambient: -40°C to +35°C
 - .2 Interior Ambient: +16°C to +29°C
 - .3 Adjust calculations to account for colour treatments or coatings on curtain wall framing members.
 - .2 Allow for thermal movement with no buckling of frame members, stress on glass, glazing edge seal failure, sealant failure, excess stress on curtain wall framing, anchors and fasteners, or reduction of performance.
 - .2 Condensation Resistance: Design thermal break to limit frosting and condensation on interior of window metal surfaces to not over 5% of area when conditions are:
 - .1 Exterior Air Temperature: -32°C
 - .2 Interior Air Temperature: 22°C ±1.2°C
 - .3 Interior Relative Humidity: 15%

- .3 Air Infiltration: Design system for maximum air leakage of 0.03 L/m² of fixed wall area when tested in accordance with ASTM E283 at a minimum static air pressure differential of 300 Pa.
- .4 Water Penetration Under Static Pressure: Design system for zero water penetration when tested in accordance with ASTM E331 at a minimum differential static pressure of 20% of positive design wind load; but not less than 720 Pa.
- .5 Average Thermal Conductance: Design system having average insulation factor of not more than 2.6 W/m²*K when tested in accordance with AAMA 1503.

2.3 MATERIALS

- .1 Aluminum: Materials recommended by manufacturer for type of use and finish indicated, and as follows:
 - .1 Sheet and Plate: In accordance with ASTM B209/B209M, and ANSI H35.1, and AA1100-H14, AA5005-H32 or H34, anodizing quality.
 - .2 Extruded Bars, Rods, Profiles, and Tubes: In accordance with ASTM B221/B221M, and ANSI H35.1, AA6063-T5 or T6, anodizing quality.
 - .3 Extruded Structural Pipe and Tubes: In accordance with ASTM B429, and ANSI H35.1 AA6061-T6 or AA6063-T6, anodizing quality.
 - .4 Structural Profiles: In accordance with ASTM B308/B308M, anodizing quality.
 - .5 Welding Rods and Bare Electrodes: CSA W59.2.
- .2 Formed Aluminum Flashings: Tension levelled, aluminum sheet in accordance with ASTM B209 and ANSI H35.1 alloy designation 3003-H14 and as follows:
 - .1 Thickness: Minimum 1.00 mm, unless noted otherwise.
 - .2 Aluminum Flashing: Finish to match adjacent aluminum frames.
 - .3 Sill Flashings: Provide end dams, 25 mm high, to sill flashings that fit behind jamb flashings to stop water from draining between the adjacent flashings.
- .3 Steel Reinforcement: Coat steel with manufacturer's standard corrosion resistant primer applied immediately after surface preparation and pre-treatment, and as follows:
 - .1 Rolled Sheet or Strip: CSA G40.20/G40.21.
 - .2 Structural Shapes, Plates and Bars: CSA G40.20/G40.21.
- .4 Brackets and Reinforcements: Manufacturer's standard high strength aluminum with non-staining, nonferrous shims for aligning system components.
- .5 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
 - .1 Use self-locking devices where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration.
 - .2 Reinforce members as required to receive fastener threads.
 - .3 Use only concealed fasteners, unless use of exposed fasteners has been accepted in writing by the Consultant.
 - .4 Finish exposed portions to match framing system.

- .5 Use slip joint linings, spacers, and sleeves at movement joints of material and type recommended by manufacturer.
- .6 Anti-Rotation Channels: Extruded aluminum or bent metal anti-rotation channel designed to mechanically retain air seal membrane to the face of the tubular back section.
- .7 Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- .8 Concealed Flashing: Manufacturer's standard corrosion resistant, non-staining, non-bleeding flashing compatible with adjacent materials.
- .9 Transition Membranes: Full length mechanically anchored, transition membrane to perimeter of frame profile to provide continuous air/vapour retarder to adjacent wall construction:
 - .1 Basis-of-Design Materials: Alumicor.
- .10 Glazing Gaskets: Manufacturer's standard sealed corner pressure glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers; as recommended by manufacturer for joint type.
- .11 Pressure Plates: Manufacturer's continuous fibreglass pressure plates the full length of framing.

2.4 FRAMING SYSTEMS: UNITIZED

- .1 Frame Type: To profiles and thicknesses required to meet performance criteria; but not less than 3 mm thickness, and as follows:
 - .1 Frame Dimensions: Nominal 65 mm wide x 100 mm deep back section having a 50 mm glazing throat.
 - .2 Cover Depth: Nominal 65 mm wide x 19 mm depth, square profile.
 - .3 Acceptable Materials:
 - .1 Alumicor
- .2 Aluminum Flashing: 2.1 mm thick minimum prefinished aluminum flashing to match aluminum framing exterior aluminum curtain wall caps.

2.5 GLAZING SYSTEMS

- .1 Glass: Specified in Section 08 81 00 – Glass and Glazing.
- .2 Glazing Gaskets: Manufacturer's standard sealed corner pressure glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- .3 Standard Glazing Sealants: As recommended by manufacturer for joint type.
- .4 Glazing Sealants: As recommended by manufacturer for joint type.

2.6 ACCESSORY MATERIALS

- .1 Perimeter Fire Containment Systems: Specified in Section 07 84 00 – Fire Stopping.
- .2 Insulating Materials: Specified in Section 07 21 13 – Board Insulation.

2.7 FABRICATION

- .1 Form aluminum shapes before finishing.
- .2 Fabricate components that have the following characteristics when assembled:
 - .1 Sharp profiles, straight and free of defects or deformations.
 - .2 Accurately fitted joints with ends coped or mitred.
 - .3 Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
 - .4 Physical and thermal isolation of glazing from framing members.
 - .5 Accommodations for thermal and mechanical movements of glazing and framing to prevent glazing-to-glazing contact and to maintain required glazing edge clearances.
 - .6 Provisions for re-glazing.
- .3 Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish; remove weld spatter and welding oxides from exposed surfaces by de-scaling or grinding.
- .4 Clearly mark fabricated components to identify their locations in accordance with Shop Drawings.
- .5 Refer to Section 07 92 00 – Joint Sealants.

2.8 ALUMINUM EXTRUSION FABRICATIONS

- .1 Aluminum Extrusion Units: Fabricate extruded aluminum running units with formed or extruded aluminum joint covers for installation behind main members where possible. Fabricate mitred and welded corner units.

2.9 ALUMINUM FINISHES

- .1 Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- .2 Aluminum Coloured Anodized Finish:
 - .1 Exterior: Class I Finish: Architectural Class I, integrally coloured or electrolytically deposited colour coating 0.018 mm or thicker in accordance with AAMA 611.
 - .2 Interior: Class II Finish: Architectural Class II, integrally coloured or electrolytically deposited colour coating 0.010 mm or thicker in accordance with AAMA 611.
 - .3 Colour: Based on design: Alumicor, standard bronze.

2.10 INSULATED SPANDREL PANELS

- .1 Spandrel Glass: Double-glazed in accordance with Section 08 81 00 – Glass and Glazing.
- .2 Back Pan:

- .1 Aluminum Sheet: in accordance with ASTM B209. 1.6 mm (0.063”) thickness, formed into a pan shape to fit glazing throat with back of pan flush with inside face of back section.
- .2 Finish: Matching curtain wall framing in areas where exposed, mill finish in non-exposed areas.
- .3 Insulation: Rigid mineral fibre insulation held in place with manufacturer’s standard system to back face of back pan.”

2.11 ACOUSTIC WINDOW - SECURE

- .1 Engineered, fixed aluminum framed, acoustically sealed fixed glazed window unit with integral horizontal pivoting aluminum louvres, factory glazed and sealed as per accepted manufacturer: Unicec Architectural Corp (1-800-668-1580).
 - .1 Extruded aluminum perimeter frame, 63 mm nominal width, depth to suit glazing thickness.
 - .2 Unit tested sound transmission co-efficient to be STC 48 or greater for complete unit assembly.
 - .3 Lexan Marguard Polycarbonate 6 mm thick as manufactured by G.E. Plastics. Inner glazing panel, cut and installed in accordance with manufacturers recommendations.
 - .4 50 mm air space.
 - .5 Lexan Marguard Polycarbonate 6 mm thick as manufactured by G.E. Plastics. Inner glazing panel, cut and installed in accordance with manufacturers.
 - .6 Horizontal pivoting louvre system, hand operated tilting mechanism concealed in frame, with knob operator on room 116 side.
 - .7 Duracron White K-1285 finish to complete frame.
 - .8 Seal both side of window with paintable acoustic sealant.

2.12 ROOM 101/105 MILLWORK WINDOWS

- .1 Low-profile aluminum millwork frames: Based on the Kawneer profile 1040 for counter barrier windows. Window profiles will be fastened to adjacent construction materials and are not to slide. Profile approximately 45 mm x 58 mm.
- .2 Glazing is to be in accordance with Section 08 81 00 – Glass and Glazing.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine areas for compliance with requirements for installation tolerances and other conditions affecting performance of work; report any conflicts or coordination issues to Contractor.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION: GENERAL

- .1 Install in accordance with manufacturer's written instructions.
- .2 Install components free from damage or irregularities.

- .3 Fit joints to produce hairline joints free of burrs and distortion.
- .4 Rigidly secure non-movement joints.
- .5 Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- .6 Weld components in concealed locations to minimize distortion or discoloration of finish:
 - .1 Protect glazing surfaces from welding.
 - .2 Protect work of other sections from welding.
- .7 Seal joints watertight, except where manufacturer's standard details indicate a requirement for open joints.
- .8 Metal Protection:
 - .1 Protect aluminum against galvanic action by painting contact surfaces with primer, by applying sealant or tape, or installing nonconductive spacers where aluminum contacts dissimilar metals.
 - .2 Protect aluminum against corrosion by painting contact surfaces with bituminous paint where aluminum contacts concrete or masonry.
- .9 Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- .10 Install components plumb and true in alignment with established lines and grades.
- .11 Install glass in accordance with manufacturer's standard glazing recommendations.
- .12 Install sealants in accordance with Section 07 92 00 – Joint Sealants.
- .13 Install insulation materials in accordance with manufacturer's standard practices.
- .14 Install perimeter fire containment systems as specified in Section 07 84 00 – Fire Stopping.
- .15 Erection Tolerances: Install glazed aluminum curtain wall systems in accordance with the following maximum tolerances:
 - .1 Plumb: 3 mm in 3050 mm; 6 mm in 12 m cumulative.
 - .2 Level: 3 mm in 3050 mm; 6 mm in 12 m cumulative.
 - .3 Alignment:
 - .1 Limit offset from true alignment to 1.5 mm where surfaces abut in line or are separated by reveal or protruding element up to 13 mm wide,
 - .2 Limit offset from true alignment to 3 mm where surfaces are separated by reveal or protruding element from 13 mm to 25 mm wide,
 - .3 Limit offset from true alignment to 6 mm where surfaces are separated by reveal or protruding element of 25 mm wide or greater.
 - .4 Location: Limit variation from plane to 3 mm in 3660 mm; 13 mm over total length.
- .16 Snap covers, profiles as indicated, and pressure plates shall be continuous from top to bottom of frame, with horizontals abutting between. Deep mullion caps to be corner mitred with horizontal shallow cap abutting deep mullion cap. All 19 mm and

50 mm deep caps, unless noted otherwise. Mechanically fasten glazing caps to pressure plates, one (1) fastener for each section.

3.3 ERECTION TOLERANCES

- .1 Install aluminum framed curtain wall systems in accordance with the following maximum tolerances:
 - .1 Location and Plane: Limit variation from true location and plane to 3 mm in 3660 mm; 6 mm over total length.
 - .2 Alignment:
 - .3 Limit offset from true alignment to 1.5 mm where surfaces abut in line.
 - .4 Limit offset from true alignment to 0.8 mm where surfaces meet at corners
 - .5 Diagonal Measurements: Limit difference between diagonal measurements to 3 mm.

3.4 SITE QUALITY CONTROL

- .1 Engage a qualified independent testing and inspecting agency to perform site tests and inspections and prepare test reports.
- .2 Tests and inspections of representative areas will determine compliance of installed systems with specified requirements and in successive stages through out installation.
- .3 Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
- .4 Air Infiltration: Test for air leakage at 1.5 times the rate specified for laboratory testing under Performance Requirements, but not more than 0.03 L/s/m² of fixed wall area in accordance with ASTM E783 at a minimum static air pressure difference of 75 Pa.
- .5 Water Penetration: Test for water penetration in accordance with ASTM E1105 at a minimum uniform and cyclic static-air-pressure difference of 0.67 times the static air pressure difference specified for laboratory testing under Performance Requirements, but not less than 200 Pa, with no evidence water penetration.
- .6 Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- .7 Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 ADJUSTING

- .1 Adjust operating hardware for smooth operation in accordance with hardware manufacturers' written instructions.

3.6 CLEANING

- .1 Clean aluminum frames and glazing in accordance with Section 01 74 11 – Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

3.7 PROTECTION

- .1 Protect aluminum finishes and glazing during erection against disfiguration, contamination or damage by abuse or harmful materials.
- .2 Install protective cover where exposure to damage is critical.
- .3 Mark each light with large cross or other symbol to make glass obvious and noticeable to other trades after glass is installed, using substance that will not stain, mark or "shadow" glass either by itself or by reaction with sunlight, moisture or the environment; masking tape is not considered as a suitable material; replace glass units marked with masking tape.

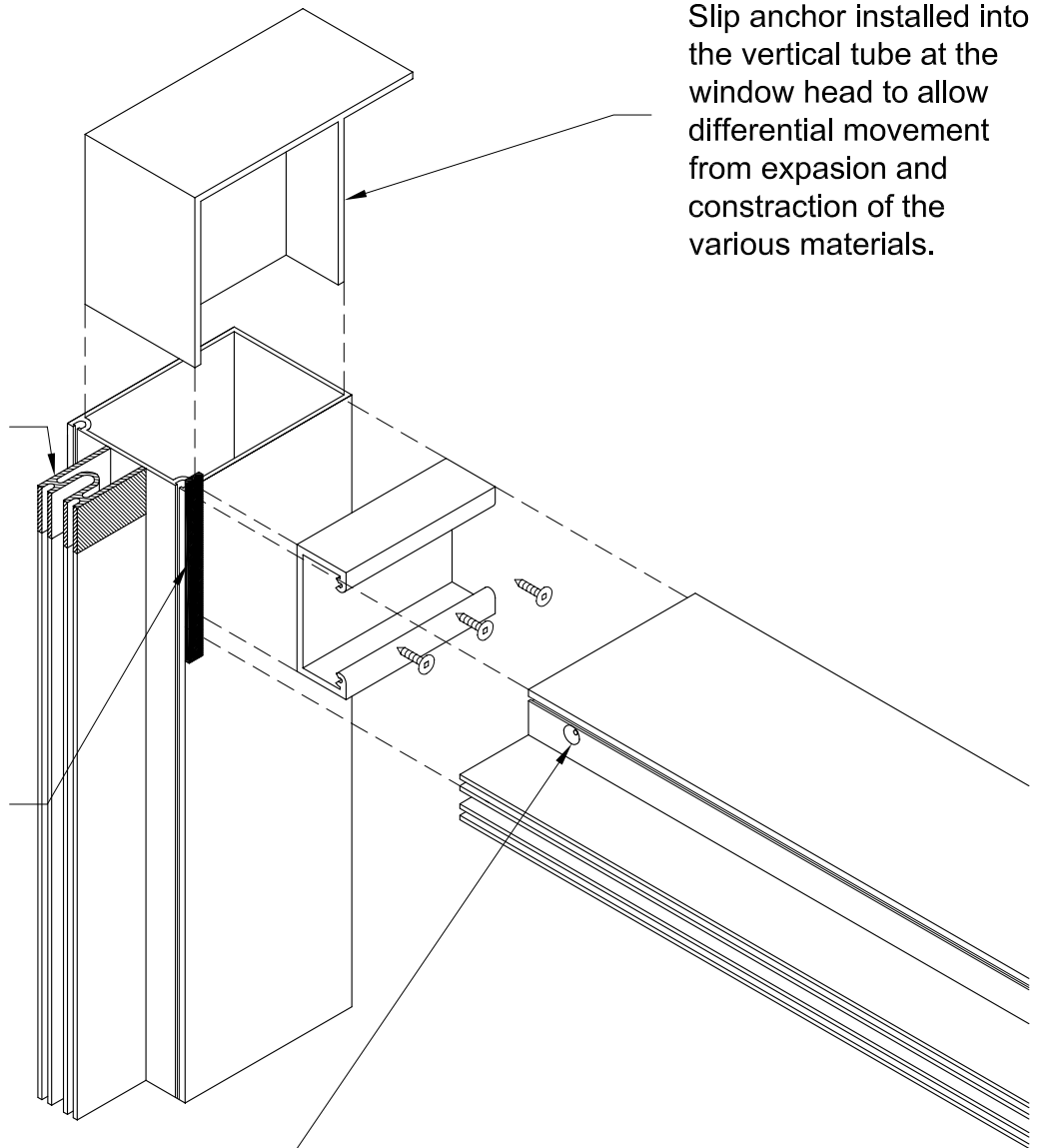
END OF SECTION

Slip anchor installed into the vertical tube at the window head to allow differential movement from expansion and contraction of the various materials.

Portion of the screw spline removed to allow for membrane tie-in to the tube face of the section.

Butt joint between the horizontal and the vertical mullions should be sealed with butyl tape*.

Predrilled holes for screw attachment should be slightly offset from the shear block to ensure a tight joint between the two box sections.



(* Butyl tape is preferred over silicone sealant because silicone will set up over time and if the seal fails it will not re-seal. Butyl will remain tacky and will re-seal when the temperature of the frame is increased.)



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW HEAD DETAILS

BUILDING SCIENCES SECTION

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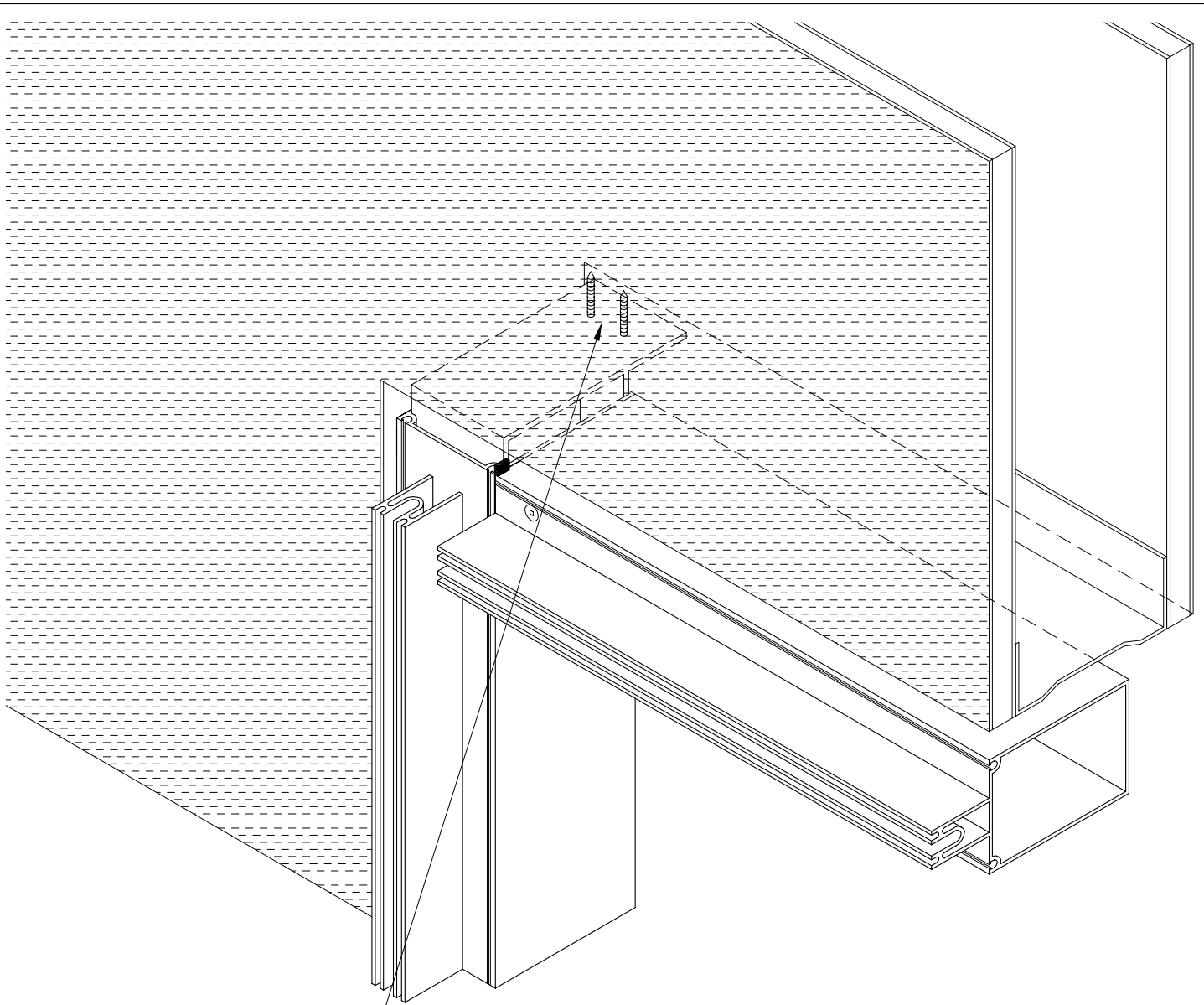
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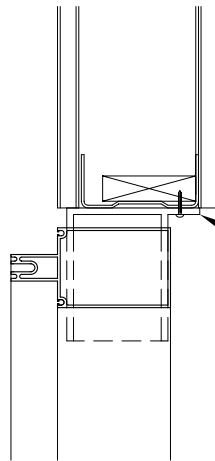
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DETAIL NUMBER

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Window frame tilted up into the rough opening and the slip anchor at the head is fastened into the structure. The frame is positioned so the tube face of the box curtain-wall section is in plane with the exterior sheathing.



Flange on the slip anchor needs to extend far enough beyond the frame to allow for fastening into the head of the rough opening after the frame is set in place.



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW HEAD DETAILS

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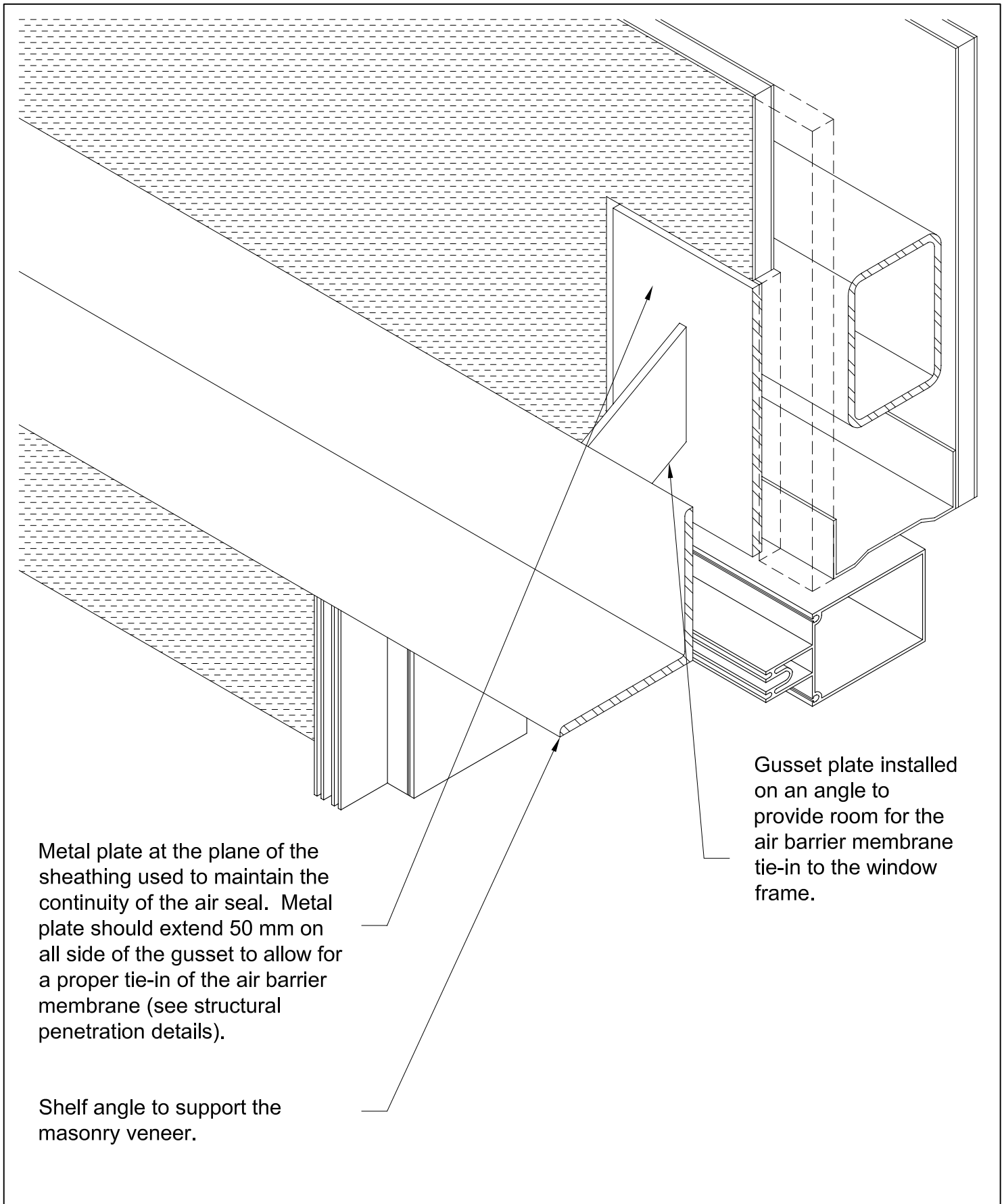
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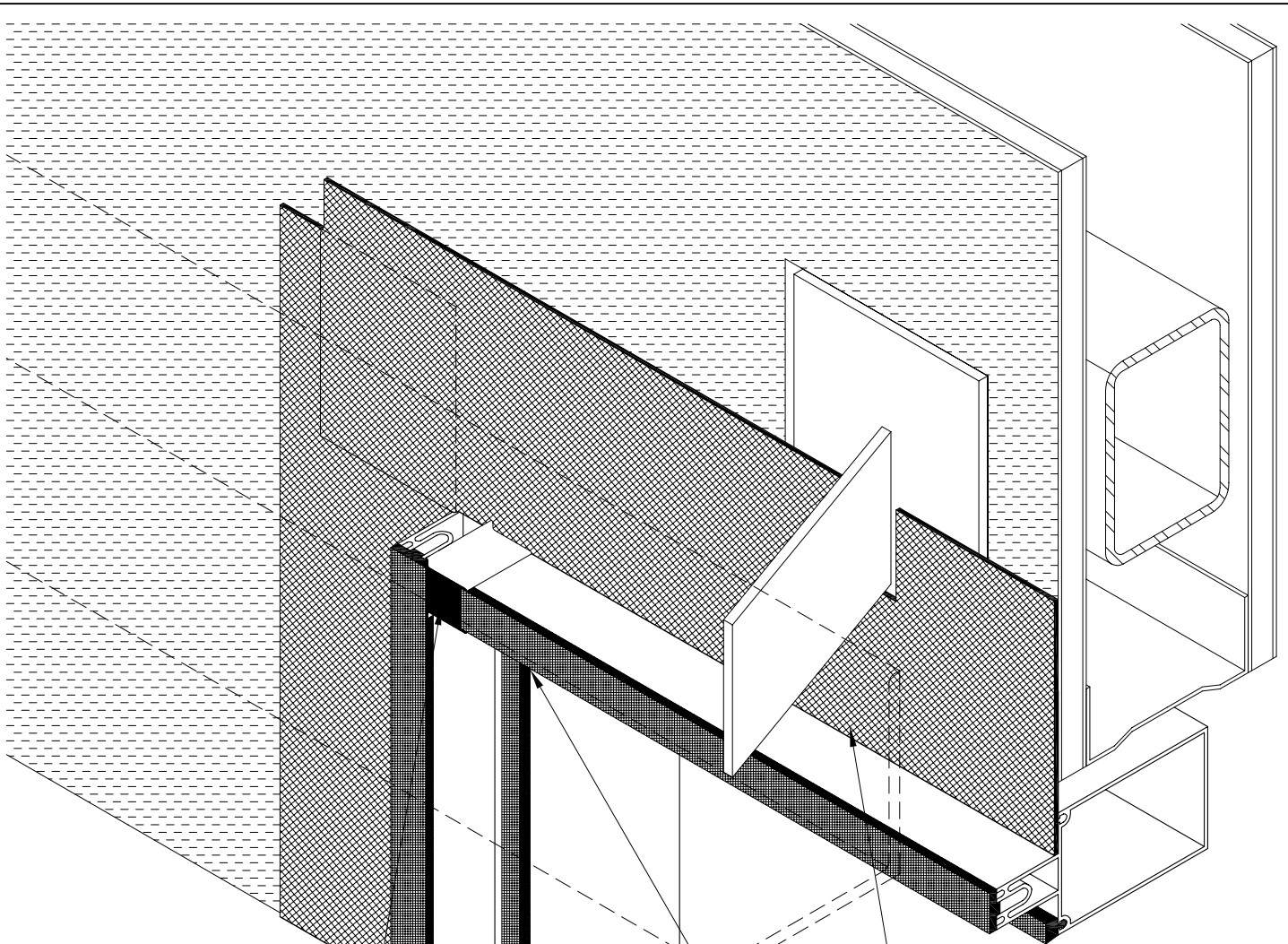


Metal plate at the plane of the sheathing used to maintain the continuity of the air seal. Metal plate should extend 50 mm on all side of the gusset to allow for a proper tie-in of the air barrier membrane (see structural penetration details).

Shelf angle to support the masonry veneer.

Gusset plate installed on an angle to provide room for the air barrier membrane tie-in to the window frame.

	INSTALLATION SEQUENCE		BUILDING SCIENCES SECTION		DETAIL NUMBER 3
	ISOMETRIC WINDOW HEAD DETAILS				
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Neoprene corner plugs are installed to compartmentalize the glazing rabbet.

The installed length of the gaskets must be greater than the opening to accommodate shrinkage.

The head membrane tie-in is installed and lapped over top of the jamb membrane tie-in.

Corner junctions of the gaskets should be sealed with sealant or heat welded.

INSTALLATION SEQUENCE

ISOMETRIC WINDOW HEAD DETAILS

BUILDING SCIENCES SECTION

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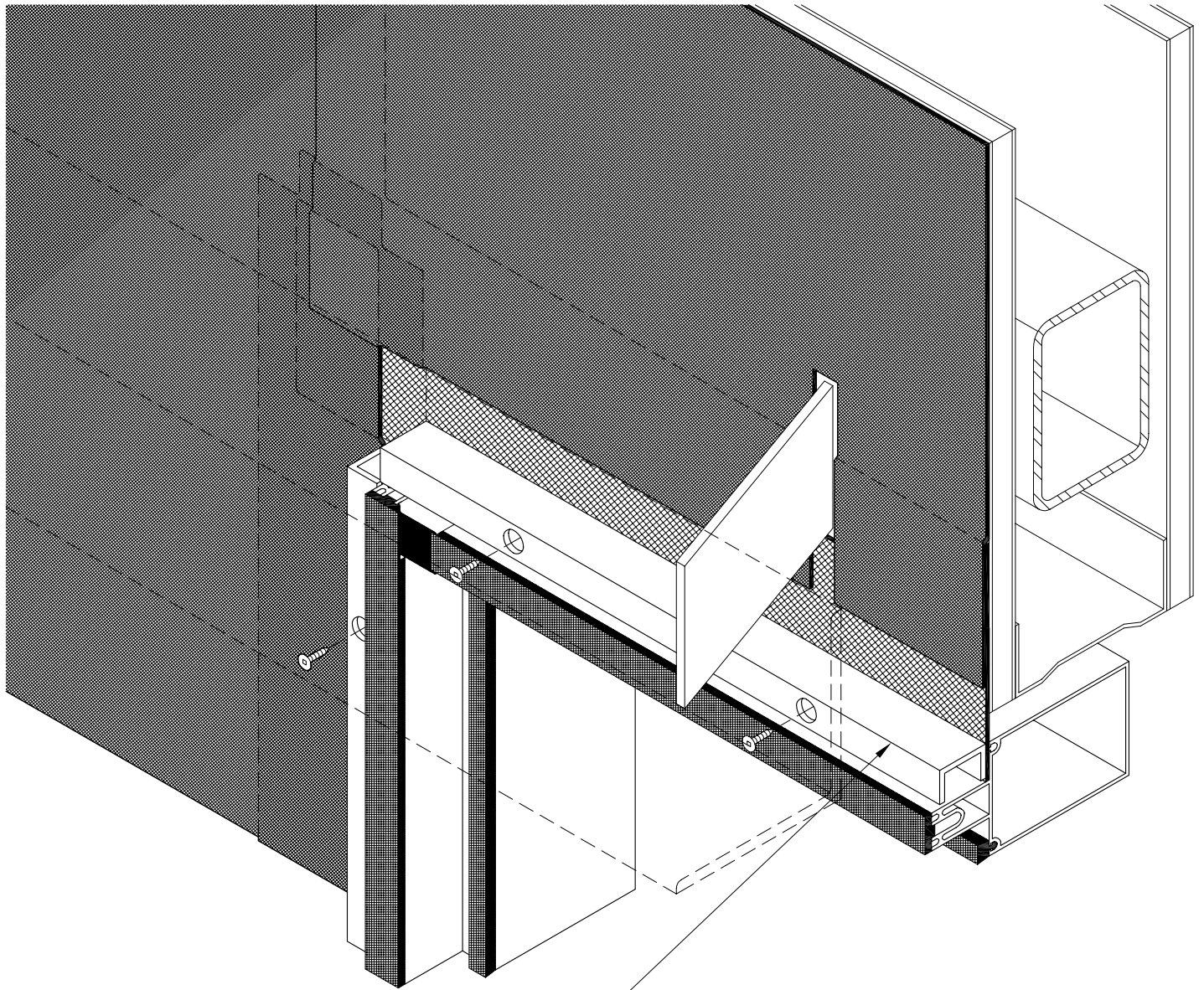
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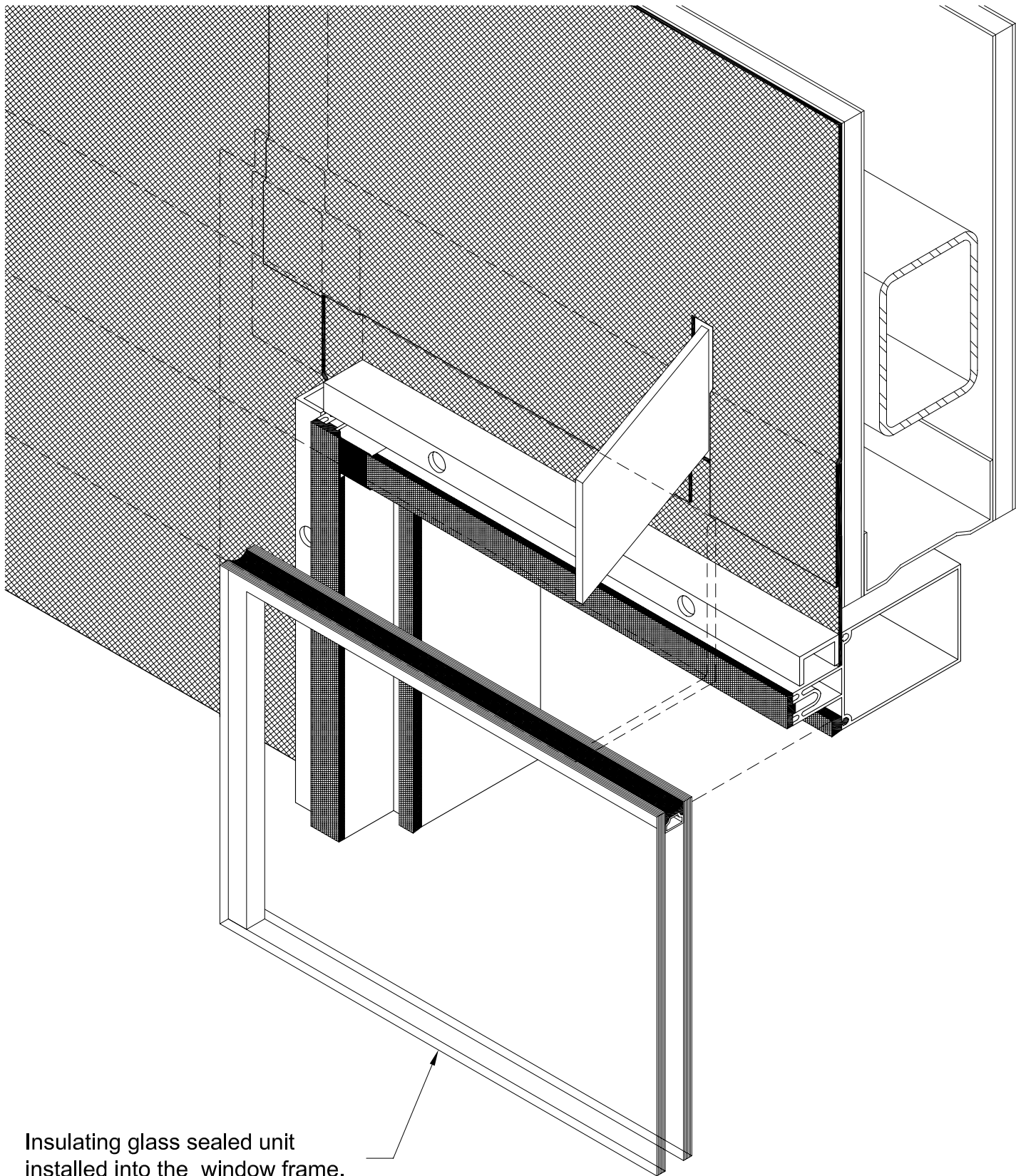
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Aluminum anti-rotation channels installed to mechanically fasten the membrane tie-in to the tube face of the box section

	INSTALLATION SEQUENCE		BUILDING SCIENCES SECTION		DETAIL NUMBER 5
	ISOMETRIC WINDOW HEAD DETAILS		DRAWN BY PETER BAKER	DATE 01-01-2005	



INSTALLATION SEQUENCE

ISOMETRIC WINDOW HEAD DETAILS

BUILDING SCIENCES SECTION

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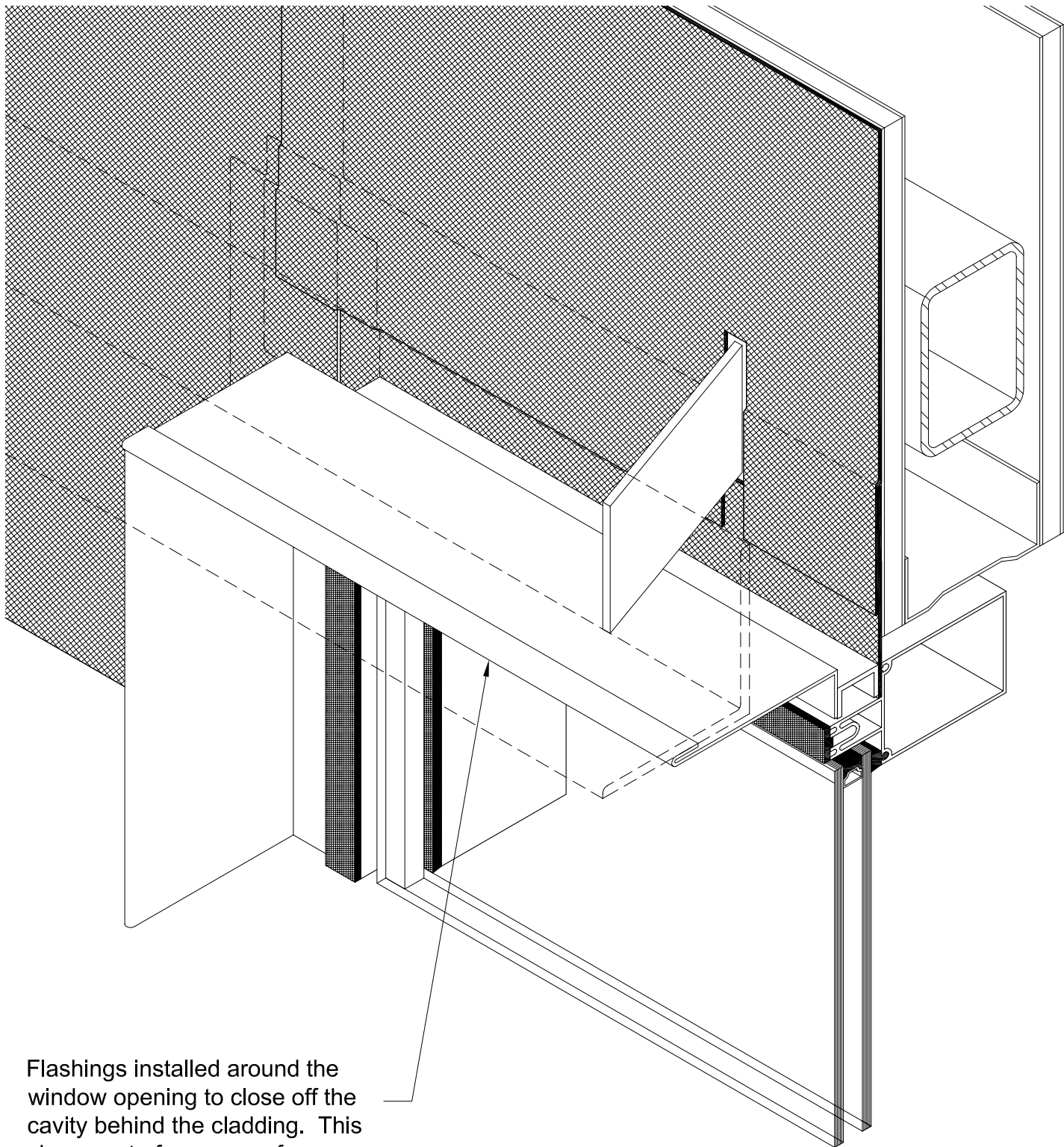
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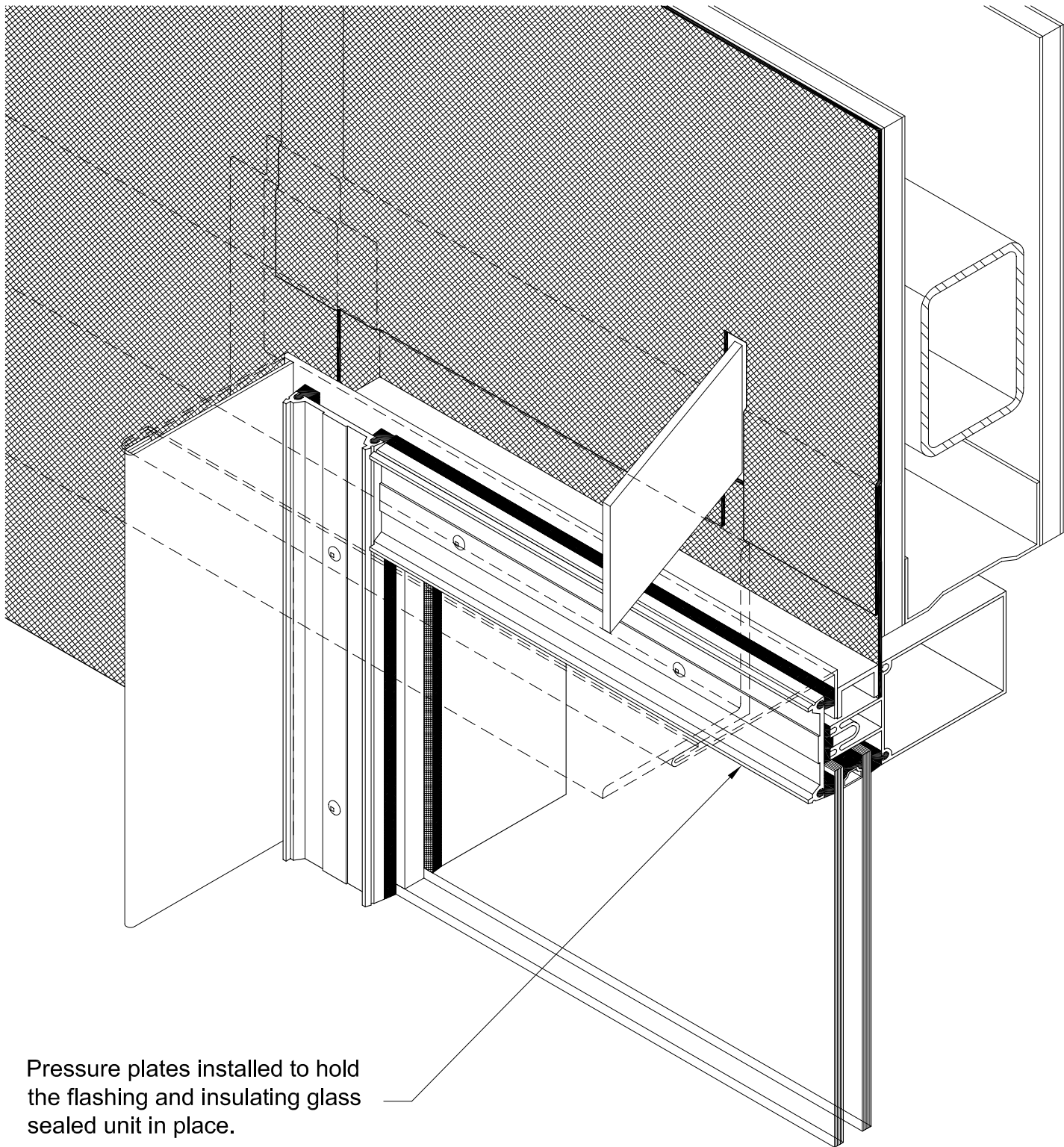
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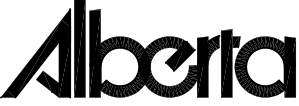


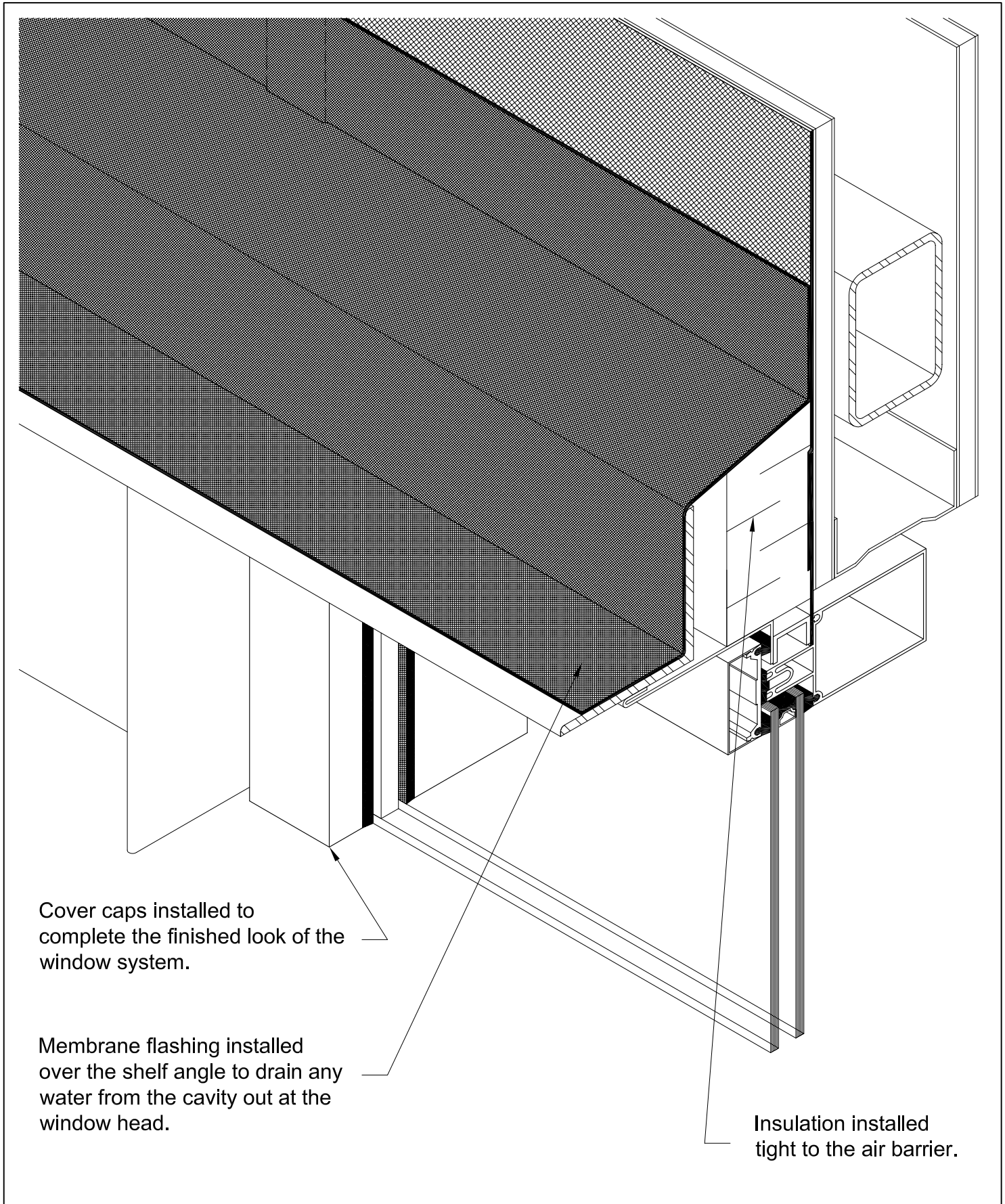
Flashings installed around the window opening to close off the cavity behind the cladding. This shown out of sequence for purposes of clarity. The flashing is usually installed after the cladding is in place.

	INSTALLATION SEQUENCE		BUILDING SCIENCES SECTION		DETAIL NUMBER 7
	ISOMETRIC WINDOW HEAD DETAILS		DRAWN BY PETER BAKER	DATE 01-01-2005	



Pressure plates installed to hold the flashing and insulating glass sealed unit in place.

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	ISOMETRIC WINDOW HEAD DETAILS		DRAWN BY PETER BAKER	DATE 01-01-2005	

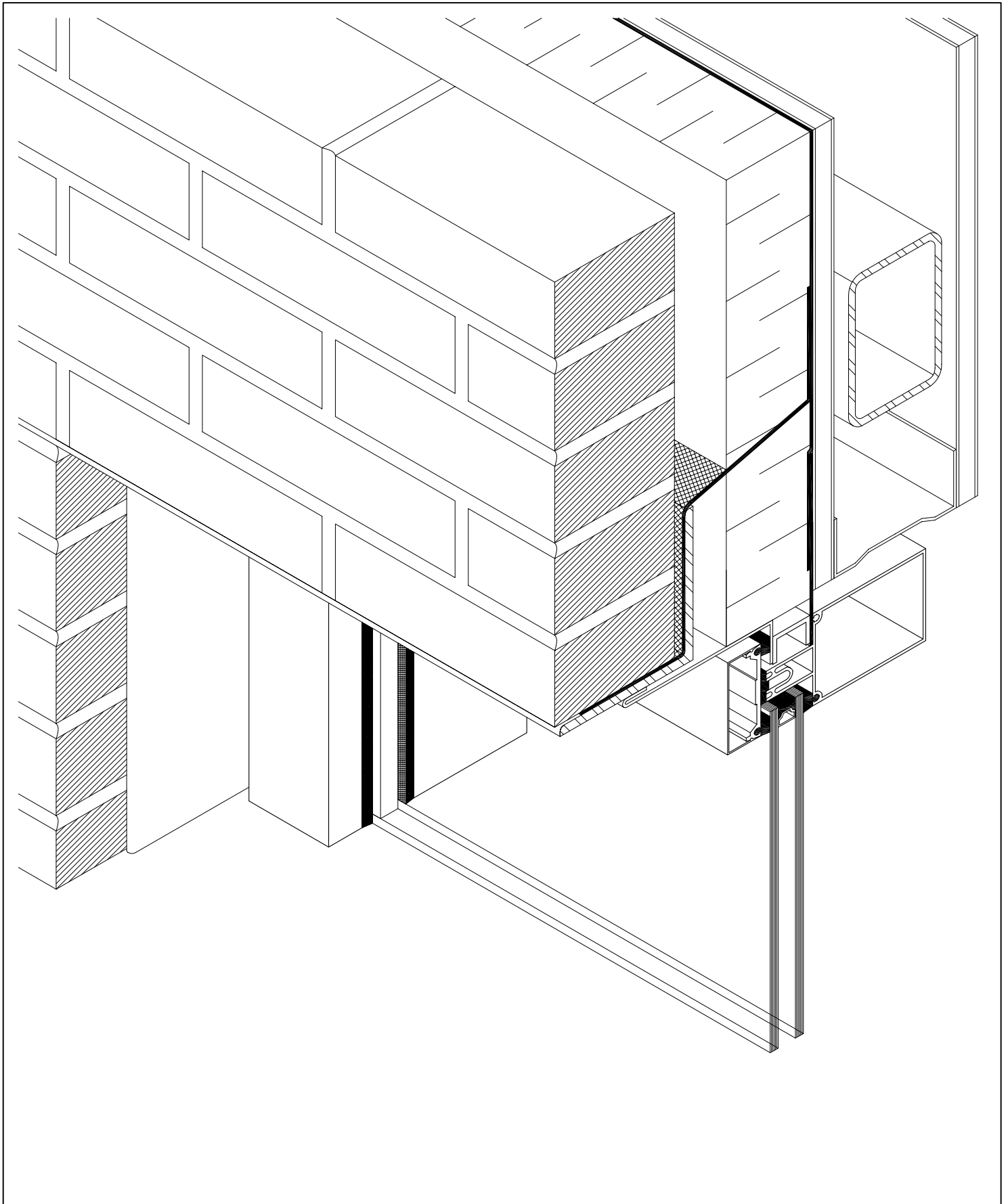


Cover caps installed to complete the finished look of the window system.

Membrane flashing installed over the shelf angle to drain any water from the cavity out at the window head.

Insulation installed tight to the air barrier.

	INSTALLATION SEQUENCE		BUILDING SCIENCES SECTION		DETAIL NUMBER
	ISOMETRIC WINDOW HEAD DETAILS				9
DRAWN BY PETER BAKER		DATE 01-01-2005	CHECKED BY	DATE	



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW HEAD DETAILS

BUILDING SCIENCES SECTION

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Portion of the screw spline removed to allow for membrane tie-in to the tube face of the section.

Butt joint between the horizontal and the vertical mullions should be sealed with butyl tape*.

Predrilled holes for screw attachment should be slightly offset from the shear block to ensure a tight joint between the two box sections. Cap bead with butyl sealant.

(* Butyl tape is preferred over silicone sealant because silicone will set up over time and if the seal fails it will not re-seal. Butyl will remain tacky and will re-seal when the temperature of the frame is increased.)



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW SILL DETAILS

BUILDING SCIENCES SECTION

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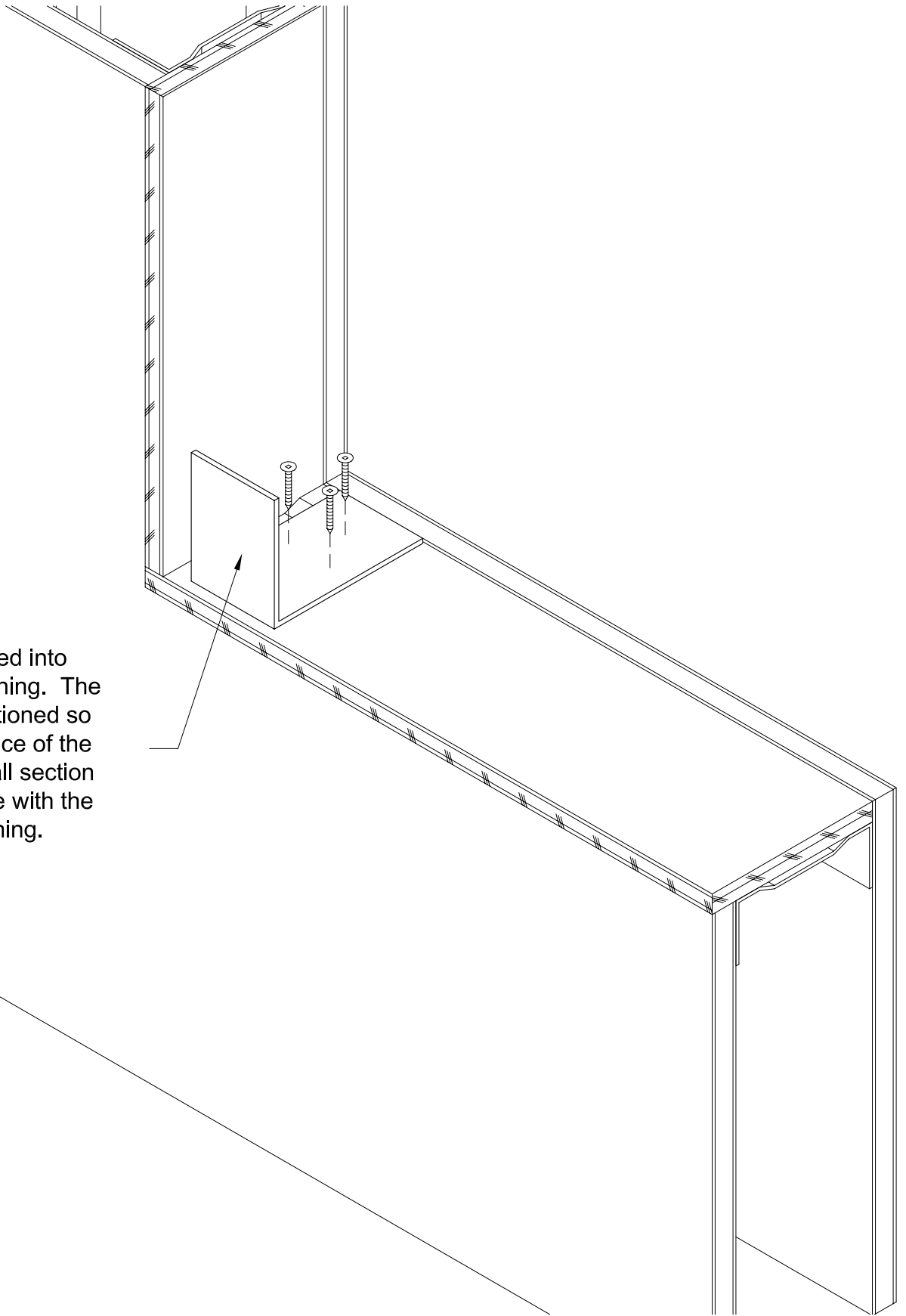
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Anchor fastened into the rough opening. The anchor is positioned so the the tube face of the box curtain-wall section will be in plane with the exterior sheathing.



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW SILL DETAILS

BUILDING SCIENCES SECTION

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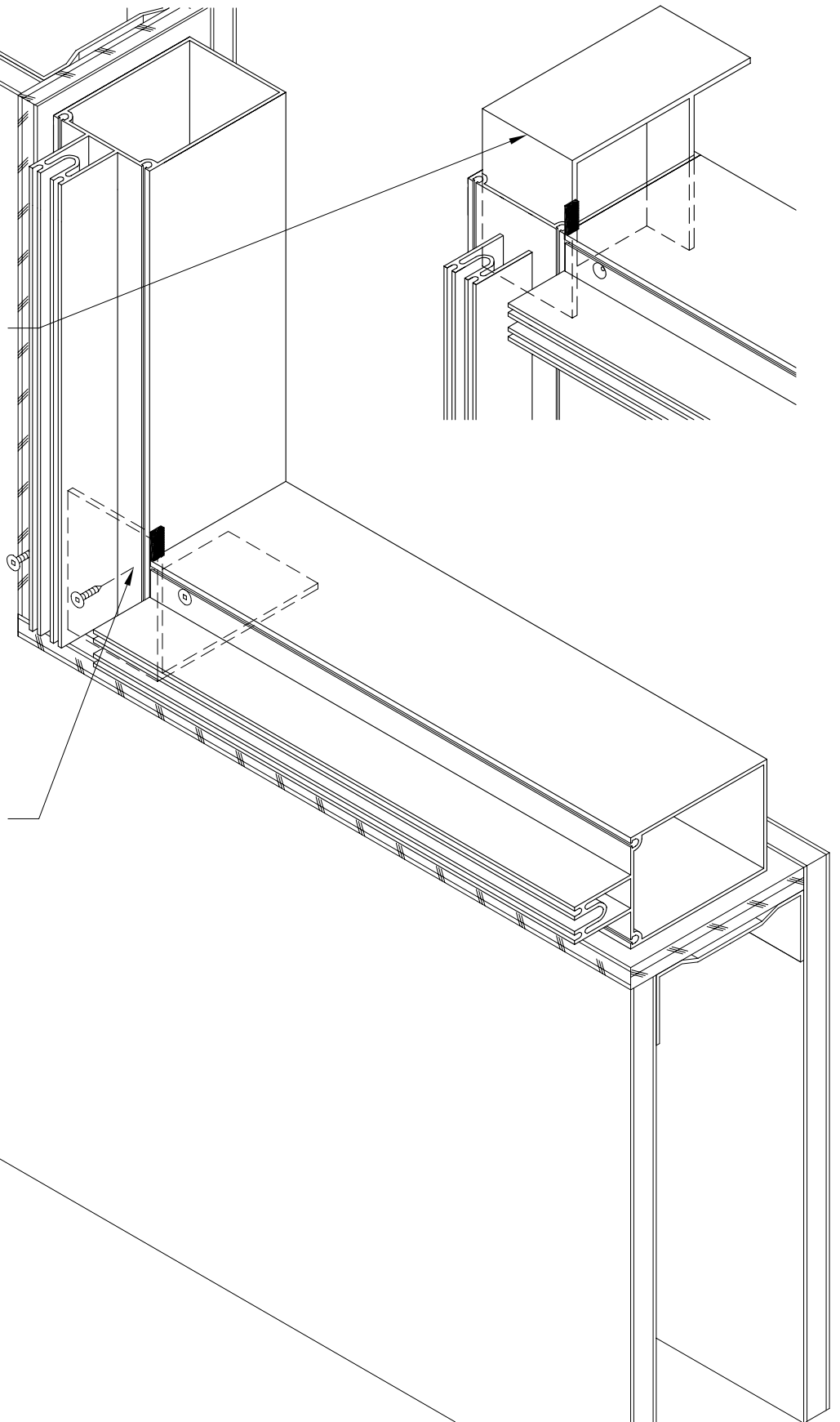
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The deflection anchor will be raised and fastened into the rough opening after alignment of the frame. The top anchor is designed to sit in the tube and slide if any movement occurs.

The vertical tube of the preassembled frame is slipped over the anchor, shimmed, then fastened through the front of the tube face to the anchor.



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW SILL DETAILS

BUILDING SCIENCES SECTION

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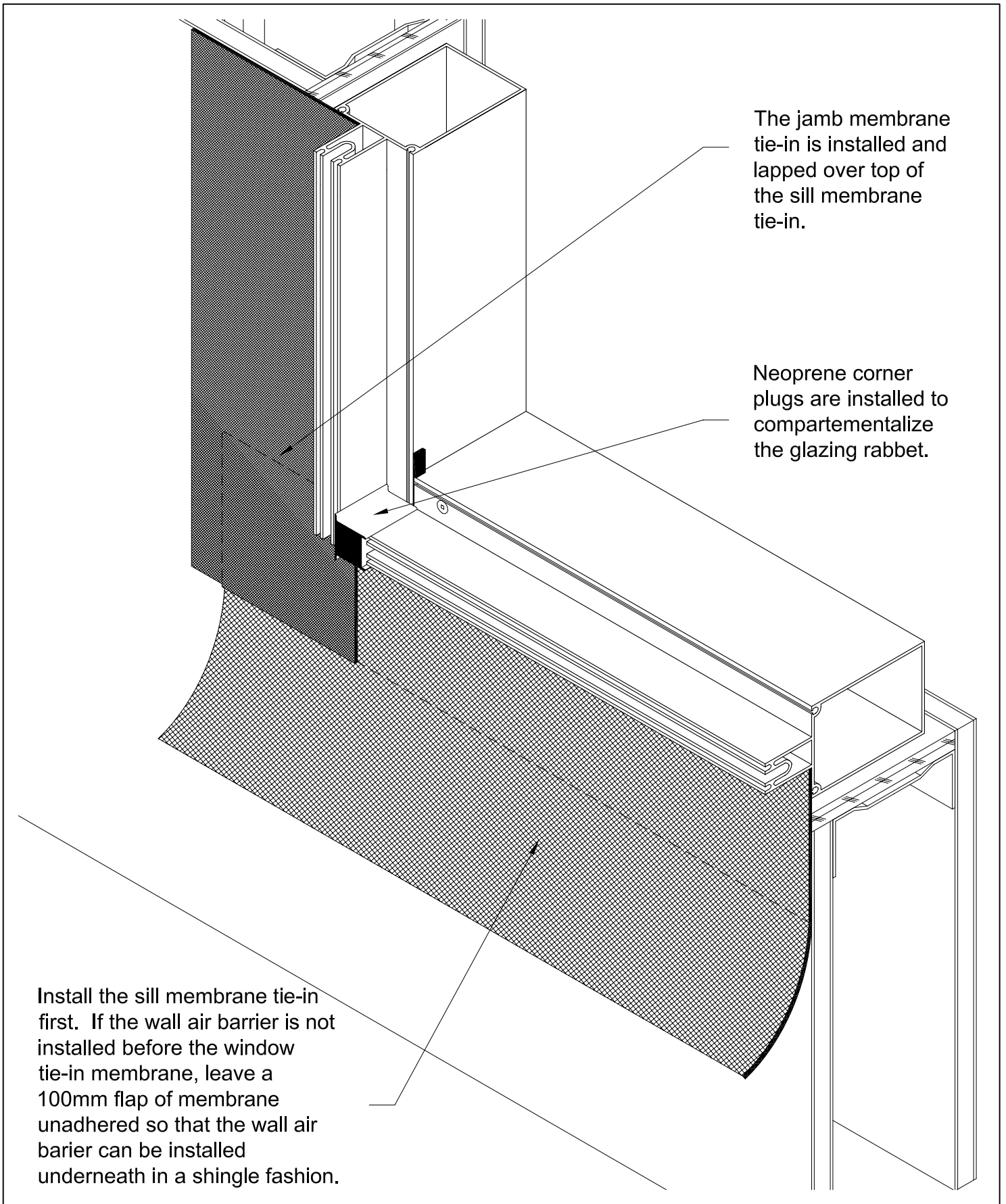
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INSTALLATION SEQUENCE

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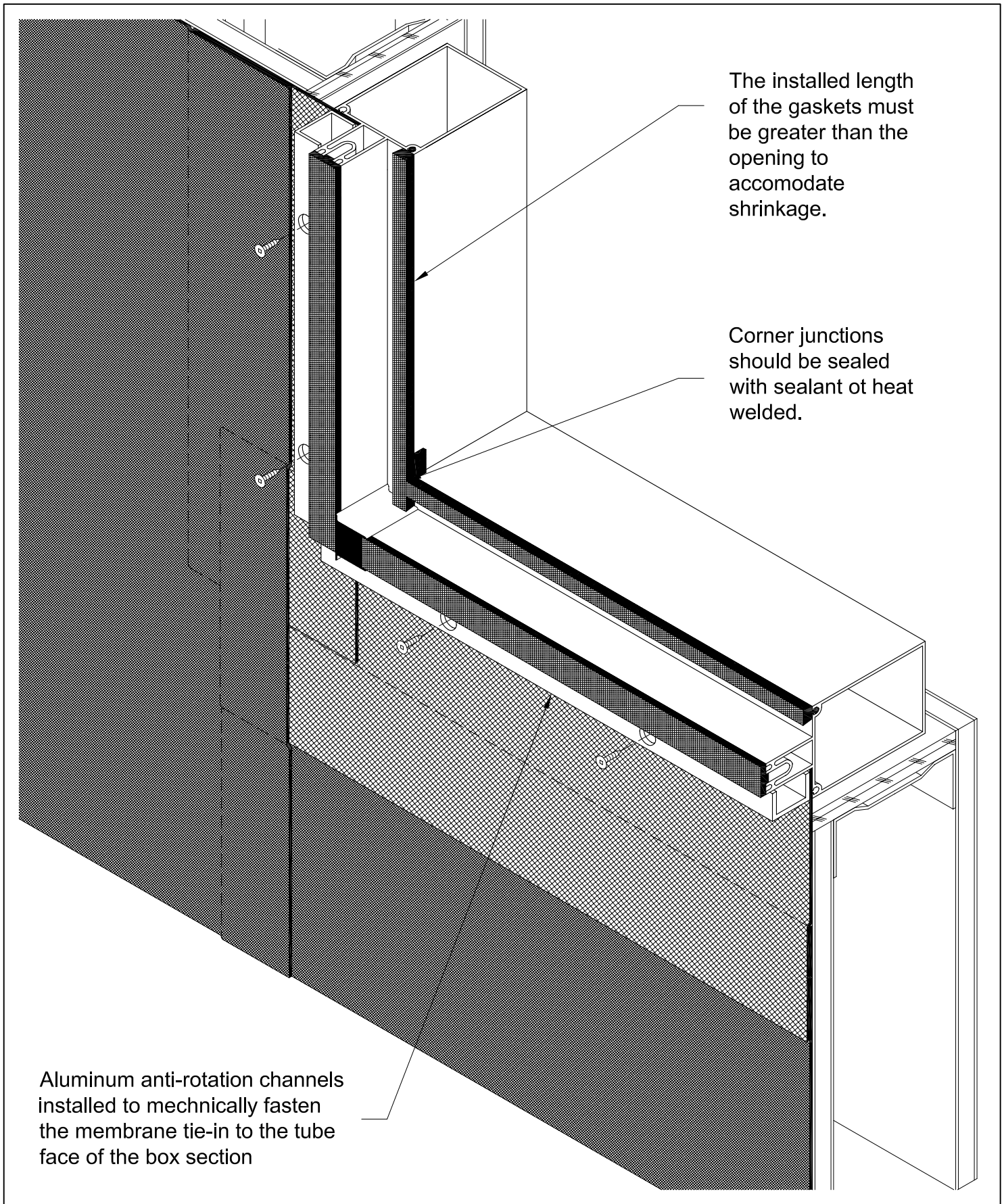
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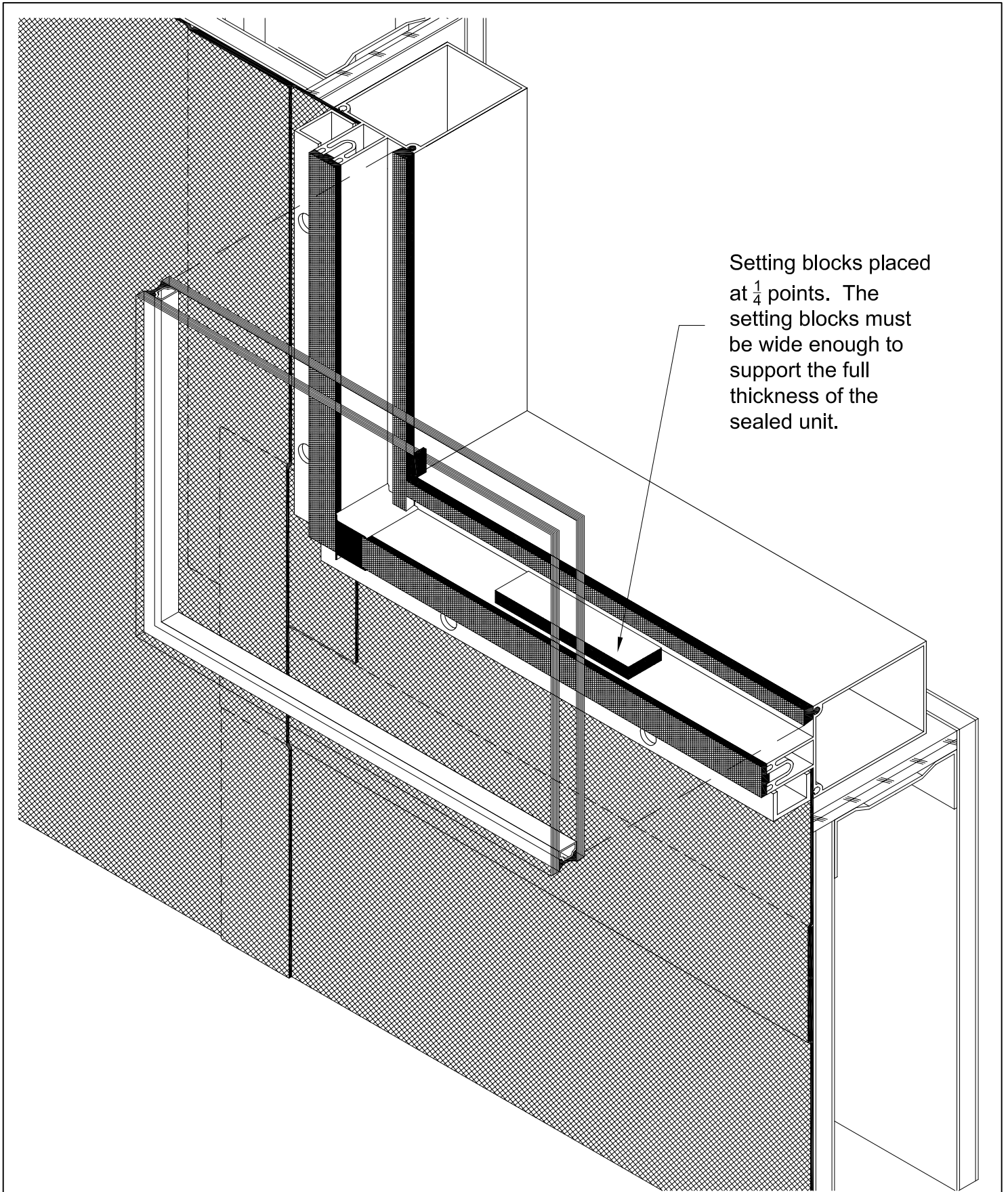


The installed length of the gaskets must be greater than the opening to accommodate shrinkage.

Corner junctions should be sealed with sealant or heat welded.

Aluminum anti-rotation channels installed to mechanically fasten the membrane tie-in to the tube face of the box section

	INSTALLATION SEQUENCE		BUILDING SCIENCES SECTION		DETAIL NUMBER 5
	ISOMETRIC WINDOW SILL DETAILS		DRAWN BY PETER BAKER	DATE 01-01-2005	



Setting blocks placed at $\frac{1}{4}$ points. The setting blocks must be wide enough to support the full thickness of the sealed unit.



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW SILL DETAILS

BUILDING SCIENCES SECTION

DRAWN BY
PETER BAKER

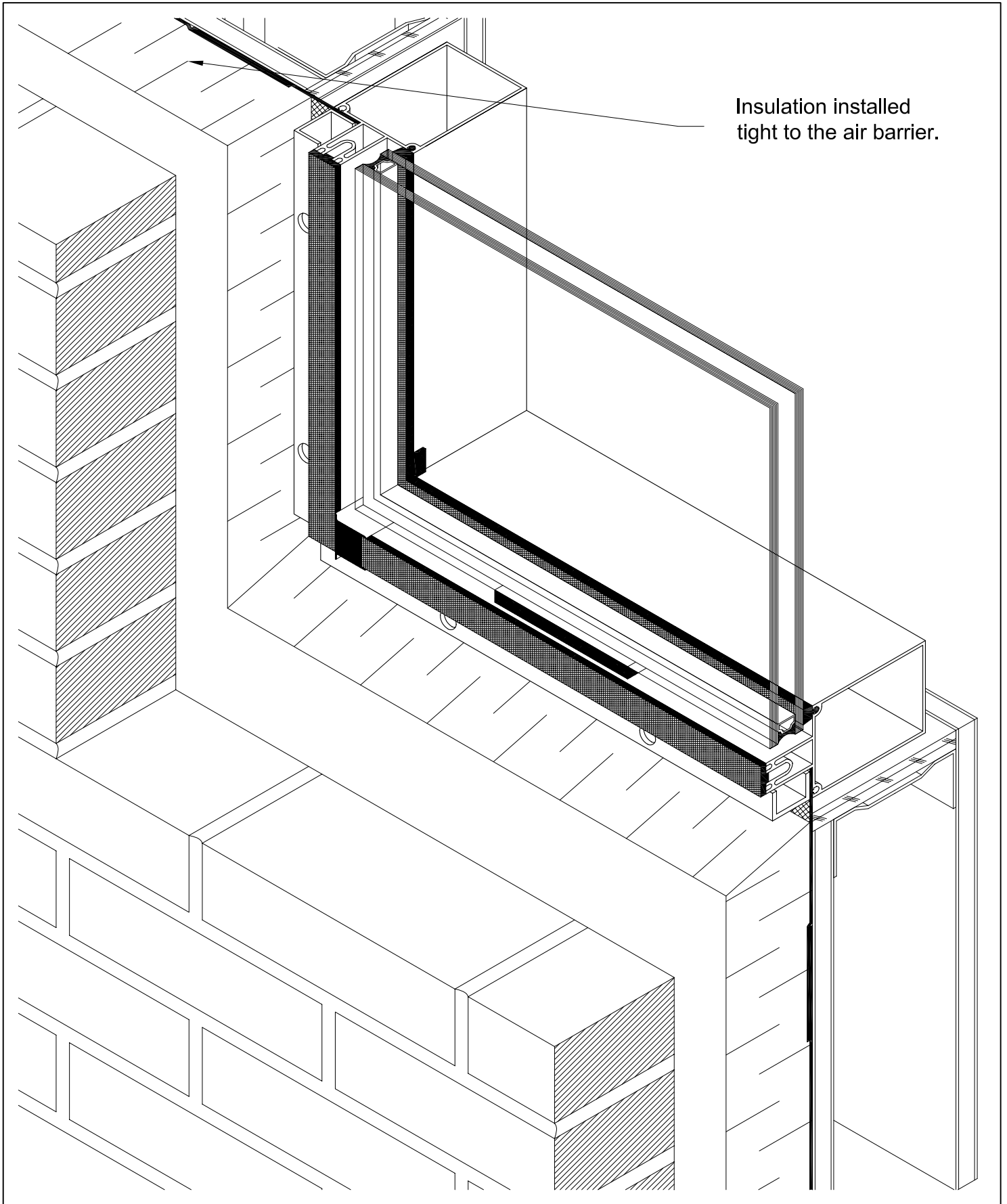
DATE
01-01-2005

CHECKED BY

DATE

DETAIL
NUMBER

6



Insulation installed
tight to the air barrier.

INSTALLATION SEQUENCE

ISOMETRIC WINDOW SILL DETAILS

BUILDING SCIENCES SECTION

DETAIL
NUMBER

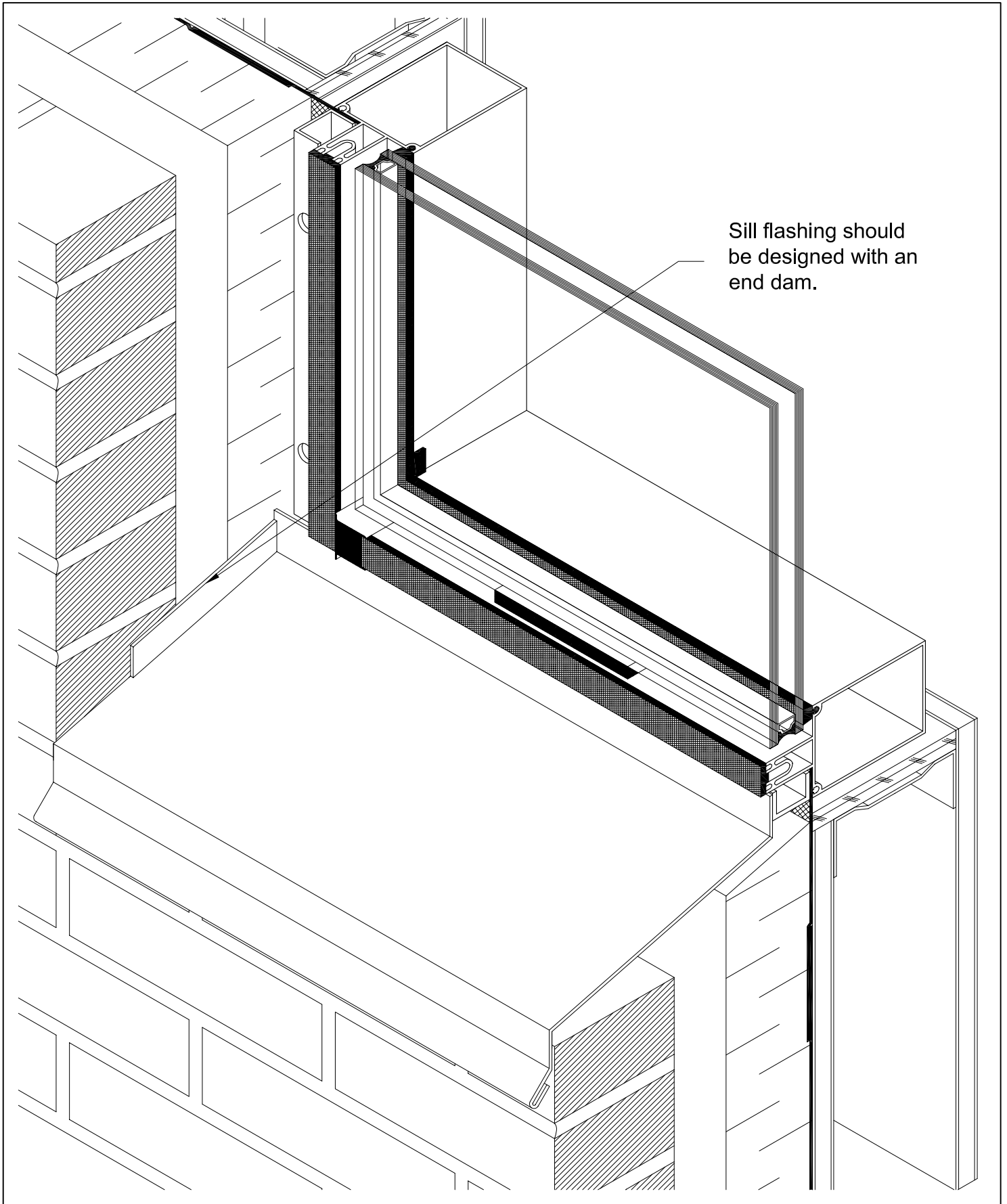
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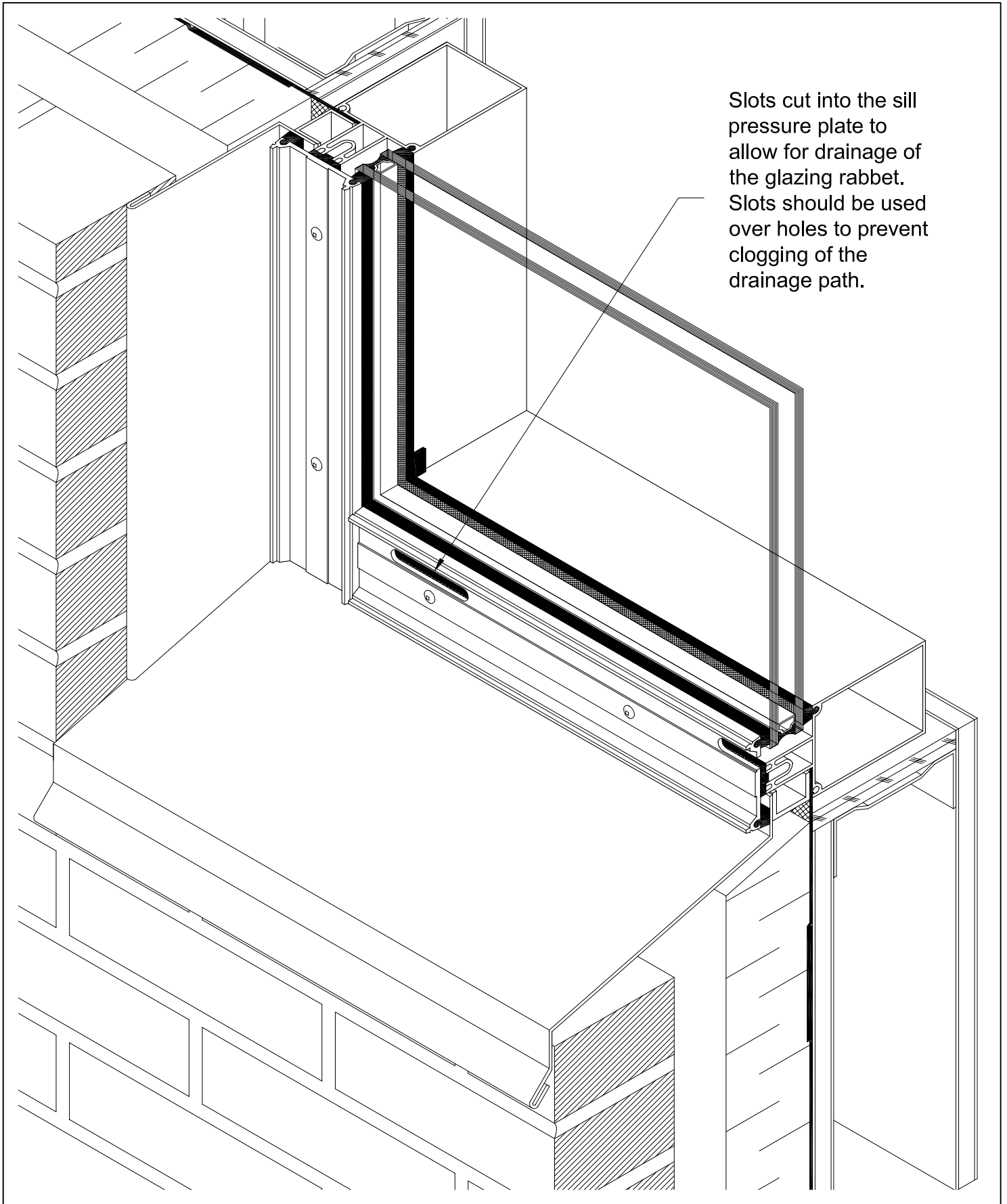
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Sill flashing should be designed with an end dam.

	INSTALLATION SEQUENCE		BUILDING SCIENCES SECTION		DETAIL NUMBER 8
	ISOMETRIC WINDOW SILL DETAILS		DRAWN BY PETER BAKER	DATE 01-01-2005	



INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW SILL DETAILS

BUILDING SCIENCES SECTION

DRAWN BY
PETER BAKER

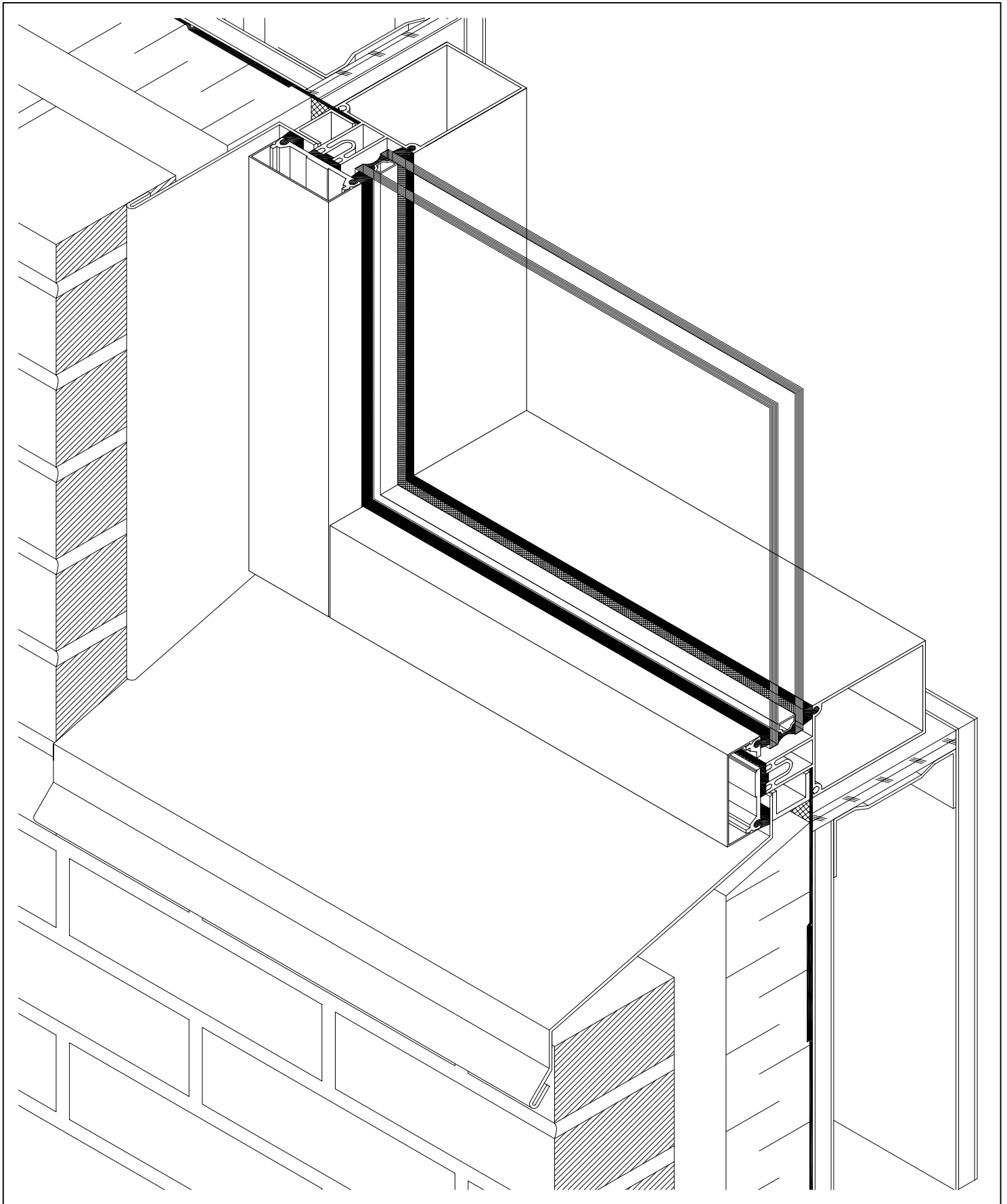
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NUMBER

9



Alberta

INFRASTRUCTURE AND TRANSPORTATION

INSTALLATION SEQUENCE

ISOMETRIC WINDOW SILL DETAILS

BUILDING SCIENCES SECTION

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PETER BAKER

DATE
01-01-2005

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DATE

DETAIL
NUMBER

10

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 08 11 00 – Metal Doors and Frames
- .2 Section 08 14 16 - Flush Wood Doors
- .3 Section 08 42 29 – Automatic Entrances
- .4 Division 28 – Electronic Safety and Security

1.2 REFERENCES

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1-2000, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.2-2003, Bored and Preassembled Locks and Latches.
 - .3 ANSI/BHMA A156.3-2001, Exit Devices.
 - .4 ANSI/BHMA A156.4-2000, Door Controls - Closers.
 - .5 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
 - .6 ANSI/BHMA A156.6-2005, Architectural Door Trim.
 - .7 ANSI/BHMA A156.8-2005, Door Controls - Overhead Stops and Holders.
 - .8 ANSI/BHMA A156.10-1999, Power Operated Pedestrian Doors.
 - .9 ANSI/BHMA A156.13-2002, Mortise Locks and Latches Series 1000.
 - .10 ANSI/BHMA A156.15-2006, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
 - .11 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
 - .12 ANSI/BHMA A156.18-2006, Materials and Finishes.
- .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)
 - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for door hardware and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.

- .4 After approval samples will be returned for incorporation in Work.
- .4 Hardware List:
 - .1 Submit contract hardware list.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions: submit manufacturer's installation instructions.
- .7 Sustainable Design Submittals:
 - .1 Sustainable Submittals: in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements, in accordance with Section 01 74 21 Construction Demolition Waste Management and Disposal.
 - .3 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer, pre-consumer content, and total cost of materials for project.
 - .4 Regional Materials: submit evidence that project incorporates of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for door hardware for incorporation into manual.

1.5 MAINTENANCE MATERIALS SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Supply maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Tools:
 - .1 Supply two (2) sets of wrenches for door closers, locksets, and fire exit hardware.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect door hardware from nicks, scratches, and blemishes.
 - .3 Protect prefinished surfaces with wrapping.
 - .4 Replace defective or damaged materials with new.
- .5 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 43 – Environmental Procedures.
- .6 Packaging Waste Management: remove for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products only for similar items.

2.2 DOOR HARDWARE

- .1 Locks and latches:
 - .1 Mortise locks and latches: to ANSI/BHMA A156.13, series 1000 mortise lock, grade 1, designed for function and keyed as stated in Hardware Schedule.
 - .2 Lever handles and knob trims keyed as stated in Hardware Schedule.
 - .3 Roses, Escutcheons keyed as stated in Hardware Schedule. Normal strikes: box type, lip projection not beyond jamb.
 - .4 Cylinders: key into keying system as noted as directed.
- .2 Butts and hinges:
 - .1 Butts and hinges: to ANSI/BHMA A156.1, designated by the letter 'A' and numeral identifiers, followed by size and finish, listed in Hardware Schedule.
- .3 Exit devices: to ANSI/BHMA A156.3, type & function, grade 1, as stated in Hardware Schedule.

- .1 Auxiliary item: door coordinator, Type 21, for pairs of doors with overlapping astragals.
- .4 Door Closers and Accessories:
 - .1 Door controls/closers: to ANSI/BHMA A156.4, designated by letter C and numeral identifiers listed in Hardware Schedule, size
 - .2 Door controls - overhead holders: to ANSI/BHMA A156.8, designated by letter C and numeral identifiers listed in Hardware Schedule.
 - .3 Detention/Security rated door closer to be used in Rooms 114 – 131 as noted in the hardware schedule.
- .5 Door Operators:
 - .1 Power-operated pedestrian doors: to ANSI/BHMA A156.10.
 - .2 Power assist and low energy power operated doors: to ANSI/BHMA A156.19.
- .6 Architectural door trim: to ANSI/BHMA A156.6, listed in Hardware Schedule.
 - .1 Door protection plates: kick plate type 1.27 mm stainless steel
 - .2 Push plates: 1.27 mm thick stainless steel.
 - .3 Push/Pull units: stainless steel.
- .7 Door bottom seal: heavy duty, door seal of extruded aluminum frame and solid closed cell neoprene weather seal, recessed in door bottom, closed ends, clear anodized finish.
- .8 Thresholds: full width of door opening, extruded aluminum mill finish.
- .9 Weatherstripping:
 - .1 Head and jamb seal:
 - .1 Extruded aluminum frame and closed cell neoprene insert, clear anodized finish.
 - .2 Adhesive backed neoprene material.
 - .2 Door bottom seal:
 - .1 Extruded aluminum frame and closed cell neoprene clear anodized finish.
- .10 Door Viewers
 - .1 Where a door viewer is required, install either of the following types, 1.4 m above the floor level, in perimeter pedestrian doors, fire doors (where a larger opening would negate the ULC rating), and doors which are security barriers dividing functions.
 - .1 Loxem 190- Manufactured by: VSI Hardware Industries (USA) or Taymour Industries (Canada)
 - .2 Madison No. 20 R35-Manufactured by: Madison Products Company Limited
 - .3 Ives No. U698- Manufactured by: Leigh Metal Products Ltd.

- .4 ASD metallic industrial DS238. Advanced Safety Devices (2 3/8" Viewing Diameter and Door Cut-out). NOTE: This product cannot be used where a Fire rated door required.
- .5 Metallic Industrial Grade Door Viewer (2 3/8" Viewing Diameter and Door Cut-out). NOTE: The plastic Door Viewer is not approved for use.
- .2 Fire rated doors to have viewer installed by door manufacturer.

.11 Astragal: overlapping extruded aluminum finished to match doors.

2.3 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

2.4 KEYING

- .1 Hardware to match existing type, material and finish, and to be keyed into existing system.
- .2 Provide BLANK keys in duplicate for every lock in this Contract, except for cell locks where a total of three (3) working keys are required. Supply all blank keys, BLANK both sides. ie:(35-131).
- .3 Provide six pin design cylinders keyed 000000. Forward cylinders prepaid to Owner. Cylinders having removable cores must not be used.
- .4 Provide three (3) master keys for each MK or GMK group.
- .5 Stamp keying code numbers on keys and cylinders.
- .6 To order and purchase the restricted cylinders/keys in IIFF profile, supplier shall request a Purchase Authorization letter from the Alberta Abloy representative.
- .7 Keyway shall be supplied in Secure Abloy CY415T Cylinders. For security reasons, forward all keys (and bitting list) by hand address and contact to be confirmed by Owner
- .8 Hardware supplier will supply a sufficient number of unrestricted keyway cylinders to the Contractor to secure the perimeter of the building and one storage room. The Contractor will return the cylinders to the supplier upon turnover of the building.
- .9 Owner will provide keying and final installation of secure keyways. Contractor to ensure continuous locking / security of building and simultaneous removal of construction cylinders coinciding with Owner installation of secure keyways.

Part 3 Execution

3.1 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Supply metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Supply manufacturers' instructions for proper installation of each hardware component.
- .4 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).
- .5 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .6 Install key control cabinet.
- .7 Use only manufacturer's supplied fasteners.
 - .1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
 - .2 Tamper proof fasteners to be used in Area 140 to 174 on all hardware devices.

3.2 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to ensure tight fit at contact points with frames.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
 - .3 Remove protective material from hardware items where present.
 - .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 SECURITY SYSTEM INSTALLATION INSTRUCTIONS

- .1 Install electric strikes, consoles, and switches according to manufacturer's instructions.

- .2 Tag all wires and label each connection in tabular form indicating unit, location, lead, sig name, colour, pin and marker.
- .3 Commission system ensuring all doors function properly and according to approved schematics.

3.5 PROTECTION

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

END OF SECTION

SCHEDULE

Heading # 1

1	Sgl	Dr # 100A	Exterior from 100 1/900 x 2150 x 45mm IHMD x IPSF Type D1 / F1		LHR
1	ea.	Continuous Hinges	SL11HD x D.H. w/PT Prep		628
1	ea.	Power Transfer	PT5	CPT	626
1	ea.	Exit Devices	QEL98L-NL RX/LX x 996L-R	LR	630
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Operators	Horton 4100LE c/w Header	OP	628
1	ea.	Safety Sensor	with Operator System	SEN	
1	ea.	Network Relay/Sequencer	CX22	SEQ	
2	ea.	Switches	482A1U / 482A1U / 712T	PB2/KS	Blue
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Power Supply	PS904-900-FA	PS	PCP
1	set	Gasketing	DS133CT 1/D.W. 2/D.H.		627
1	ea.	Door Sweep	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)		627
1	ea.	Threshold	DS5000 x D.W.		627
1	ea.	Security Astragal	PROVIDED BY OWNER		
		Notes:	Rough in for future Card Reader		
		Sequence Mode	OP/LR-L-EDF13		
		Exit:	Manually depressing the inside touchpad on the exit device allows for immediate exit, door closes upon door opening cycle returns to latched position. For automatic operation, press the wall mounted push button (PB) which retracts exit device (LR) to non-latched state, to trigger the auto opening of the door. Upon cycle completion, door closes and return to latched secure state. Keyswitch (KS) provide local off / on operation including push / pull dogging of the electronic features.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily which retracts exit device (LR) to non-latched state, then pulling open, door closes upon door opening cycle returns to secure and latched position. Double tap on the card reader or press the wall mounted push button (PB) which retracts exit device (LR) to non-latched state, to trigger the auto opening of the door. Manual Key Override Entry with Valid Key.		

Heading # 2

1	Sgl	Dr # 100B	100 from 101 1/900 x 2150 x 45mm HMD x PSF Type D3 / F1		RHR
1	ea.	Continuous Hinges	SL11HD x D.H. w/PT Prep		628
1	ea.	Power Transfer	PT5	CPT	626
1	ea.	Exit Devices	QEL98L-NL RX/LX x 996L-R	LR	630
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Operators	Horton 4100LE c/w Header	OP	628
1	ea.	Safety Sensor	with Operator System	SEN	
1	ea.	Network Relay/Sequencer	CX22	SEQ	
2	ea.	Switches	482A1U / 482A1U / 712T	PB2/KS	Blue
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS904-900-FA ELH Mode - OP/LR-L-EDF13	PS	PCP
		Exit:	Manually depressing the inside touchpad on the exit device allows for immediate exit, door closes upon door opening cycle returns to latched position. For automatic operation, press the wall mounted push button (PB) which retracts exit device (LR) to non-latched state, to trigger the auto opening of the door. Upon cycle completion, door closes and return to latched secure state. Keyswitch (KS) provide local off / on operation including push / pull dogging of the electronic features.		
		Entry:	Press the wall mounted push button (PB) which retracts exit device (LR) to non-latched state, to trigger the auto opening of the door. Upon cycle completion, door closes and return to latched secure state. Door can be pushed or pulled open when electronic dogging feature is activated by local keyswitch (KS)		

Heading # 3

1	Sgl	Dr # 102A	101 to 102 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51	LH
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1	ea.	Cam Lift Hinges	by Door Supplier	
		Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
		Note:	STC Rated Door, acoustic seal by door supplier M/F07	

Heading # 4

1	Sgl	Dr # 102B	102 from 111 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51	LHR
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1	ea.	Cam Lift Hinges	by Door Supplier	
		Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
		Note:	STC Rated Door, acoustic seal by door supplier M/F15	

Heading # 5

1	Sgl	Dr # 103A	101 to 103 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51	LH
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1	ea.	Cam Lift Hinges	by Door Supplier	
		Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
		Note:	STC Rated Door, acoustic seal by door supplier M/F07	

Heading # 6

1	Sgl	Dr # 103B	103 from 106 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51	RHR
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1	ea.	Cam Lift Hinges	By Door Supplier	
		Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
		Note:	STC Rated Door, acoustic seal by door supplier M/F15	

Heading # 7

1	Sgl	Dr # 104A	101 to 104 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51	LH
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1	ea.	Cam Lift Hinges	By Door Supplier	
		Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
		Note:	STC Rated Door, acoustic seal by door supplier M/F07	

Heading # 8

1	Sgl	Dr # 104B	104 from 106 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51	LHR
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1	ea.	Cam Lift Hinges	By Door Supplier	
		Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
		Note:	STC Rated Door, acoustic seal by door supplier M/F15	

Heading # 9

1	Sgl	Dr # 105	101 to 105 1/900 x 2150 x 45mm HMD x PSF Type D1/F1		LH
2	ea.	Hinges	TA786 114 x 101mm		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108 M/F15	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 10

1	Sgl	Dr # 108	107 to 108 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min Rated		LH
2	ea.	Hinges	TA786 114 x 101mm		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108 M/F15	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		

Notes:

Rough in for future Card Reader

Heading # 11

1	Sgl	Dr # 109	109 from 106 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 – STC51	RH
1	ea.	Cam Lift Hinges	By Door Supplier	
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
		Note:	STC Rated Door, acoustic seal by door supplier M/F15	

Heading # 12

1	Sgl	Dr # 110	106 to 110 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3	RH
3	ea.	Hinges	TA714 114 x 101mm NRP	652
1	ea.	Office Lockset	L9050P-06C - ANSI # F04	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O / PS	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Overhead Door Stop	GJ100S M/F04	626

Heading # 13

1	Sgl	Dr # 112	111 from 112 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3	LHR
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Office Lockset	L9050P-06C - ANSI # F04	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O / PS	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F04	626

Heading # 14

1	Sgl	Dr # 113	106 to 113 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 – O min Rated	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O / PS	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S103 / S121 M/F15	626

Heading # 14A

1	Sgl	Dr # 114A	114 from 111 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min Rated	RHR
3	ea.	Hinges	HTTA786 114 x 101mm NRP	
1	ea.	Store / Utility Lockset	L9466P-42B - ANSI # F14K	
2	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	
1	ea.	Kickplate	K10A-254 x D.W. w/SS Rivets	
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H. ADH	
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	
1	Ea.	Door Viewer	U698 M/F14K	

Heading # 14B

1	Sgl	Dr # 114B	114 to 111 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min Rated	LH
3	ea.	Hinges	HTTA786 114 x 101mm NRP	630
1	ea.	Store / Utility Lockset	L9466P-42B - ANSI # F14K	626
2	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. w/SS Rivets	630
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H. ADH	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
2	Ea.	Door Viewer	U698 M/F14K	626

Heading # 15

1	Sgl	Dr # 116	115 from 116 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC 51 Rated	RHR
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3	ea.	Hinges	HTTA786 114 x 101mm NRP	652
1	ea.	Store / Utility Lockset	L9466P-42B - ANSI # F14K	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate Note:	K10A-254 x D.W. w/SS Rivets STC Rated Door, acoustic seal by door supplier M/F14K	630

Heading # 16

1	Sgl	Dr # 115	Exterior from 115 1/900 x 2150 x 45mm IHMD x IPSF Type D1/F1	RHR
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3	ea.	Hinges	HTTA386 114 x 101mm NRP	630
1	ea.	Store / Utility Lockset	L9466P-42B - ANSI # F14K	626
2	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. w/SS Rivets	630
1	ea.	Thresholds	DS5000 x D.W. w/Torx Fasteners	627
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H. w/Torx Fasteners	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas) w/Torx Fasteners	627
1	ea.	Security Astragal	Provided by Owner	600
1	Ea.	Door Viewer	DS238 M/F14K	626

Heading # 17

1	Sgl	Dr # 117	115 from 117 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min. Rated	RHR
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3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Storeroom Lockset	L9080P-42B ANSI # F07K	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets) M/F07K	630

Heading # 18

1	Sgl	Dr # 118	115 from 118 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min. Rated	RHR
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3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Storeroom Lockset	L9080P-42B - ANSI # F07K	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets) M/F07K	630

Heading # 19

1	Sgl	Dr # 119	115 from 119 1/900 x 2150 x 45mm HMD x PSF Type D6/F1	LHR
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3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Deadlock	L9464P - ANSI # F18	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Cylinder Pull	SMx342	630
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets) M/F18	630

Heading # 20

1	Sgl	Dr # 120	115 from 120 1/800 x 2050 x 45mm HMD x PSF Type D1/F4	RHR
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3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Deadlock	L9464P - ANSI # F18	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Cylinder Pull	SMX342	630
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Overhead Stop	GJ100S-SOC	626
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets) M/F18	630

Heading # 21

1	Sldg	Dr # 121	115 to 121	
1	Sldg	Dr # 122	115 to 122	
1	Sldg	Dr # 124	115 to 124	
1	Sldg	Dr # 125	115 to 125	
1	Sldg	Dr # 127	115 to 127 5/900 x 2150 x 45mm SD Type D5/	

Heading # 22

1	Sgl	Dr # 123	115 from 123 1/900 x 2050 x 45mm HMD x PSF Type D1/F4	LHR
3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Deadlock	L9464P - ANSI # F18	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Cylinder Pull	SMX342	630
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets) M/F18	630

Heading # 23

1	Sgl	Dr # 126	115 from 126 1/900 x 2150 x 45mm HMD x PSF Type D1/F4	LHR
3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Deadlock	L9464P - ANSI # F18	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Cylinder Pull	SMX342	630
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets) M/F18	630

Heading # 24

1	Sgl	Dr # 128	115 from 128 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	LHR
3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Storeroom Lockset	L9080P-42B- ANSI # F07K	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets) M/F07K	630

Heading # 25

1	Sgl	Dr # 129	115 from 129 1/900 x 2150 x 45mm HMD x PSF Type D6/F1	LHR
3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Storeroom Lockset	L9080P-42B- ANSI # F07K	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets)	630

M/F07K

Heading # 26

1	Sgl	Dr # 130A	115 from 130 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 60 Min Rated	LHR
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3	ea.	Hinges	HTTA786 114 x 101mm NRP	3	ea.
1	ea.	Store / Utility Lockset	L9466P-42B - ANSI # F14K	1	ea.
2	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	2	ea.
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	1	ea.
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	1	ea.
1	ea.	Kickplate	K10A-254 x D.W. w/SS Rivets	1	ea.
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H. ADH	1	sets
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	1	ea.
1	Ea.	Door Viewer	U698 M/F14K	1	Ea.

Heading # 27

1	Sgl	Dr # 130B	Exterior from 130 1/900 x 2150 x 45mm IHMD x IPSF Type D1/F1	LHR
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3	ea.	Hinges	HTTA786 114 x 101mm NRP	630
1	ea.	Store / Utility Lockset	L9466P-42B - ANSI # F14K	626
2	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. w/SS Rivets	630
1	ea.	Thresholds	DS5000 x D.W. w/Torx Fasteners	627
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H. w/Torx Fasteners	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)w/Torx Fasteners	627
1	Ea.	Door Viewer	DS238	626
1	ea.	Security Astragal	Provided by Owner M/F14K	600

Heading # 28

1	Sgl	Dr # 131	115 from 131 1/900 x 2150 x 45mm HMD x PSF Type D4/F1 - STC51	LHR
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3	ea.	Hinges	GSH918-HT 114 x 101mm SYS / NRP	630
1	ea.	Deadlock	L9464P - ANSI # F18	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Cylinder Pull	SMX342	630
1	ea.	Door Closer	351-SSP (P10) Torx Fasteners	689
1	ea.	Kickplate	K10A-254 x D.W. (SS Rivets)	630

Note: STC Rated Door, acoustic seal by door supplier
M/F18

Heading # 29

1	Sldg	Dr # OH130	Exterior from 130
1	Sldg	Dr # OH140	Exterior from 140
1	Sldg	Dr # OH141	Exterior from 141
1	Sldg	Dr # OH150	Exterior from 150
1	Sldg	Dr # OH153	Exterior from 153
1	Sldg	Dr # OH154	Exterior from 154
6/3600 / 3400 x 3100mm OHD x STF			

Complete by Overhead Door Supplier

Heading # 30

1	Sgl	Dr 132	106 to 132	RH
			1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51 / 45	
			Min Rated	

3	ea.	Hinges	TA786 114 x 101mm NRP	652
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626

Note: STC Rated Door, acoustic seal by door supplier

Heading # 31

1	Sgl	Dr # 134	133 to 134	RH
			1/900 x 2150 x 45mm HMD x PSF Type D1/F1	

2	ea.	Hinges	TA386 114 x 101mm NRP	652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH 652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU 626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Power Supply	PS902-900-FA	PS PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
1	ea.	Security Door Contact	TA4108	DPS BLK

Exit:
Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Notes: Rough in for future Card Reader

Heading # 32

1	Sgl	Dr # 135	133 to 135 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	LH
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2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108	DPS	BLK

Exit: Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Notes: Rough in for future Card Reader

Heading # 33

1	Sgl	Dr # 191A	191 from 136 1/900 x 2150 x 45mm HMD x PSF Type D2 / F1	LHR
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1	ea.	Continuous Hinges	SL11HD x D.H.		628
1	ea.	Exit Devices	98L-BE x BE996L-R	LR	630
1	ea.	Door Closer	351- PS		689
1	ea.	Kickplate	K10A-900 x D.W. M/ED-F15		630

Heading # 34

1	Sgl	Dr # 191B	Exterior from 191 1/900 x 2150 x 45mm IHMD x IPSF Type D1 / F1		LHR
1	ea.	Continuous Hinges	SL11HD x D.H. w/PT Prep		628
1	ea.	Power Transfer	PT5	CPT	626
1	ea.	Exit Devices	QEL98L-NL RX/LX x 996L-R	LR	630
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Door Closer	351- PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Door Sweep	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)		627
1	ea.	Threshold	DS5000 x D.W.		627
1	ea.	Security Astragal	PROVIDED BY OWNER		
1	set	Gasketing	DS133CT 1/D.W. 2/D.H.		627
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	Ea.	Door Viewer	DS238		626
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Notes:	ELH Mode – CR/LR-L-EDF14 Rough in for future Card Reader		
		Exit:	Manually depressing the inside touchpad on the exit device allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential to card reader (CR) retracts exit device (LR) to non-latched state. Manual Key Override Entry with Valid Key.		

Heading # 35

1	Sgl	Dr # 137B	Exterior from 137 1/900 x 2150 x 45mm IHMD x IPSF Type D1 / F1		LHR
1	ea.	Continuous Hinges	SL11HD x D.H. w/PT Prep		628
1	ea.	Power Transfer	PT5	CPT	626
1	ea.	Exit Devices	QEL98L- NL-RX/LX x 996L-R	LR	630
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Door Closer	351- PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	set	Gasketing	DS133CT 1/D.W. 2/D.H.		627
1	ea.	Door Sweep	DS138CN x D.W.		627
1	ea.	Threshold	DS5000 x D.W.		627
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Security Astragal	PROVIDED BY OWNER		
1	ea.	Security Door Contact	TA4108	DPS	BLK
1	Ea.	Door Viewer	DS238		652
		Notes:	Rough in for future Card Reader		
		Sequence Mode	LR-L-EDF13		
		Exit:	Manually depressing the inside touchpad on the exit device allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential to card reader (CR) retracts exit device (LR) to non-latched state. Manual Key Override Entry with Valid Key.		

Heading # 36

1	Sgl	Dr # 137A	137 from 136 1/900 x 2150 x 45mm HMD x PSF Type D2 / F1	RHR
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1	ea.	Continuous Hinges	SL11HD x D.H.		628
1	ea.	Exit Devices	98L-BE x BE996L-R	LR	630
1	ea.	Door Closer	351- PS		689
1	ea.	Kickplate	K10A-900 x D.W.		630
1	set	Gasketing	DS133CT 1/D.W. 2/D.H. ELH Mode - CR/LR-L-EDF14		627

Exit: Manually depressing the inside touchpad on the exit device allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: For manual entry depress the lever handle and pull, door closes upon door opening cycle returns to latched position.

Heading # 37

1	Sgl	Dr # 138	136 to 138 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min rated	LH
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2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108	DPS	BLK

Exit: Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Notes: Rough in for future Card Reader

Heading # 38

1	Sgl	Dr # 139	136 to 139 1/900 x 2150 x 45mm HMD x PSF Type D1/F1		RH
3	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Storeroom Lockset	L9010-06C - ANSI # F01		626
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W. M/F01		630

Heading # 39

1	Sgl	Dr # 140	136 to 140 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 60 Min. Rated		LH
2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 40

1	Sgl	Dr # 141A	141 to 140 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 – 60 Min Rated		RH
3	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108	DPS	BLK

Exit: Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Notes: Rough in for future Card Reader

Heading # 41

1	Sgl	Dr # 141B	136 to 141 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 60 Min. Rated	RH
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2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108	DPS	BLK

Exit: Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Notes: Rough in for future Card Reader

Heading # 42

1	Sgl	Dr # 141C	Exterior from 141 1/900 x 2150 x 45mm IHMD x IPSF Type D1/F1		LHR
2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Threshold	DS5000 x D.W.		627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H.		627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)		627
1	ea.	Security Astragal	PROVIDED BY OWNER		
1	Ea.	Door Viewer	DS238		626
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 43

1	sgl	Dr # 142	136 to 142 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min rated		LH
3	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hotel Guest Lock	L9485P-42B - ANSI # F15K		652
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108 M/F15K	DPS	BLK

Heading # 44

1	Sgl	Dr # 143A	136 to 143 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 – 0 Min Rated		RH
2	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 45

1	Sgl	Dr # 143B	Exterior from 143 1/900 x 2150 x 45mm HMD x PSF Type D1/F1		LHR
2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Threshold	DS5000 x D.W.		627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H.		627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)		627
1	ea.	Security Astragal	PROVIDED BY OWNER		
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 46

1	Sgl	Dr # 144	136 to 144 1/900 x 2150 x 45mm HMD x PSF Type D1/F1		RH
2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H. ADH		627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)		627
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 47

1	sgl	Dr # 145	144 to 145 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min rated		LH
3	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hotel Guest Lock	L9485P-06C - ANSI # F15K		652
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108 M/F15K	DPS	BLK

Heading # 48

1	Sgl	Dr # 146	144 to 146 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min rated	RH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
1	ea.	Security Door Contact	TA4108 M/F15	DPS BLK

Heading # 49

1	Sgl	Dr # 147	144 to 147 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min rated	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
1	ea.	Security Door Contact	TA4108 M/F15	DPS BLK

Heading # 50

1	Sgl	Dr # 148	136 to 148 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC51	RH
1	ea.	Hotel Guest Lock	Cam Lift Hinges by Door Supplier L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Stop	S121	626
		Note:	STC Rated Door, acoustic seal by door supplier M/F15	

Heading # 51

1	Sgl	Dr # 149	144 to 149 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3		RH
3	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Office Lockset	L9050P-06C - ANSI # F04		626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Door Stop	S121 M/F04		626

Heading # 52

1	Sgl	Dr # 150	144 to 150 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 60 Min Rated		RH
2	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Threshold	DS5000 x D.W.		627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H.		627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)		627
1	Ea.	Door Viewer	U698		626
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 53

1	Sgl	Dr # 151	144 to 151 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min rated	LH
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3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Storeroom Lockset	L9456P-06C - ANSI # F13	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F13	626

Heading # 54

1	Sgl	Dr # 152	136 to 152 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	RH
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3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Privacy Lockset	L9040-06C - ANSI # F22 w/Occp Indicator	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F22	626

Heading # 55

1	Sgl	153A	136 to 153 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 90 Min rated	RH
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2	ea.	Hinges	TA786 114 x 101mm NRP	652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH 652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU 626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Power Supply	PS902-900-FA	PS 689
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR 630
1	ea.	Door Closer	351-O	627
1	ea.	Kickplate	K10A-254 x D.W.	627
1	ea.	Threshold	DS5000 x D.W.	627
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
1	ea.	Security Astragal	PROVIDED BY OWNER	
1	ea.	Security Door Contact	TA4108	DPS BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.	
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.	

Notes: Rough in for future Card Reader

Heading # 56

1	Sgl	Dr # 153B	Exterior from 153 1/900 x 2150 x 45mm IHMD x IPSF Type D1/F1		LHR
2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Threshold	DS5000 x D.W.		627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H.		627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)		627
1	ea.	Security Astragal	PROVIDED BY OWNER		
1	Ea.	Door Viewer	DS238		626
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 57

1	Pr	Dr # 154A	144 to 154 2/900 x 2150 x 45mm HMD x PSF Type D1/F2 - 60 Min rated	LH/RHA
6	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	set	Flush Bolts	SMX845	626
2	ea.	Door Closer	351-PS	689
2	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Coordinator	SMX672 2/AB	600
1	ea.	Threshold	DS5000 x D.W.	627
1	ea.	Security Astragal	Provided by Owner M/F015	

Heading # 58

1	Sgl	Dr # 154B	Exterior from 154 1/900 x 2150 x 45mm IHMD x IPSF Type D1/F1	LHR
2	ea.	Hinges	TA386 114 x 101mm NRP	630
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH 630
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU 626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Power Supply	PS902-900-FA	PS PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR
1	ea.	Door Closer	351-PS	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Threshold	DS5000 x D.W.	627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H.	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
1	ea.	Security Astragal	Provided by Owner	
1	Ea.	Door Viewer	DS238	626
1	ea.	Security Door Contact	TA4108	DPS BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.	
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.	
		Notes:	Rough in for future Card Reader	

Heading # 59

1	Pr	Dr # 155A	136 to 155 2/900 x 2150 x 45mm HMD x PSF Type D1/F2 - 45 Min rated	LH/RHA
6	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	set	Flush Bolts	SMX845	626
2	ea.	Door Closer	351-PS	689
2	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Coordinator	SMX672 2/AB	600
1	ea.	Threshold	DS5000 x D.W.	627
2	ea.	Security Door Contact	TA4108 M/F015	DPS BLK

Heading # 60

1	Sgl	Dr # 155B	155 from 158 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min rated	LHR
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Hotel Guest Lock	L9485P-06C L/Occ Indicator - ANSI # F15	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-PS	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Security Door Contact	TA4108 M/F015	DPS BLK

Heading # 61

1	Sgl	Dr # 156	155 to 156 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min rated	RH
3	ea.	Hinges	TA386 114 x 101mm NRP	652
1	ea.	Passage Set	L9010-06C - ANSI # F01	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.	BRZ
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas) M/F01	627

Heading # 62

1	sgl	Dr # 157	155 to 157 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min rated		LH
3	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Storeroom Lockset	L9485P-42B - ANSI # F15K		652
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108 M/F15K(no knob)	DPS	BLK

Heading # 63

1	Sgl	Dr # 159	161 to 159 1/900 x 2150 x 45mm HMD x PSF Type D1/F1		RH
2	ea.	Hinges	TA786 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	630
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Overhead Stop	GJ100S		626
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Threshold	DS5000 x D.W.		627
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 64

1	Sgl	Dr # 162	161 to 162 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3		RH
2	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	630
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Overhead Stop	GJ100S		626
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Threshold	DS5000 x D.W.		627
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 65

1	Sgl	Dr # 163	162 to 163 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min rated		RH
3	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Storeroom Lockset	L9485P-06C L/Occ Indicator - ANSI # F15		626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Door Closer	351-PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Security Door Contact	TA4108 M/F015	DPS	BLK

Heading # 66

1	Sgl	Dr # 164	162 to 164 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min Rated	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Classroom Lockset	L9456P-06C - ANSI # F13	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626

Heading # 67

1	Sgl	Dr # 165	162 to 165 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Office Lockset	L9050P-06C - ANSI # F04	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626

Heading # 68

1	Sgl	Dr # 166	162 to 166 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3	RH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Office Lockset	L9050P-06C - ANSI # F04	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S103 / S121	626

Heading # 69

1	Sgl	Dr # 168A	168 From 167 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC 51 rated	RHR
1	ea.	Cam Lift Hinges	Cam Lift Hinges by Door Supplier	
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	626
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	689
1	ea.	Power Supply	PS902-900-FA	630
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	626
1	ea.	Overhead Stop	GJ100S	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Threshold	DS5000 x D.W.	627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
1	Ea.	Door Viewer	DS238	626
1	ea.	Security Door Contact	TA4108	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.	
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.	
		Note:	STC Rated Door, acoustic seal by door supplier	
		Notes:	Rough in for future Card Reader	

Heading # 70

1	Sgl	Dr # 168B	101 to 168 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC 51 rated	RH
1	ea.	Cam Lift Hinges	By Door Supplier	
1	ea.	Power Transfer	EPT	626
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	689
1	ea.	Power Supply	PS902-900-FA	630
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	626
1	ea.	Overhead Stop	GJ100S	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Threshold	DS5000 x D.W.	627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
1	Ea.	Door Viewer	DS238	626
1	ea.	Security Door Contact	TA4108	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.	

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Note: STC Rated Door, acoustic seal by door supplier

Heading # 71

1	Sgl	Dr # 169	101 to 169 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - STC 51 rated	LH
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		Cam Lift Hinges	By Door Supplier	
1	ea.	Power transfer	EPT	
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	689
1	ea.	Power Supply	PS902-900-FA	630
1	ea.	Card Reader (Future)	Reader & Components complete by Security Contractor	626
1	ea.	Overhead Stop	GJ100S	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Threshold	DS5000 x D.W.	627
1	sets	Weatherstrip	DSS133CT 1/D.W. 2/D.H.	628
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
1	Ea.	Door Viewer	DS238	626
1	ea.	Security Door Contact	TA4108	652

Exit: Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Notes: Rough in for future Card Reader

Note: STC Rated Door, acoustic seal by door supplier

Heading # 72

1	Sgl	Dr # 170	169 to 170 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3	RH
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3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Office Lockset	L9050P-06C - ANSI # F04	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626

Heading # 73

1	Sgl	Dr # 171	169 to 117 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3 - 0 Min. Rated	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F07	626

Heading # 74

1	Sgl	Dr # 172	101 to 172 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	RH
1	ea.	Continuous Hinges	SL11HD x D.H.	628
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Electric Strike	6211FSE	ES 626
1	ea.	Current Reduction Unit	CRUi	CLR
1	ea.	Operators	Horton 4100LE c/w Header	OP 628
1	ea.	Multi-Function Relay	CNA-CX-EMF2	
1	ea.	Push to Lock Button	CNA-CX-CM400/8	PB2/KSL 630
1	ea.	Panic Button	CNA-CX-CM420E	PB2/KS 630
2	ea.	Switches	CNA-CX-CM9600/2	PB2/KS-OP 630
1	ea.	Power Supply	902-900-FA	PS
1	ea.	Kickplates	K10A-254 x D.W.	630
1	ea.	Security Door Contact	MC-4	BLK
1	ea.	Call Button	By Electrical	
1	ea.	Remote Release Button	SDC15-2 Mode - OP/ES/L - F07	630

Heading # 75

1	Sgl	Dr # 173A	101 to 173 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-PS	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	Ea.	Door Viewer	DS238 M/F07	

Heading # 76

1	Sgl	Dr # 173B	173 from 105 1/900 x 2150 x 45mm HMD x PSF Type D1/F1		RHR
2	ea.	Hinges	TA386 114 x 101mm NRP		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
2	ea.	Card Readers (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	Ea.	Door Viewer	DS238		
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 77

1	Sgl	Dr # 174	167 from 174 1/900 x 2150 x 45mm SCWD x PSF Type D1/F1 - 0 Min. Rated		LHR
3	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07		626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Door Closer	351-PS		689
1	ea.	Kickplate	K10A-254 x D.W. M/F07		630

Heading # 78

1	Sgl	Dr # 175	167 to 175 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	RH
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3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Privacy Lockset	L9040-06C - ANSI # F22 w/Occp Indicator	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F22	652

Heading # 79

1	Sgl	Dr # 176	167 to 176 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	LH
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3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Privacy Lockset	L9040-06C - ANSI # F22 w/Occp Indicator	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F22	652

Heading # 80

1	Sgl	Dr # 177	167 to 177 1/900 x 2150 x 45mm HMD x PSF Type D1/F1	RH
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2	ea.	Hinges	TA786 114 x 101mm	652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH 652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # EL	EU 626
2	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Power Supply	PS902-900-FA	PS PCP
1	ea.	Card Readers (Future)	Reader & Components complete by Security Contractor	CR
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Security Door Contact	TA4108	DPS BLK

Exit: Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.

Entry: Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.

Notes: Rough in for future Card Reader

Heading # 81

1	Sgl	Dr # 178	177 to 178 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 45 Min Rated		LH
2	ea.	Hinges	TA786 114 x 101mm		652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	ETH	652
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)		626
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Readers (Future)	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.		
		Notes:	Rough in for future Card Reader		

Heading # 82

1	Sgl	Dr # 179	161 to 179 1/900 x 2150 x 45mm SCMD x PSF Type D1/F6		RH
3	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Latchset	L9010-06C - ANSI # F01		626
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
			M/F01		

Heading # 83

1	Sgl	Dr # 180	136 to 180 1/900 x 2150 x 45mm SCWD x PSF Type D1/F3 - 0 Min Rated	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Hinges	TA386 114 x 101mm ETH (8/28 ga)	626
1	ea.	Hotel Elect. Lockset	L9492P-06C-RX DM LEU ANSI # F15 EL	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	630
1	ea.	Power Supply	PS902-900-FA	626
1	ea.	Card Readers (Future)	Reader & Components complete by Security Contractor	
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
1	ea.	Security Door Contact	TA4108	652
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.	626
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position. Manual Key Override Entry with Valid Key.	626
		Notes:	Rough in for future Card Reader	

Heading # 84

1	Sgl	Dr # 181	136 to 181 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min Fire Rated	RH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device)	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
			M/F07	

Heading # 85

1	Sgl	Dr # 182A	136 to 182 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min Fire Rated	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Overhead Stop	GJ100S	626
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.	RH
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas) M/F07	

Heading # 86

1	Sgl	Dr # 182B	Exterior from 182 1/900 x 1500 x 45mm HMD x PSF Type D8/F1	RHR
3	ea.	Hinges	TA386 114 x 101mm NRP	652
1	ea.	Storeroom Lockset	L9466P-06C L/Occ Indicator - ANSI # F14	626
2	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	Ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-PS	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Thresholds	DS5000 x D.W.	627
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas) M/F14	627

Heading # 87

1	Sgl	Dr # 183	136 to 183 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min Rated	LH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Storeroom Lockset	L9456P-06C - ANSI # F13	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F13	626

Heading # 88

1	sgl	Dr # 184	183 to 184 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min rated	LH
3	ea.	Hinges	TA386 114 x 101mm NRP	652
1	ea.	Storeroom Lockset	L9485P-42B - ANSI # F15K	652
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S103 / S121	626
1	ea.	Security Door Contact	TA4108	DPS BLK
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.	RH
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas) M/F15K	

Heading # 89

1	sgl	Dr # 185	136 to 185 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 0 Min rated	RH
3	ea.	Hinges	TA714 114 x 101mm	652
1	ea.	Storeroom Lockset	L9080P-06C - ANSI # F07	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121 M/F07	626

Heading # 90

1	Sgl	Dr # 186	133 to 186 1/900 x 2150 x 45mm HMD x PSF Type D1/F6 - 45 Min Rated		LH
2	ea.	Hinges	TA786 114 x 101mm NRP		630
1	ea.	Hinges	TA786 114 x 101mm ETH (8/28 ga)	ETH	630
1	ea.	Storeroom Lockset	L9092PEU-06C - ANSI # F04	EU	626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -		626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike		
1	ea.	Power Supply	PS902-900-FA	PS	PCP
1	ea.	Card Reader	Reader & Components complete by Security Contractor	CR	
1	ea.	Door Closer	351-O		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	ea.	Door Stop	S121		626
1	ea.	Security Door Contact	TA4108	DPS	BLK
		Notes:	EL Mode - CR/EU-L Rough in for future Card Reader		
		Exit:	Depressing inside lever handle allows for immediate exit, door closes upon door opening cycle returns to latched position.		
		Entry:	Presenting valid credential (FOB, Card) to card reader (CR) momentarily unlocks lockset (EU-L), door closes upon door opening cycle returns to secure and latched position.		
		Notes:	Manual Key Override Entry with Valid Key. Rough in for future Card Reader		

Heading # 91

1	Sgl	Dr # 187	186 to 187 1/900 x 2150 x 45mm HMD x PSF Type D7/F1 - 45Min Rated		LH
3	ea.	Hinges	TA714 114 x 101mm		652
1	ea.	Classroom Lockset	L9070P-06C - ANSI # F05		626
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -		626
1	ea.	Door Closer	351-PS		689
1	ea.	Kickplate	K10A-254 x D.W.		630
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.		RH
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas) M/F04		

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Heading # 92

1	sgl	Dr # 188	186 to 188 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min rated	RH
3	ea.	Hinges	TA786 114 x 101mm NRP	652
1	ea.	Storeroom Lockset	L9485P-42B - ANSI # F15	652
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S103 / S121	626
1	ea.	Security Door Contact	TA4108 M/F15K	DPS BLK

Heading # 93

1	sgl	Dr # 189	106 to 189 1/900 x 2150 x 45mm HMD x PSF Type D1/F1 - 45 Min rated	RH
3	ea.	Hinges	TA786 114 x 101mm NRP	652
1	ea.	Storeroom Lockset	L9485P-06C - ANSI # F15	652
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Door Stop	S121	626
1	ea.	Security Door Contact	TA4108 M/F15K	DPS BLK

Heading # 94

1	sgl	Dr # 190	Exterior from 190 1/900 x 2150 x 45mm IHMD x IPSF Type D1/F1	LHR
3	ea.	Hinges	TA386 114 x 101mm NRP	652
1	ea.	Storeroom Lockset	L9485P-42B - ANSI # F15K	652
1	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
1	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
1	ea.	Door Closer	351-O	689
1	ea.	Kickplate	K10A-254 x D.W.	630
1	ea.	Thresholds	DS5000 x D.W.	627
1	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.	627
1	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
1	ea.	Security Astragal	PROVIDED BY OWNER M/F15K	

Heading # 95

1	sgl	Dr # 002	Exterior from Out Building 002	LHR
1	sgl	Dr # 003	Exterior from Out Building 003	LHR
1	sgl	Dr # 004	Exterior from Out Building 004	LHR
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12	ea.	Hinges	TA386 114 x 101mm NRP	652
4	ea.	Storeroom Lockset	L9485P-42B - ANSI # F15K	652
4	ea.	Abloy Cylinder	Secure Abloy CY415T (Ensure Cylinder Compatibility with Locking Device) -	626
4	ea.	Construction Cylinder	Mortise/Rim as Per Device - Keyed Alike	
4	ea.	Door Closer	351-O	689
4	ea.	Kickplate	K10A-254 x D.W.	630
4	ea.	Thresholds	DS5000 x D.W.	627
4	sets	Weatherstrip	DS133CT 1/D.W. 2/D.H.	627
4	ea.	Door Sweeps	DS138CN x D.W. (*Use DS148NB Brush in Office Areas)	627
4	ea.	Security Astragal	PROVIDED BY OWNER M/F15K	

Heading # 96

1	Ovr Hd	Dr # OH001	Exterior from Out Building 001
1	Ovr Hd	Dr # OH002A	Exterior from Out Building 002
1	Ovr Hd	Dr # OH002B	Exterior from Out Building 002
1	Ovr Hd	Dr # OH003	Exterior from Out Building 003
1	Ovr Hd	Dr # OH004	Exterior from Out Building 004
<hr/>			
4/3600 / 3400 x 3100mm OHD x STF Type			

Complete by Overhead Door Supplier

END OF SECTION

Part 1 General

1.1 ADMINISTRATION REQUIREMENTS

- .1 Coordination: Coordinate work of this Section with the installation of frames to ensure a continuous, uninterrupted sequence, and to prevent the undue exposure of unprotected frames to weather, and as follows:
 - .1 Do not install any glazing until all nearby welding is completed.
 - .2 Mark each light of glass as it is installed in a manner to make it visible and obvious to all persons.
 - .3 Do not use materials that may permanently mar, discolour or disfigure the glass.

1.2 RELATED REQUIREMENTS

- .1 ASTM International
 - .1 ASTM C1503-08(2013), Standard Specification for Silvered Flat Glass Mirror.
- .2 CSA Group
 - .1 CAN/CGSB-12.1-2017, Safety Glazing.
 - .2 CAN/CGSB-12.3-M91(R2017), Flat, Clear Float Glass.
 - .3 CAN/CGSB-12.4(R2017), Heat Absorbing Glass.

1.3 SUBMITTALS

- .1 Submit required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Product Data: Submit manufacturer's technical data for each glazing material required, including installation and maintenance instructions.
- .3 Samples for Verification: Submit the following samples for each glass type specified for verification by Consultant of products supplied to the Project:
 - .1 Sealed Glass Units: Submit one fully double glazed 300 mm x 300 mm sample; indicate which surface low-e coatings have been applied to; attach glass performance requirements to back side of unit.
 - .2 Spandrel Glass Units: Submit one fully double glazed 300 mm x 300 mm sample using material selected from initial sample selection process; and for each additional spandrel type specified.

1.4 PROJECT CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: Submit maintenance brochures on the care and cleaning of glass and glazing materials.

1.5 QUALITY ASSURANCE

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Installer: Use installers having experience with projects of similar scope and complexity, and approved for installing products by glass manufacturer.
 - .2 Delegated Design Professional: Manufacturer's engineering recommendations:
 - .1 Perform glazing work in accordance with written recommendations from the glass manufacturer or glass fabricator.
 - .2 Certify glass compatibility with glazing materials; such as insulating glass sealants, structural sealants and silicones, gaskets, setting blocks, and similar components
 - .3 Verify glass design, heat treatment and thickness; analyze for thermal stress and maximum deflection.
- .2 Certifications: Provide the following during the course of the Work:
 - .1 Compliance Certification: Provide certificates from manufacturer indicating tested performance requirements required by Authorities Having Jurisdiction and these specifications have been met.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: Deliver packaged materials in their original containers with manufacturer's labels and seals intact.
- .3 Storage and Handling Requirements: Store vertically, blocked off the floor in a weatherproof enclosure in original containers with manufacturers labels and seals intact until read for installation, and as follows:
 - .1 Install glass as soon as possible after delivery to site.
 - .2 Handle glass carefully to its place of installation.
 - .3 Prevent damage to glass, adjacent materials and surfaces.

1.7 SITE CONDITIONS

- .1 Ambient Conditions: Maintain temperature, humidity and solar exposure conditions of glass and glazing materials during shipping, storage and site installation as required by manufacturer to maintain warranty and performance of installed products, and as follows:
 - .1 Install glazing when ambient temperature is above 2°C of the manufacturer's minimum and rising.
 - .2 Maintain ventilated environment for 24 hours after installation.
 - .3 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

- .1 Provide manufacturer's warranty for the following types of glass listed, against defects in materials and workmanship for the period indicated, commencing from the date of Substantial Performance of Work:
 - .1 Seal Failure: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions.
 - .2 Evidence of Failure: Obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - .3 Allowable Specific Exclusions: Breakage resulting from thermal stress will be accepted as a limitation to the warranty in accordance with CAN/CGSB 12.20
 - .4 Warranty Period: Ten (10) Years.

Part 2 Products

2.1 MANUFACTURERS

- .1 Basis-of-Design products are named in this Section; additional manufacturers offering similar setting systems may be incorporated into the work provided they meet the performance requirements established by the named products.
- .2 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - .1 Vision Glass:
 - .1 AGC Flat Glass North America (formerly AFG or AFGD)
 - .2 AHC Glass (formerly Visteon)
 - .3 Pilkington Glass of Canada
 - .4 Prelco Inc.
 - .5 Vitro Architectural Glass (formerly PPG Industries)
 - .6 Schott Glass AG
 - .7 Viracon Inc.

2.2 PERFORMANCE REQUIREMENTS

- .1 Building Envelope Performance: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials utilizing inner light of multiple lite insulated units for continuity of air and vapour seal.
- .2 Exterior Glazing: Provide engineered exterior glazing units to design loads.

2.3 GLASS MATERIALS

- .1 Float Glass: In accordance with CAN/CGSB-12.3, glazing quality and as follows:
 - .1 Glass thickness: 6 mm each lite.
 - .2 Clear Glass: no tint
- .2 Aluminum Insulated Glass: Tinted Glass outside light and inside light with low E coating: Manufactured in accordance with CAN/CGSB-12.4 and as follows:

- .1 Insulating Glass Applications: Triple Unit
- .2 Glass thickness: 6 mm each lite.
- .3 Class: B - Heat strengthened or Class C - Tempered as required to prevent thermal shock breakage.
- .4 Tint: Bronze.
- .5 Provide samples to Consultant for review.
- .3 Pressed Steel Insulated Glass: Tinted Glass outside light and inside light with low E coating: Manufactured in accordance with CAN/CGSB-12.4 and as follows:
 - .1 Insulating Glass Applications: Double Unit
 - .2 Glass thickness: 6 mm each lite.
 - .3 Class: B – Heat strengthened or Class C – Tempered as required to prevent thermal shock breakage.
 - .4 Tint: Bronze.
 - .5 Provide samples to Consultant for review.
- .4 Insulated Spandel Glass:
 - .1 Insulating Glass Applications: Triple Unit
 - .2 Glass thickness: 6 mm each lite.
 - .3 Cass: B – Heat strengthened or Class C – Tempered as required to prevent thermal shock breakage.
 - .4 Clear glass with full scrim Opasci coating on face 2.
 - .5 Colour: Colour match bronze of aluminum insulated glass.
- .5 Clear Safety Glass: Manufactured in accordance with CAN/CGSB-12.1, in accordance with EN14179-1, and as follows:
 - .1 Type: 2 - Tempered.
 - .2 Class: B - Float Glass.
 - .3 Category: II - 540 J impact resistance.
- .6 Clear Laminated Anti-Vault Glass: Manufactured in accordance with CAN/CGSB-12.1, and as follows:
 - .1 Tempered glass, 6 mm.
 - .2 PVB Interlayer, 0.76 mm.
 - .3 Tempered glass, 6 mm.
- .7 Detention Glazing:
 - .1 In accordance with Section 08 32 00 – Steel Detention Doors.
- .8 Acoustic Windows:
 - .1 Acoustic Window Secure: In accordance with Section 08 44 13 – Glazed Aluminum Curtain Walls and Aluminum Windows.
 - .2 Acoustic Window: In accordance with Section 08 44 13 – Glazed Aluminum Curtain Walls and Aluminum Windows.
- .9 Transparent, One Way, Mirrored Glass Window: Manufactured in accordance with CAN/CGSB-12.6-M91 and as follows:

- .1 Type: 1 – Almost transparent metallic coating applied to clear glass, 6.76 mm laminated glass.
- .2 Class: B – Laminated, to CAN/CGSB-12.1-M90, 0.76 mm minimum thickness of laminating film.
- .10 Mirrors, Silvered: to ASTM C1503 and as follows:
 - .1 Type: 1B - Float glass for high humidity use.
 - .2 Tint: Clear
 - .3 Edges: Pencil polished edge. Seal edges to prevent chemical or atmospheric penetration of backing.
 - .4 Sizes: refer to drawings.
- .11 Dome Mirror
 - .1 Type: Half dome, 180 degrees
 - .2 Size: 510 mm diameter
 - .3 Edges: Steel-reinforced block bumper.
 - .4 Fastened to wall and ceiling.

2.4 INSULATING GLASS

- .1 Insulating Glass Units: Provide sealed insulating glass units in configurations indicated, and as specified herein.
 - .1 Manufacture sealed insulating glass units without edge channels or tape, that is, with bare glass edges.
 - .2 Use two stage seal method of manufacture, as follows:
 - .1 Primary Seal: polyisobutylene sealing compound between glass and metal spacer/separator.
 - .2 Secondary Seal: polyurethane, silicone or polysulphide base sealant, filling gap between the two lites of glass at the edge up to the spacer/separator and primary seal.
 - .3 Install stainless steel capillary breather tubes to equalize pressure differentials between insulating glass fabricating location and insulating glass installation location; crimp tube immediately prior to installation in accordance with glass fabricator's written instructions.
 - .4 Spacer/Separator: Glass Fabricator's standard stainless steel; coloured natural, spacer containing desiccant, sealed to provide continuous vapour barrier between interior of sealed unit and secondary seal.
 - .5 Sealants for Insulating Glass Units:
 - .1 Primary Seal: Polyisobutylene; colour black
 - .2 Secondary Seal: Silicone Sealant Structural Glazing as specified in Section 07 92 00; compatible with SSG adhered curtain wall system specified in Section 08 44 13;
- .2 Sealed units to exterior hollow metal doors and sidelights and where required by the National Building Code 2015: double glazed units with bronze tinted exterior lite.
- .3 Insulating Glass Units – Triple Glazed:

- .1 Unit Composition:
 - .1 Exterior Lite: 6 mm Bronze tinted heat strengthened or tempered glass.
 - .2 Air Space: 13 mm air filled
 - .3 Center Lite: 6 mm Clear float glass.
 - .4 Air Space: 13 mm air filled.
 - .5 Interior Lite: 6 mm Clear annealed glass with low E coating, surface 5.
- .2 Unit Properties:
 - .1 Thickness: 6 mm glazing or greater as required to meet structural performance criteria.
 - .2 Solar Heat Gain Coefficient (SHGC): 0.21
 - .3 Visible Light Transmission (Tvis): 15
 - .4 Winter U-Value English (Btu/(hr x sqft x °F): 0.21
 - .5 Winter U-Value Metric (W/(M² x K): 1.18
 - .6 Basis-of-Design Materials: Solarcool on Solarbronze 6 mm on surface 1 + 13 mm air space + Clear 6 mm + 13 mm air space + Solarban 60 Low-E on surface 5 on Clear 6mm.
- .4 Insulating Glass Units – Double Glazed:
 - .1 Unit Composition:
 - .1 Exterior Lite: 6 mm Bronze tinted heat strengthened or tempered glass.
 - .2 Air Space: 13 mm air filled.
 - .3 Interior Lite: 6 mm Clear annealed glass with low E coating, surface 3.
 - .2 Unit Properties:
 - .1 Thickness: 6 mm glazing or greater as required to meet structural performance criteria.
 - .2 Solar Heat Gain Coefficient (SHGC): 0.16
 - .3 Visible Light Transmission (Tvis): 37
 - .4 Winter U-Value English (Btu/(hr x sqft x °F): 0.29
 - .5 Winter U-Value Metric (W/(M² x K): 1.65
 - .6 Basis-of-Design Materials: Solarcool on Solarbronze 6 mm on surface 1 + 13 mm air space + Solarban Low-E on surface 3 on Clear 6 mm.
- .5 Insulating Glass Units – Triple Glazed Spandrel:
 - .1 Unit Composition:
 - .1 Exterior Lite: 6 mm clear glass heat strengthened or tempered with Opasci coat on surface 2.
 - .2 Air Space: 13 mm air filled
 - .3 Center Lite: 6 mm Clear float glass.
 - .4 Air Space: 13 mm air filled.
 - .5 Interior Lite: 6 mm Clear annealed glass.
 - .2 Unit Properties:
 - .1 Thickness: 6 mm glazing or greater as required to meet structural performance criteria.

- .2 Solar Heat Gain Coefficient (SHGC): 0.21
 - .3 Visible Light Transmission (Tvis): 15
 - .4 Winter U-Value English (Btu/(hr x sqft x °F): 0.21
 - .5 Winter U-Value Metric (W/(M² x K): 1.18
 - .6 Basis-of-Design Materials: Solarcool on Solarbonze 6 mm on surface 1, Opasci coat on surface 2 + 13 mm air space + Clear 6 mm + 13 mm air space + Solarban 60 Low-E on surface 5 on Clear 6mm.
- .6 Insulation Glass Units – Privacy:
- .1 Unit Composition:
 - .1 Exterior Lite: 6 mm Bronze tinted heat strengthened or tempered glass.
 - .2 Air Space: 13 mm air filled.
 - .3 Interior Lite: 3 mm clear annealed glass, translucent PVB 0.76 mm interlayer, 3 mm clear annealed glass.
 - .2 Unit Properties:
 - .1 Thickness: 6 mm glazing or greater as required to meet structural performance criteria.
 - .2 Solar Heat Gain Coefficient (SHGC): 0.50
 - .3 Visible Light Transmission (Tvis): 45
 - .4 Winter U-Value English (Btu/(hr x sqft x °F): 0.47
 - .5 Winter U-Value Metric (W/(M² x K): 2.65
 - .6 Basis-of-Design Materials: Solarcool on Solarbonze 6 mm on surface 1 + 13 mm air space + Clear 3 mm, Etch PVB interlayer, Clear 3 mm.

2.5 ACCESSORY MATERIALS

- .1 Glazing Tape: 100% polybutalene vehicle. Extruded in ribbon form with paper separator. Tape shall have an integral shim strip where required.
- .2 Setting Blocks: Silicone, Shore A Hardness 90; Shims Shore A Hardness 50.
- .3 Spacers: Silicone and other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified primary and secondary glazing materials.
- .4 Glazing Compound: For glazing to metal, in accordance with CAN/CGSB 19.2.
- .5 Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.
- .6 Stainless Steel Speaker Disc:
 - .1 125 mm Diameter, including gaskets, exterior and interior plates with speak through holes, and tamperproof fasteners, Room 105.
 - .2 Weizel Security Speaking Disc Model Number: 45-115-01-SD1, room 131 and 132.
- .7 Security Film:
 - .1 Clear 0.18 mm thick, security film, based on 3M Safety and Security Window Film Exterior Safety Series.

- .2 Locate on interior surface of glazing in room 100.

2.6 FABRICATION - GENERAL

- .1 Fabricate mirrors to fit measurements of finished spaces, made at the site. Make no horizontal joints.
- .2 Cut all glass to field measurement with proper clearances. Cut to produce clean, straight edges with no chips, cracks or flaws.
- .3 Make any cut outs, openings to reviewed shop drawings. Grind exposed edges smooth round off corners.

2.7 FABRICATION - INSULATING GLASS

- .1 Shop fabricate insulating glass units in accordance with CAN/CGSB.12.8 and IGMAC certification as a minimum.
- .2 Sealed units shall have a minimum of 13 mm air space giving a total overall thickness of not less than 25 mm. Edge spacer shall not bow in or out more than 5 mm over full length of a side.
- .3 Sealed units shall be assembled and air space sealed in a clean, dry environment, in a location with the same barometric air pressure as the job site.
- .4 Sealed units shall be assembled and air space sealed in a clean, dry environment, to suit local barometric air pressure conditions to prevent distortion of sealed units.
- .5 Unit types, make-up and colour shade as listed at end of this Section.

Part 3 Execution

3.1 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.

3.2 PREPARATION

- .1 Ensure all glazing rebates smooth and true, free of projections nails, screws, fastenings properly set to prevent contact with glass.
- .2 Ensure all stops, splines, glazing accessories provided by other sub-contractors accurately cut to length and proper size and type for specific glazing.
- .3 Clean contact surfaces with solvent and wipe dry.
- .4 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .5 Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION - GENERAL

- .1 Install in accordance with the manufacturer's written instructions and the contract documents, plumb, true, level and rigid.

- .2 Do not glaze when ambient or surface temperatures are less than 4°C. Glazing rebates, stops and glass shall be dry, free from ice, frost slick, grease, oil, dust, rust, or other matter detrimental to adhesion of tape, glazing compounds and sealant.
- .3 Installation of glass shall be by workmen skilled in this trade in strict accordance with manufacturer's directions.
- .4 Position sealed units to provide minimum 12 mm glass bite, and minimum 6 mm perimeter clearance between glass and framing.
- .5 Glass shall be free from contact with the frames and stops.
- .6 Glaze interior doors with foam tape on both sides. Trim tape even with the sight line.
- .7 Use sealant at exterior doors, sealing water and weather tight.

3.4 SEALED UNITS

- .1 Install sealed units in accordance with manufacturer's written instructions, taking care not to warp or twist glass to prevent stress or breaking of glass seals.
- .2 Crimp capillary breather tube in accordance with fabricator's written instructions, and as follows:
 - .1 Do not trim sealant from around base of tube.
 - .2 Do not pull or attempt to remove the tube.
 - .3 Crimp tube immediately prior to installing sealed unit by placing pliers perpendicular to tube 25 mm from end of tube.
 - .4 Do not permit tube to be exposed to or sit in water.
 - .5 Cover tube with stainless steel strip and set in sealant bead compatible with insulated glass sealants.
- .3 Install new sealed units into existing skylight frames.
 - .1 Install accessories to complete installation of sealed units.

3.5 GLASS SCHEDULE

- .1 Aluminum Windows Exterior:
 - .1 Insulating triple glass units: 6 mm bronze tinted, tempered exterior lite; 6 mm clear float glass middle lite; 6 mm clear annealed glass low E coating to #5 surface.
 - .2 Insulating double glass units: 6 mm bronze tinted, tempered exterior lite; 6 mm clear annealed glass low E coating to #3 surface.
 - .3 Insulating triple spandrel unit: 6 mm clear tempered glass exterior light with Opasci coating #2 surface, 6 mm clear float glass middle lite; 6 mm clear annealed glass.
 - .4 Insulating double, fritted glass units: 6 mm bronze tinted, tempered exterior lite; 6 mm clear annealed glass 30% black frit to #3 surface: rooms 134 and 135.
- .2 Aluminum/Pressed Steel Windows Interior:
 - .1 Antivault glazing millwork between room 101 and 105, and room 131 and 132.
 - .2 Acoustic Window Secure: Room 116.

- .3 Hollow Metal Doors, Borrowed Lights and Pressed Steel Glazed Frames:
 - .1 Exterior Doors and Frames: 6 mm bronze tinted, tempered exterior light; 6 mm clear float interior light, low E coating to #3 surface.
 - .2 Interior Doors: Single pane 6 mm tempered safety glazing.
 - .3 Interior Borrowed Lights: 6 mm single pane glass.
- .4 Detention Glazing:
 - .1 Detention Doors: Locations noted in door schedule. Sizes and finishes in accordance with Section 08 32 00 – Steel Detention Doors.
- .5 One-way Mirrored Glass:
 - .1 Glazing on sides of front counter, refer to drawings.
- .6 Mirrors:
 - .1 Sizes and locations as per drawings.
- .7 Dome Mirror:
 - .1 Dome mirror located in room 187, opposite wall of door.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 05 41 00 – Structural Metal Stud Framing
- .2 Section 07 84 00 – Fire Stopping
- .3 Section 07 92 00 – Joint Sealants
- .4 Section 08 11 00 – Metal Doors and Frames
- .5 Section 08 14 16 – Flush Wood Doors
- .6 Section 08 31 00 – Access Doors and Panels
- .7 Section 08 44 13 – Glazed Aluminum Curtain Walls and Aluminum Windows
- .8 Section 09 30 00 - Tiling

1.2 DEFINITIONS

- .1 Levels of Finish: Standard levels of finish defined by NWCB Manual apply to products of this Section as follows:
 - .1 Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile.
 - .2 Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view.
- .2 Refer to ASTM C11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.3 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 - Submittals.
 - 1.1.1 Action Submittals: Provide following submittals before starting any work of this Section:
 - .1 Product Data: Submit product data for each type of product indicated.
 - .2 Samples: Submit samples for trim accessories, full-size sample 300 mm long for each trim accessory indicated.
 - .2 Informational Submittals: Provide following submittals during the course of the Work:
 - .1 Submit ULC Assembly Listings and Materials cut sheets for fire rated assemblies as follows:
 - .1 Not later than 30 working days following Award of Contract, submit copies of ULC Assembly and Materials Listing for indicating ULC Number and how assembly meets the rating criteria for assemblies listed on drawings or meets requirements of Appendix D of Alberta Building Code for review by the Consultant.
 - .2 Use the same system and material as would be required for a tested assembly for the project; ULC Listings are tested with the specific

materials indicated; substitutions will not be permitted unless evidence of equivalency is confirmed.

- .3 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.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- .2 Storage and Handling Requirements: Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes; Stack gypsum panels flat and on sufficient spacers to prevent sagging, not in direct contact with floor surfaces.

1.5 SITE CONDITIONS

- .1 Ambient Conditions: Store and install materials specified in this Section in accordance with requirements of NWCB Manual.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work upon preapproval from Consultant include; but are not limited to, the following:
 - .1 CertainTeed
 - .2 CGC Inc.
 - .3 Georgia-Pacific Canada, Inc.
- .2 Additional Manufacturers: Additional manufacturers are listed for accessory items and are incorporated into the Work subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials.

2.2 PERFORMANCE REQUIREMENTS

- .1 Fire Test Response Characteristics: Refer to Section 07 05 80; use materials identical to those listed for ULC assemblies submitted to Consultant.
- .2 Acoustic Characteristics: Walls are to be assembled to tested rating assemblies to meet STC ratings as indicated.

2.3 MATERIALS

- .1 Steel Suspended Ceiling and Bulkhead Framing: Provide components and materials in accordance with ASTM C754 for interior conditions as indicated on Drawings, and as follows:
 - .1 Tie Wire: ASTM A641 Class 1 zinc coating, soft temper, No. 18 gauge wire.

- .2 Hangers:
 - .1 Wire Hangers: ASTM A641, Class 1 zinc coating, soft temper, No. 8 gauge.
- .3 Carrying Channels: Cold rolled, commercial steel sheet with a base metal thickness of 1.2 mm x 13 mm minimum wide flange, with ASTM A653, Z180, hot dip galvanized zinc coating; 38 mm minimum depth.
- .4 Furring Channels: Commercial steel sheet with ASTM A653, Z180, hot dip galvanized zinc coating, as follows:
 - .1 Hat Shaped, Rigid Furring Channels: ASTM C645, 0.46 mm thickness x 22 mm deep.
- .2 Steel Partition Framing: Provide components and materials in accordance with ASTM C754 for conditions indicated on Drawings.
- .3 Steel Sheet Components, Steel Studs and Runners: In accordance with ASTM C645 requirements for metal and with ASTM A653, Z180, hot dip galvanized zinc coating and as follows:
 - .1 Steel Studs: Nominal 0.61 mm base metal thickness, except use 1.6 mm heavy weight framing to support fire rated door frames; depth as indicated on drawings.
 - .2 Runners: Width, thickness and galvanizing to match steel studs, and as follows:
 - .1 Double Runner Deflection Track: Outside runner using 50 mm flanges; inner runner 33 mm; maintaining 25 mm minimum deflection space.
 - .2 Base Runner: Bottom track with 33 mm upstanding legs.
 - .3 Flat Strap and Backing Plate, strapping: Steel sheet for blocking and bracing in length and width indicated; 1.2 mm nominal base metal thickness x 406 mm wide.
 - .4 Horizontal Cross Bracing: 1.2 mm nominal base metal thickness; 13 mm minimum width flange x 38 mm minimum depth.
 - .5 Clip Angle: 38 mm x 38 mm x 1.8 mm nominal base metal thickness.
 - .6 Furring Channels: Commercial steel sheet with ASTM A653, Z180, hot dip galvanized zinc coating, as follows:
 - .1 Hat Shaped, Rigid Furring Channels: ASTM C645, 0.75 mm thickness x 22 mm deep.
 - .2 U-shaped, Rigid Furring Channels: ASTM C635, 0.61 mm thickness x 64 mm deep.
 - .3 Resilient Furring Channels: 0.46 mm thickness x 13 mm deep members designed to reduce sound transmission having asymmetrical face attached to single flange by a slotted leg (web).
- .4 Heavy Gauge Interior Partition Framing: Steel stud framing for walls having large format tile finish, and walls exceeding 4440 mm in height, and as follows:
 - .1 Cold Formed Sheet Steel: Commercial steel sheet Interior members not forming a part of the exterior building envelope shall have a minimum ASTM A653, Z180, hot dip galvanized zinc coating, thickness of framing members exclusive of galvanized coating.

- .2 Studs: to CAN/CSA-S136 and shall be identified as to specification, type grade and mechanical properties; minimum 92 mm deep x 38mm wide x metal core thickness 0.75 mm spaced at 406 mm on centre, hot dipped galvanized steel; roll formed with knurled flanges, services and bracing cut outs.
- .3 Sill tracks: To CAN/CSA-S136, top track shall be a single track system with minimum metal core thickness 0.75 mm, hot dipped galvanized steel. Top track flanges of depth to suit vertical deflection; do not fix top of studs to track, minimum depth 38 mm and width to suit studs. Floor track to suit stud width, with 33 mm flanges.
- .4 Channel stiffener: 19 mm cold rolled channel of 1.2 mm, electro-galvanized steel.
- .5 Fasteners:
 - .1 Stud to stud: Steel, self drilling, self threading, case hardened. Material: stainless steel or steel with minimum 0.008mm cadmium or zinc coating. Head Profile: hex, pan, and low profile type. Length: adequate to penetrate not less than 3 fully exposed threads beyond joined materials.
 - .2 Track to concrete: Hilti drilled insert, sizes as specified. Do not use Powder Actuated Fasteners.
 - .3 Track to steel: Secure track to structural steel over 8 mm thickness with Hilti "DX fastening system" with "X-EDNI" nails as specified. Provide additional steel back up above interstitial steel deck for wall support.
 - .4 Drilled Inserts: Steel, cadmium plated or hot dip galvanized, sizes as indicated on drawings.
- .6 Bolts and Nuts: Meeting requirements of ASTM A307, with large flat type steel washers, sized to suit fasteners, hot dip galvanized, 413.68 MPa Tensile Strength
- .7 Welding Electrodes: Minimum tensile strength series of 480 MPa, suitable for material being welded.
- .8 Touch up Paint: Zinc rich, to CAN/CGSB-1.181.
- .5 Interior Gypsum Panels: Provide in maximum lengths and widths available that minimize joints in each area and correspond with support system as indicated on drawings, in thicknesses as indicated and as follows:
 - .1 Regular Type Gypsum Board: Meeting requirements of ASTM C1396M with long edges tapered, and as follows:
 - .1 Location: Vertical surfaces, unless otherwise indicated.
 - .2 Acceptable Materials:
 - .1 CertainTeed, Easi-Lite
 - .2 CGC Inc., Sheetrock
 - .3 Georgia-Pacific Canada, Inc., Toughrock Gypsum Wallboard
 - .2 Fire Resistant Type (Type X) Gypsum Board: Meeting requirements of ASTM C1396M with long edges tapered, and as follows:
 - .1 Location: Where required for fire resistance rated assembly.
 - .2 Acceptable Materials:
 - .1 CGC Inc., Fiberock Aqua-Tough Firecode.

- .2 Georgia Pacific Canada, Inc., Toughrock Fireguard
- .3 CertainTeed Inc., ProRoc Type X
- .3 Cementitious Backer Board: Manufactured to produce superior resistance to moisture and mould; panels with polymer coated, glass-fiber mesh completely encompassing edges, back and front surfaces. 16 mm thickness. Tested to the following performance ratings:
 - .1 Location: Washrooms, showers, janitor sinks, wall tile applications, and wall protection.
 - .2 Mould Resistant: ASTM D3273, rating of 10.
 - .3 Water Resistant: ASTM C1178, glass mat coating.
 - .4 Basis-of-Design Materials: CertainTeed Glasrock Diamondback tile backer. Type X, where required.
 - .5 Acceptable Materials:
 - .1 CertainTeed Glasrock Diamondback
 - .2 CGC Durock, Cement Board
 - .3 Georgia Pacific Dens-Shield tile backers
- .6 Exterior Sheathing: Provide gypsum sheathing panels in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated, and as follows:
 - .1 Gypsum Based Wall Sheathing Board: ASTM C1177 proprietary brand gypsum based wall sheathing material formulated specifically for exterior use in water managed building envelope systems and as follows:
 - .1 Location: Exterior walls, roof deck and soffits.
 - .2 Acceptable Materials:
 - .1 CertainTeed GlasRoc Exterior Sheathing
 - .2 CGC Securock Glass Mat Sheathing
 - .3 Georgia Pacific Dens-Glass Gold
 - .2 Cement Board: ASTM C1325 fibre-mat reinforced cementitious sheathing, below grade as follows:
 - .1 Location: protection for foundation insulation.
- .7 Joint Treatment Materials: Provide joint compound and accessory materials in accordance with ASTM C475 and as follows:
 - .1 Joint Tape:
 - .1 Interior Gypsum Board: Paper.
 - .2 Interior Mould Resistant Gypsum Board: Fibreglass mesh tape.
 - .3 Exterior Gypsum Soffit Board: Fibreglass mesh tape.
 - .4 Tile Backing Panels: As recommended by panel manufacturer.
 - .2 Joint Compound for Interior Gypsum Board: Vinyl based, non-asbestos, low dusting type compatible with other compounds applied on previous or for successive coats, and as follows:
 - .1 Pre-filling: Setting type taping compound.

- .2 Embedding and First Coat: Drying type compound.
- .3 Fill Coat: Drying type compound.
- .4 Finish Coat: Drying type, sandable topping compound.
- .5 Skim Coat: Drying type, sandable topping compound.
- .6 Acceptable Materials:
 - .1 CertainTeed Dust Away
 - .2 CGC Dust Control
- .8 Joint Compound for Tile Backing Panels:
 - .1 Gypsum based tile backing board: Use setting type taping and setting type, sandable topping compounds.
- .9 Joint Compound for Interior Mould Resistant Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - .1 Pre-filling: Setting type joint compound.
 - .2 Embedding and First Coat: Setting type joint compound.
 - .3 Fill Coat: Setting type, sandable topping compound.
 - .4 Skim Coat: Setting type joint compound, sandable topping compound.

2.4 ACCESSORIES

- .1 Trim Accessories:
 - .1 Interior Trim: structural laminate drywall corners; tapered copolymer core, joint tape, and formulated surface paper, based on No-Coat distributed by CertainTeed, in the following shapes:
 - .1 Insider 90 Corner Bead.
 - .2 Outside 90 Corner Bead.
 - .3 L-Trim, to suit gypsum board thickness.
 - .2 Interior Reveals: Extruded aluminum alloy 6063 T5, with chemical clear anodized:
 - .1 Gypsum Board Reveal: Reglet reveal, 50 mm x 16 mm, double fastened through gypsum board to supports behind. Based on Fry Reglet Reveal.
 - .3 Interior Joints: Galvanized coated steel sheet or rolled zinc meeting the requirements of ASTM C1047, in the following shapes:
 - .1 Expansion Joints: Back-to-back edge beads at joints spanning building expansion and movement joints.
 - .2 Control Joints: V-shaped trim having strippable joint protection specifically manufactured to provide thermal stress relief to large ceiling and wall areas; confirm locations with Consultant before installation. Not to be located in acoustic walls.

- .2 Acoustic Materials: Coordinate placement of acoustic materials with wall assembly types. Use only fire rated materials in fire and smoke rated assemblies. Acoustic sealants shall be applied prior application of fire and smoke seals specified in Section 07 84 00 and as follows:
 - .1 Acoustic Sealant for Exposed Joints: Non-sag, paintable, non-staining, latex sealant in accordance with ASTM C834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction:
 - .1 Basis-of-Design Materials: Pecora Corp., AC-20 FTR Acoustic and Insulation Sealant.
 - .2 Acoustic Sealant for Concealed Joints: Non-drying, non-hardening, non-skinning, non-staining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission:
 - .1 Acceptable Materials:
 - .1 Pecora Corp., BA-98.
 - .2 Tremco, Acoustical Sealant
 - .3 Acoustic Insulation for Fire and Smoke Rated Assemblies: Meeting the requirements of ULC S702 mineral fibre acoustic sound batts, Type 1 for all properties except thermal performance, width to friction fit steel studs; un-faced, thickness minimum 89 mm to fill a minimum of 90% of the cavity thickness, nominal density 40 kg/m³ minimum; STC ratings as indicated on drawings; having maximum flame spread and smoke developed of 20/20 in accordance with CAN/ULC S102 and being non-combustible in accordance with CAN/ULC S114:
 - .1 Acceptable Materials:
 - .1 Owens-Corning Canada Inc., Sound Attenuation Fire Batt
 - .2 Roxul Inc., Roxul AFB Acoustical Fire Batt
 - .3 Auxiliary Materials: Provide auxiliary materials in accordance with referenced installation standards and manufacturer's written recommendations, and as follows:
 - .1 Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - .2 Steel Drill Screws: ASTM C1002, unless otherwise indicated, except use screws in accordance with ASTM C954 for fastening panels to steel members from 0.75 mm to 2.67 mm thickness, and as follows:
 - .1 Type S: Shallow pitch screw; used for single layer gypsum board application
 - .2 Type G: Steep pitch screw; used for double layer gypsum board application
 - .3 Isolation Strip at Exterior Walls: Adhesive backed, closed cell vinyl foam strips that allow fastener penetration without foam displacement, 3 mm thick, in width to suit steel stud size.
 - .4 Access Panels: Refer to Section 08 31 00, rated to suit wall or ceiling fire rating.
 - .5 6 mil poly vapour barrier at locations indicated on drawings out building.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine areas and substrates, with Installer present, and including welded hollow metal frames, cast in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Suspended Ceilings:
 - .1 Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
 - .2 Furnish inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction where concrete inserts are required.
- .2 Spray Applied Cementitious Fire Rating Materials:
 - .1 Coordinate with sprayed fire resistive materials; install gypsum board assemblies to the greatest extent possible before application of spray applied fire rating materials.
 - .2 Before sprayed fire resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed on fire resistive materials.
 - .3 Provide continuous plates fastened to building structure not more than 610 mm O/C where offset anchor plates are required.
 - .4 After sprayed fire resistive materials are applied, remove them only to extent necessary for installation of gypsum board assemblies and without reducing the fire resistive material thickness below that required to obtain fire resistance rating indicated. Protect remaining fire resistive materials from damage.
- .3 Foam Deck Inserts:
 - .1 Coordinate with fire resistive foam deck inserts, firestopping and smoke seal materials specified in Section 07 84 00 – Fire Stopping.
 - .2 Install specified materials in accordance with material manufacturer's written instructions.
- .4 Access Panels and Doors:
 - .1 Coordinate access panels and wall types with materials specified in Section 08 31 00 – Access Doors and Panels.
 - .2 Coordinate with Mechanical and Electrical for locations and size requirements of access panels.
 - .3 Coordinate and confirm location of access panels before installation with Consultant.

- .4 Install specified materials in accordance with material manufacturer's written instructions.
- .5 Fire Rated Construction:
 - .1 Install materials forming a part of fire rated construction in accordance with manufacturer's instructions and as required to meet specific ULC listed construction requirements submitted by Subcontractor.
 - .2 Install fire rated gypsum wall panels vertically; horizontal installation does not meet testing standard unless horizontal blocking is installed behind horizontal joints.

3.3 INSTALLING STEEL FRAMING

- .1 Installation Standards: ASTM C754, and ASTM C840 requirements that apply to framing installation.
- .2 Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. In accordance with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with NWCB, Specification Standards Manual.
- .3 Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement, and as follows:
 - .1 Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - .2 Isolate partition framing and wall furring where it abuts structure, except at floor.
 - .3 Install double runner deflection track at head of assemblies that avoid axial loading of assembly and laterally support assembly.
- .4 Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.
- .5 Installing Steel Suspended Ceiling and Bulkhead Framing: Suspend ceiling hangers from building structure as follows:
 - .1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
 - .2 Install supplemental suspension members and hangers in form of trapezes or equivalent devices where width of ducts and other construction within ceiling plenum produces hanger spacing that interfere with the location of hangers required to support standard suspension system members.
 - .3 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - .4 Secure wire hangers by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.

- .5 Secure rod, flat or angle hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail:
 - .1 Do not attach hangers to steel deck tabs.
 - .2 Do not attach hangers to steel roof deck. Attach hangers to structural members. Provide additional carrier channels between structural elements where structure does not align with hangers.
 - .3 Do not connect or suspend steel framing from ducts, pipes, or conduit.
- .6 Install steel framing components for suspended ceilings so members for panel attachment are level to within 3 mm in 3600 mm measured lengthwise on each member and transversely between parallel members.
- .7 Wire-tie furring channels to supports, as required to in accordance with requirements for assemblies indicated. Clips will not be acceptable.
- .8 Install suspended steel framing components in sizes and spacing indicated, but not less than that required by the referenced steel framing and installation standards:
 - .1 Hangers: 1220 mm O/C.
 - .2 Carrying Channels (Main Runners): 1220 mm O/C.
 - .3 Furring Channels (Furring Members): 406 mm O/C.
- .6 Installing Steel Partition Framing: Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction:
 - .1 Install foam gasket isolation strip between studs where studs are installed directly against exterior walls.
 - .2 Install each steel framing and furring member so fastening surfaces vary not more than 3 mm from the plane formed by the faces of adjacent framing.
 - .3 Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board:
 - .1 Cut studs 13 mm short of full height to provide perimeter relief.
 - .2 For fire resistance rated and STC rated partitions that extend to the underside of floor slabs and roof decks or other continuous solid structure surfaces: Install framing around structural and other members extending below floor slabs and roof decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
 - .3 Terminate partition framing at suspended ceilings where indicated.
 - .4 Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
 - .5 Install horizontal cross bracing to steel studs at 1220 mm O/C vertically for the entire length of wall for unbraced walls exceeding 3660 mm in length.

- .6 Frame door openings using 1.6 mm steel studs and in accordance with gypsum board manufacturer's applicable written recommendations:
 - .1 Screw vertical studs at jambs to jamb anchor clips on door frame; install runner track section (for cripple studs) at head and secure to jamb studs.
 - .2 Install two studs at each jamb, connected for entire length.
 - .3 Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- .7 Frame openings other than door openings the same as required for door openings. Install framing below sills of openings to match framing required above door heads.

3.4 ACCESS PANELS

- .1 Install access panels in wall assemblies to maintain fire rating of assembly.
- .2 Confirm location of access panels with the Consultant before installation.
- .3 Minor adjustments to location within wall system may be required where panel interferes with architectural appearance.

3.5 APPLYING AND FINISHING PANELS

- .1 Gypsum Board Application and Finishing Standards: ASTM C840.
- .2 Panel Application Methods:
 - .1 Single Layer Application:
 - .1 On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing.
 - .2 On partitions, apply gypsum panels vertically (parallel to framing), unless horizontal application is indicated or otherwise required by fire resistance rated assembly, and to minimize end joints.
 - .3 Stagger abutting end joints not less than one framing member in alternate courses of board.
 - .4 At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire resistance rated assembly.
 - .5 Apply gypsum panels to supports using Type S screws fastened 10 mm from edges of board.
 - .6 Apply gypsum board to assemblies having resilient channels using Type S screws fastened 38 mm edges of boards.
 - .2 Double Layer Application:
 - .1 Apply first layer with enough screws to hold panel in place.
 - .2 Stagger and offset joints of second layer from first layer.
 - .3 Apply second layer over first layer and secure as specified for single layer application using screws long enough to penetrate both layers and penetrate 10 mm into metal framing.
- .3 Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

- .4 Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling; stagger abutting end joints of adjacent panels not less than one framing member spacing.
- .5 Install gypsum panels with face side out; butt panels together for a light contact at edges and ends with not more than 1.5 mm of open space between panels; do not force into place.
- .6 Locate edge and end joints over supports:
 - .1 Do not place tapered edges against cut edges or ends.
 - .2 Stagger vertical joints on opposite sides of partitions.
 - .3 Do not make joints other than control joints at corners of framed openings.
 - .4 Stop gypsum board away from underside of floor above and roof deck to allow for deflection of structure.
 - .5 Attach gypsum board to vertical studs, not to ceiling track, to allow for deflection.
- .7 Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- .8 Attach gypsum panels to framing provided at openings and cut outs.
- .9 Form control joints to account for thermal movements, to account for movement where direction of framing changes direction, and movements arising differing substrate materials using V-Shaped trims by framing back-to-back framing members and a break in gypsum panel at a maximum of 7.5 metres O/C, as follows:
 - .1 Install control joints in wall and ceiling construction in accordance with ASTM C840 so that gross area enclosed by joints does not exceed 80 m² between joints using limiting distances as follows:

Partition Type	Maximum Single Dimension
Interior Partitions	9 metres
Interior Ceilings with Perimeter Relief	15 metres
Interior Ceilings without Perimeter Relief	9 metres
Exterior Ceilings	9 metres
Exterior Walls	9 metres

- .2 Lay out control joints to coincide as far as possible with door, window or screen frames, but not necessarily to occur at every individual frame; install control joints vertically and horizontally from corners of openings.
- .3 Provide continuous dust barrier behind joints.
- .4 Install joints straight and true.
- .5 Form control joints to meet sound rated construction and fire ratings required for remainder of wall or ceiling construction.
- .6 Obtain Consultant's acceptance of control joint layout before starting installation of materials specified in this Section.

- .10 Form expansion joints to account for building movements using back-to-back framing members and edge trims, and a break in gypsum panel over structural movement joints and floor slab control joints as follows:
 - .1 Install expansion joints incorporating continuous air and vapour membranes and with sufficient gap to allow for projected building movements.
 - .2 Seal back-to-back edge bead control joints with clear silicone sealant as specified in Section 07 92 00.
 - .3 Provide continuous dust barrier behind joints.
 - .4 Install joints straight and true.
 - .5 Form expansion joints to meet sound rated construction and fire ratings required for remainder of wall or ceiling construction.
- .11 Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally:
 - .1 Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 0.7 m² in area.
 - .2 Fit gypsum panels around ducts, pipes, and conduits.
 - .3 Cut gypsum panels to fit profile formed by coffers, joists, and other structural members where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks; allow 6 mm to 10 mm wide joints to install sealant.
- .12 Isolate perimeter of non-load bearing gypsum board partitions at structural abutments, except floors. Provide 6 mm to 13 mm wide spaces at these locations, and trim edges with J-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustic sealant.
- .13 Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations, and as follows:
 - .1 Space screws a maximum of 300 mm O/C for vertical applications.
 - .2 Space fasteners in panels that are tile substrates a maximum of 200 mm O/C.
- .14 Install fire rated and labelled gypsum board at all locations indicated on Drawings; continue fire and smoke rated wall construction behind and around fire hose cabinet recesses and other recessed items larger than a double gang switch box to maintain wall fire rating.
- .15 Install sheet metal backing where required for mounting of items. Spot glue sheet in place before applying surface layer of gypsum board.
- .16 Finishing Gypsum Board Assemblies:
 - .1 Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
 - .2 Pre-fill open joints, rounded or bevelled edges, and damaged surface areas.

- .3 Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- .4 Gypsum Board Finish Levels: Finish panels to levels indicated above.
- .5 Mould resistant Gypsum Board: Do not tape or fill joints in mould resistant gypsum board used as a substrate for ceramic tile.

3.6 ACOUSTIC INSTALLATION

- .1 Acoustic Sound Batts:
 - .1 Install acoustic sound batts within metal stud space and above suspended gypsum board ceilings as indicated for sound or fire rating.
 - .2 Acoustic sound batts to extend full height of partitions.
 - .3 Fill behind electrical outlet boxes, fire hose cabinets, washroom accessories and other openings with at least 150 mm lap around perimeter of opening; do not compress acoustic sound batts as this could cause the gypsum board finish to bulge or push outward.
 - .4 Electrical outlet boxes also to use plastic vapour barrier boxes inside the box and acoustic putty outside the box.
 - .5 Coordinate with Electrical and Mechanical Subcontractors and verify that no back-to-back openings are formed, whether or not so indicated on drawings.
 - .6 Installation to in accordance with manufacturer's current written recommendations.

3.7 ACOUSTIC SEALANT INSTALLATION

- .1 Apply two (2) acoustic beads to stud track bottom and top.
- .2 Apply non-hardening acoustic sealant to perimeter of each sheet of gypsum board and any wall connections and penetrations.
- .3 Offset all receptacle boxes from one another, even in unrated separations.
- .4 Stagger joints of second layer of gypsum board joints.

3.8 FIRE RATING SEALANT INSTALLATION

- .1 Seal fire rated partitions strictly in accordance with fire sealant manufacturer's instructions for specific fire rating requirements listed; coordinate with Section 07 84 00.
- .2 Locate sealant to ensure it is covered at completion of partition when finishes applied.
- .3 Seal around mechanical and electrical work and other work in wall to ensure proper fire rating.

3.9 INSTALLING TRIM ACCESSORIES

- .1 For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- .2 Control Joints: Install control joints at locations indicated on Drawings, confirm locations of joints with Consultant before construction, and in accordance with ASTM C840 and in specific locations approved by Consultant for visual effect where joints are not otherwise indicated.

- .3 Reveals: Cut vertical trims and casing beads at horizontal reveal locations and install horizontal reveals continuous around corners and edges.

3.10 FIELD QUALITY CONTROL

- .1 Above Ceiling Observation: Before installing gypsum board ceilings, Consultant will conduct an above ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected:
 - .1 Notify Consultant seven (7) working days in advance of date and time when Project, or part of Project, will be ready for above ceiling observation.
 - .2 Before notifying Consultant, complete the following in areas to receive gypsum board ceilings:
 - .1 Installation of 80% of lighting fixtures, powered for operation.
 - .2 Installation, insulation, and leak and pressure testing of water piping systems.
 - .3 Installation of air duct systems.
 - .4 Installation of air devices.
 - .5 Installation of mechanical system control air tubing.
 - .6 Installation of acoustic isolation system.
 - .7 Installation of ceiling support framing.
- .2 Acoustic Inspections
 - .1 Inspection and testing of acoustic application will be carried out by a third-party inspection agency certified to perform inspections to confirm Sound Transmission Class (STC) ratings of designated acoustic rooms.
 - .2 Contractor to coordinate inspections at completion of acoustic rooms, prior to Substantial Completion. Inspection costs to include travel, living allowance, site inspections, testing, and reports; to be drawn from Allowance 5, Section 01 22 00 – Allowances.
 - .3 If acoustic rooms perform lower than the noted STC ratings, Contractor to pay for all remediation to construction and retesting by the same inspection agency until STC levels are met.
 - .4 Rooms 102, 103, 104, 109, 116, 131 and 132, 148, 168, 169, 170, and 171 are to be tested to STC 50. Rooms 131 and 132 are considered one (1) room. Rooms 169, 170, and 171 are considered one (1) room.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 09 22 16 – Gypsum Board Assemblies
- .2 Section 05 41 00 – Structural Metal Stud Framing

1.2 REFERENCES STANDARDS

- .1 ASTM International
 - .1 ASTM C645-14e1, Standard Specification for Non-structural Steel Framing Members.
 - .2 ASTM C754-17, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Environmental Choice Program (ECP)
 - .1 CCD-047-98(R2005), Architectural Surface Coatings.
 - .2 CCD-048-95(R2006), Surface Coatings - Recycled Water-Borne.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #26, Primer, Galvanized Metal, Cementitious.
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including percentages or recycled content materials and products, showing their costs and

percentages of post-consumer and pre-consumer content, and total cost of materials for project.

- .3 Regional Materials: submit evidence that project incorporates regional materials.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect metal framing from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 43 – Environmental Procedures.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C645 roll formed hot dipped galvanized steel sheet, for screw attachment of gypsum board.
 - .1 Knock-out service holes at 460 mm centers.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.
- .3 Shaft wall framing: to requirements of applicable ULC design.
- .4 Metal channel stiffener: 19 mm size, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .5 Acoustical sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .6 Sealants: VOC limit compliant with SCAQMD Rule 1168.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.
 - .1 Visually review 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 acceptance to proceed from Consultant.

3.2 ERECTION

- .1 Align partition tracks at floor and steel deck and secure at 600 mm on centre maximum.
- .2 Install damp proof course under stud shoe tracks of partitions on slabs-on-grade.
- .3 Place studs vertically at dimensions shown on drawings and not more than 50 mm from abutting walls, and at each side of openings and corners.
 - .1 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.
- .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 steel deck at each side of openings wider than stud centres specified.
 - .1 Secure studs together, 50 mm apart using column clips or other accepted means of fastening placed alongside frame anchor clips.
- .9 Install single heavy gauge and single regular gauge studs at jamb openings.
- .10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs.
 - .1 Secure track to studs at each end, in accordance with manufacturer's instructions.
 - .2 Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

- .13 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .14 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
 - .1 Use 50 mm leg ceiling tracks.
- .15 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .16 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by non-structural metal framing application.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 35 00 – Concrete Finishing
- .2 Section 07 92 00 – Joint Sealants
- .3 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCE STANDARDS

- .1 ANSI Standards
 - .1 ANSI A118.4, Latex Modified Portland Cement Mortar.
- .2 ASTM International
 - .1 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C373-16e1, Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products.
 - .3 ASTM C734-15, Standard Test Method for Low-Temperature Flexibility of Latex Sealants After Artificial Weathering.
 - .4 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.
 - .5 ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
- .3 International Organization for Standardization
 - .1 ISO 13007-14, Ceramic Tiles – Grouts and Adhesives – Part 1: Terms, Definitions and Specifications for Adhesives.
- .4 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Specification Guide 09 30 00 2016/2017, Tile Installation Manual.
 - .2 Tile Maintenance Guide 2000.

1.3 ACTION AND INFORMATION SUBMITTALS

- .1 Submit required information in accordance with Section 01 33 00 – Submittal Requirements.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Product Data: Submit manufacturer's product data for each type of product specified. Data shall indicate compliance with specification and installation recommendations of manufacturer of products being used.
 - .2 Samples for Verification: Submit samples for verification including sample sets showing the full range of variations expected where products involve normal colour and texture variations:

- .1 Submit two (2) sets 300 mm x 300 mm sized panel using specified material including coloured grout mounted on 19 mm thick plywood backer.
- .2 Submit tile sample showing installation of perimeter accessories, control or movement joints, and trims where applicable.
- .3 Informational Submittals: Provide the following submittals during the course of the work:
 - .1 Certificates: Submit written statements from manufacturers indicating compatibility with respect to other manufacturer's materials where more than one manufacturer's products form a part of a single tile assembly.

1.4 PROJECT CLOSEOUT SUBMISSIONS

- .1 Operation and Maintenance Data: Submit copies of TTMAC Maintenance Guide, and additional materials as follows:
 - .1 Provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.
 - .2 Provide manufacturer's maintenance data sheets for floor sealers and other non-tile accessories.
- .2 Spare Parts: Deliver maintenance materials to Owner as follows:
 - .1 Deliver tile maintenance materials in the following quantities:
 - .1 Ceramic Tile: 2% of total installation with a minimum of eight (8) pieces of each colour and type
 - .2 Porcelain Tile: 2% of total installation with a minimum of one (1) box of each colour and type.
 - .3 Trim Units: 3% of total installation consisting of full size units of each type, composition, colour, and pattern

1.5 QUALITY ASSURANCE

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Standard of the work of this Section: Provide materials and workmanship in accordance with recommendations of Terrazzo, Tile and Marble Association of Canada (TTMAC) and the requirements of the ANSI A108.1 Series of Standards.
 - .2 Supplier: Obtain materials from one (1) source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties.
 - .3 Materials: Tile that does not meet a Grade 1 Standard or is marked as a factory second or discount will be rejected, immediately removed from site and replaced with specified materials.
 - .4 Installers: Execute Work of this Section using qualified personnel skilled in ceramic tile installation, having a minimum of five (5) years proven experience and have completed tile installations similar in material, design, and extent to that indicated for this Project.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use in accordance with ANSI A108.1 for labelling sealed tile packages.
- .2 Storage and Handling Requirements: Store materials to prevent damage or contamination to materials by water, freezing, foreign matter, and other causes; store cementitious materials in a dry area, and blocked off floor and ground surfaces.

1.7 SITE CONDITIONS

- .1 Ambient Conditions: Apply tile after completion of work by other Sections is complete; to surfaces sufficiently dry, clean, firm, level, plumb and free from oil or wax or any other material deleterious to tile adhesion and as follows:
 - .1 Temperature: Maintain tile materials and substrate temperature between TTMAC recommended minimum and maximum temperature range; unless indicated otherwise by manufacturer, for 48 hours before and during installation until materials are fully set and cured; provide additional heat during winter months or at any other time when there is a risk that surface temperatures may drop below minimum recommended temperatures.
 - .2 Ventilation: Maintain adequate ventilation where Work of this Section generates toxic gases or where there is a risk of raising relative humidity to levels that could damage building finishes and assemblies.

Part 2 Products

2.1 MATERIALS

- .1 Provide tile products manufactured in accordance with ANSI A108.1 as appropriate to the Basis-of-Design Materials.
- .2 Factory-blend tile that exhibits colour variations within the ranges selected, and package so tile units taken from one (1) package show the same range in colours as those taken from other packages.

2.2 FLOOR TILES

- .1 Ceramic Wall Tile
 - .1 Subway Lab – Canale series.
 - .1 Refer to drawings for sizes and colours.
 - .2 Distributor: Julian Tile, 10537 169th street NW, Edmonton, AB, T5P 3Y7; P: 780-452-5010; website: www.juliantile.com
 - .2 Walker Zanger 4D and 4D Chevron.
 - .1 Refer to drawings for sizes and colours.
 - .2 Distributor: Empire Kitchen and Bath, 5539 1st Street SE, Calgary, AB, T2H 1H9; P: 403-252-2458; website: www.empirekitchenandbath.com
- .2 Porcelain Wall Tile:
 - .1 Division9, Millelegni Series.
 - .1 Refer to drawings for sizes and colours.

- .2 Distributor: Shnier Gesco LP, 4000 106th Avenue SE, Calgary, AB, T2C 5B6, P: 403-214-3123; website: www.division9.ca

2.3 WALL TILES

- .1 Porcelain Floor Tile:
 - .1 Auture Series.
 - .1 Refer to drawings for sizes and colours.
 - .2 Distributor: Ames Tile and Stone, 11693 180 Street NW, Edmonton, AB, T5S 2H6; P: 780-483-8002; website: www.amestile.com

2.4 TRIMS

- .1 Transition Edge Strips: satin nickel anodized aluminum edge strips; height as required to suit tile installation, no transition higher than 13 mm to meet barrier free standards; with integral perforated anchoring leg for setting the strip into the setting material for use at outside corners and top of tile:
 - .1 Basis-of-Design Materials: Schluter:
 - .1 Quadec Q45E
 - .2 Jolly AT
 - .3 Reno-U AT

2.5 ACCESSORY MATERIALS

- .1 Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers and as follows:
 - .1 Job Site Cleaner: Phosphoric acid/nitric acid-based cleaning solution mixed in accordance with cleaner manufacturers recommendations and as recommended by tile manufacturer.
 - .2 Maintenance Cleaner: Non-toxic, electrolytic, biodegradable, non-ammonia containing, PH controlled cleaning solution mixed in accordance with manufacturer's recommendations.

2.6 MORTAR SETTING MATERIALS

- .1 Manufacturers: Mortar and grout materials listed in this Section shall be of a uniform quality for each mortar, and grout component from a single manufacturer and each aggregate from one source or producer as follows:
 - .1 Custom Building Products Ltd.
 - .2 Flextile Ltd.
 - .3 Laticrete International Inc.
 - .4 MAPEI Inc.
- .2 Interior Thin Set Wall System: Dry set mortar meeting or exceeding the requirements of ANSI A108.1 formulated for thin set applications of ceramic biscuit tile, factory sanded mortar consisting of Portland cement, sand and additives requiring only potable water to be added for installation:
 - .1 Acceptable mortar materials:

- .1 Custom Building Products Premium Blend Thinset
 - .2 Flextile 51 Floor and Wall Mix
 - .3 Laticrete 317 Thinset Mortar
 - .4 MAPEI Kerabond
- .2 Wet Area Wall System: Polymer-modified, single-component, thin-set mortar for large and heavy tile and non-sag applications that meets ANSI A118.4 and A118.11.
 - .1 Custom Building Products MegaLite Ultimate Crack Prevention Large Format Tile Mortar
 - .2 Flextile 56SR Premium Sag-Resistant Mortar
 - .3 Laticrete Tri-Lite Mortar
 - .4 MAPEI Ultralite Mortar

2.7 GROUT

- .1 Colour: Refer to Drawings.
- .2 Portland Cement Grout for Wall and Floor Joints ≤ 3 mm, Interior Only: factory blended urethane sanded grout meeting requirements of ASHM C267 chemical:
 - .1 Acceptable Materials:
 - .1 Flextile Ltd., Colourmax Plus
 - .2 Acceptable substitutions from above listed manufacturers to match colours as noted on drawings.

2.8 MIXING MORTARS AND GROUT

- .1 Mix mortars and grouts in accordance with referenced standards, and mortar and grout manufacturers' written instructions.
- .2 Add materials, water, and additives in accurate proportions.
- .3 Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

Part 3 Execution

3.1 PREPARATION NEW INSTALLATIONS

- .1 Make backing surfaces level and true to a tolerance in plane of ± 3 mm in 2440 mm for walls.
- .2 Use trowelable levelling and patching compounds in accordance with tile setting material manufacturer's written instructions to fill cracks, holes, and depressions.
- .3 Remove protrusions, bumps, and ridges by sanding or grinding.

3.2 INSTALLATION

- .1 Install tiling in accordance with requirements of TTMAC Tile Installation Manual and parts of ANSI A108 Series of tile installation standards that apply to types of setting and grouting materials, and to methods required for complete ceramic tile installation.

- .2 Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions:
 - .1 Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - .2 Cut edges smooth, even and free from chipping.
 - .3 Do not split tile.
- .3 Accurately form intersections and returns; perform cutting and drilling of tile without marring visible surfaces:
 - .1 Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints.
 - .2 Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
- .4 Lay tile in pattern indicated on Drawings and as follows:
 - .1 Align joints when adjoining tiles on floor, base, walls, and trim are the same size.
 - .2 Cut tile accurately and without damage.
 - .3 Smooth exposed cut edges with abrasive stone, where exposed.
 - .4 Chipped or split edges are not acceptable.
 - .5 Minimum tile width: 1/2 unit unless specifically indicated otherwise on Drawings.
 - .6 Adjust tile layout to minimize tile cutting.
 - .7 Provide uniform joint widths.
 - .8 Make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished Work.
 - .9 Cut, drill, and fit tile as required accommodating Work of other trades.
 - .10 Slope floor tile towards floor drains in thick-bed mortar installations.
 - .11 Lay out tile wainscots to next full tile beyond dimensions indicated.
- .5 Press setting material into the back of tile having raised or textured backs to provide a minimum of 95% coverage:
 - .1 Set tile in place while bond coat is wet and tacky before it has skinned over.
 - .2 Notch bond coat in horizontal straight lines and set on freshly set setting material while moving tile back and forth at 90 degrees to the notches.
 - .3 Fully support corners and edges of tile with setting material.
 - .4 Set tile with, maximum lippage of 1 mm over a 3 mm wide joint.
- .6 Prevent rapid drying of setting material:
 - .1 Do not set tile on dry bed.
 - .2 Sound tile after setting and replace any hollow sounding units to obtain full bond.
- .7 Provide additional ventilation as required.
- .8 Clean excess setting materials from surface of tiles before final set.
- .9 Sound tiles after setting material have cured and replace hollow sounding tile before grouting.

- .10 Joint Widths: Install tile with the following joint widths:
 - .1 Wall Tile: 3 mm
 - .2 Floor Tile: 1.5 mm
 - .3 Make joints consistent width and alignment within tile area.
 - .4 Maintain 2/3 of grout joint depth free of setting material.
- .11 Back Buttering: Obtain minimum 100% mortar coverage in accordance with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108 series of tile installation standards for the following applications:
 - .1 Tile having tiles 305 mm or larger in any direction.
 - .2 Tile having tiles with raised or textured backs.
- .12 Install prefabricated edge strips and control at locations indicated or where exposed edge of floor tile meets different flooring materials and exposed substrates.
- .13 Protect exposed edges of floor tile with properly sized transition strips, use sloped reducer strips where uneven transitions between 6 mm and 13 mm occur. At 13 mm transitions use the Schluter Reno-ramp with 89 mm long ramp, or similar product.

3.3 GROUT

- .1 Install grout in accordance with manufacturer's written instructions, the requirements of the Terrazzo, Tile and Marble Association of Canada (TTMAC), and as follows:
 - .1 Allow proper setting time before application of grout.
 - .2 Force grout into joints to a smooth, dense finish.
 - .3 Remove excess grout in accordance with manufacturer's written instructions and polish tile with clean cloths.
- .2 Install grout for ceramic tile (Sand-Portland cement, dry-set, commercial Portland cement, and latex-Portland cement grouts) in accordance with ANSI A108.10.

3.4 CLEANING AND PROTECTION

- .1 On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter using Job Site Cleaner listed in 2.5.1.1 above:
 - .1 Remove grout residue from tile as soon as possible.
 - .2 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than ten (10) days after installation.
 - .3 Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning.
 - .4 Flush surface with clean water before and after cleaning.
- .2 Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies:
 - .1 Protect finished areas from traffic until setting materials have sufficiently cured in accordance with TTMAC requirements.
 - .2 Protect floor areas from traffic after grouting is completed in accordance with manufacturer's written instructions.

- .1 Keep traffic off floors for a minimum of twenty-four (24) hours after completion of grouting.
- .2 Use stepping boards where access is required for light foot traffic only after twenty-four (24) hours from completion of grouting.
- .3 Do not immerse in water for a minimum of twenty-one (21) days after completion of tile work.
- .3 Provide protective covering until Substantial Performance of the Work.
- .4 Protect wall tiles and bases from impact, vibration, heavy hammering on adjacent and opposite walls for a minimum of fourteen (14) days after installation.

3.5 INSTALLATION SCHEDULE

- .1 Install tile on gypsum board walls to TTMAC details 304W.
- .2 Install tile on cementitious backer to TTMAC details 305W.
- .3 Install tile on concrete floors, thin set method, to TTMAC details 311F.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and application of acoustical units for direct application or for application and installation within a suspended ceiling.
 - .2 Sustainable requirements for construction and verification.

1.2 RELATED REQUIREMENTS

- .1 Section 09 21 16 – Gypsum Board Assemblies

1.3 REFERENCES STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E1264-14, Standard Classification for Acoustical Ceiling Products.
 - .3 ASTM E1477-98a(2017), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour 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 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.
- .7 South Coast Air Quality Management District (SCAQMD), California State:
 - .1 SCAQMD Rule 1168, June 2006, Adhesives and Sealants Applications

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Product Data: Submit WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Samples: Submit duplicate samples of each type acoustical units.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Protect on site stored or installed absorptive material from moisture damage.
- .2 Store extra materials required for maintenance, where directed by Departmental Representative
- .3 Waste Management and Disposal:
 - .1 Separate waste materials in accordance with Section 01 74 21 - Construction /Demolition Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate facilities.
 - .3 Collect and separate for disposal paper, plastic, and corrugated cardboard packaging material in accordance with Waste Management Plan.
 - .4 Place materials defined as hazardous or toxic in designated containers in accordance with Section 01 35 43 - Environmental Procedures.
 - .5 Handle and dispose of hazardous materials in accordance with Regional and Municipal, regulations.
 - .6 Fold up metal and/or plastic banding, flatten and place in designated area for recycling.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15°C and humidity of 20% before and during installation.
- .3 Store materials in work area forty-eight (48) hours prior to installation.

1.7 EXTRA MATERIALS

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Deliver to Owner, upon completion of the work of this Section.

Part 2 Products

2.1 MATERIALS

- .1 Acoustic units for suspended ceiling system: to ASTM E1264.
 - .1 Type ACP-1. Based on Armstrong, Ultima, 1941 OR CGC, USG, MARS CLIMAPHIS, HIGH-NRC/HIGH-CAC:
 - .1 Class: A Fire Rating.
 - .2 Ecolabel: certified mineral fibre with minimum 68% + recycled content
 - .3 Textures: smooth, fine.
 - .4 Flame spread rating: 0.25 or less, in accordance with CAN/ULC-S102.
 - .5 Smoke developed: 50 or less, in accordance with CAN/ULC-S102.
 - .6 Noise Reduction Coefficient (NRC): 0.80.
 - .7 Ceiling Attenuation Class (CAC) rating: 35, in accordance with ASTM E1264
 - .8 Light Reflectance (LR) range: 0.87 to ASTM E1477.
 - .9 Edge type: tegular.
 - .10 Colour: white.
 - .11 Size: 610 x 610 x 24 mm thick.
 - .12 Surface coverings: Ecolabel certified paint low VOC paint.
 - .2 Type ACP-2: Based on CertainTeed, Theatre Black F with foil backing, Room 156.
 - .1 Class: A Fire Rating.
 - .2 Material: Fibreglass.
 - .3 Textures: matte.
 - .4 Flame spread rating: 25 or less, in accordance with ASTM E84 and CAN/ULC-S102
 - .5 Smoke developed: 50 or less, in accordance with ASTM E84 and CAN/ULC-S102
 - .6 Noise Reduction Coefficient (NRC): 0.75.
 - .7 Ceiling Attenuation Class (CAC) rating: 25 or less.
 - .8 Edge type: Trim.
 - .9 Colour: black panel and grid.
 - .10 Size: 610 x 610 x 24 mm thick.
 - .3 Acceptable manufacturers are Armstrong and CertainTeed.
- .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 Suspension Ceiling System by acoustic unit manufacturer.

Part 3 Execution

3.1 EXAMINATION

- .1 Do not install acoustical panels and tiles until work above ceiling has been reviewed by Consultants.

3.2 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Cut edges of partial tegular tiles to fit into suspension system and paint edges of tiles to match.

3.3 APPLICATION

- .1 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width.
- .2 Scribe acoustic units to fit adjacent work. Butt joints tight.

3.4 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, and gypsum bulkheads to be built into acoustical ceiling components.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 – Cast-In-Place Concrete.

1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM F1303-04, Standard Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-16, Architectural Coatings.
 - .2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for resilient floor and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit duplicate 300 x 300 mm sample pieces of sheet material and 150 mm long for resilient accessories and heat welding beads.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of recycled content materials and products, showing their percentages of post-consumer, post-industrial content, and total cost of materials for project.
 - .3 Regional Materials: submit evidence that project incorporates regional materials.
- .5 Closeout Submittals:
 - .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials or [recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 AMBIENT CONDITIONS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and 48 hours after installation.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide 6 linear m x roll width of each colour, pattern and type flooring material required for project for maintenance use.
 - .3 Extra materials one piece and from same production run as installed materials.
 - .4 Identify each roll of sheet flooring and each container of adhesive.
 - .5 Deliver to owner, Consultant, upon completion of the work of this section.
 - .6 Store where directed by DCC Representative

Part 2 Products

2.1 MATERIALS

- .1 Sheet vinyl with backing: to ASTM F1913.
 - .1 Wear layer: 1.27 mm.
 - .2 Products: Mannington Commercial, refer to drawings for colours.
 - .3 Thickness: 2 mm.
- .2 Linoleum sheet flooring: to ASTM F2034.
 - .1 Type: Linoleum sheet with backing.
 - .2 Thickness: 2.5 mm.
 - .3 Product: Forbo, refer to drawings for colours and series.
- .3 Backed sheet rubber sports floor:
 - .1 Width: 1.86 mm.
 - .2 Thickness: 6 mm.
 - .3 Product: Mondo, Ramflex Weight and Skate
 - .4 Colour: Refer to drawings.
- .4 Resilient base: continuous, top set, complete with pre-moulded end stops

- .1 Type: rubber.
- .2 Style: cove.
- .3 Height: 102 mm.
- .4 Lengths: cut lengths minimum 2400 mm.
- .5 Colour: indicated on finished schedule drawings.
- .5 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
 - .1 Rubber floor adhesives:
 - .1 Adhesive: maximum VOC limit compliant with SCAQMD Rule 1168.
 - .2 Cove base adhesives:
 - .1 Adhesive: maximum VOC limit compliant with SCAQMD Rule 1168.
- .6 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste, 2 part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product.
- .7 Metal edge and transition strips:
 - .1 Aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top adjacent floor finish.
 - .2 Edge and transitions strips to create smooth transition between dissimilar resilient sheet flooring materials.
- .8 Sealer and wax: not recommended.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 SITE VERIFICATION OF CONDITIONS

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.3 PREPARATION

- .1 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Prime concrete slab to resilient flooring manufacturer's printed instructions.

3.4 APPLICATION: FLOORING

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one (1) month following installation.
- .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .4 Run sheets in direction of traffic. Double cut sheet joints and heat weld according to manufacturer's printed instructions.
- .5 Heat weld seams of linoleum sheet flooring in accordance with manufacturer's printed instructions.
- .6 As installation progresses, roll flooring with 45 kg minimum roller to ensure full adhesion.
- .7 Cut flooring around fixed objects. Millwork may be placed on flooring depending on Contractor's schedule.
- .8 Install feature strips and floor markings where indicated. Fit joints tightly.
- .9 Continue flooring over areas which will be under built-in furniture.
- .10 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .11 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar, except at acoustic doors. Acoustic thresholds must be level, if flooring terminates to dissimilar thicknesses, continue the thickest material to edge of threshold.
- .12 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 APPLICATION: BASE

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
- .8 Install toeless type base before installation of carpet on floors.
- .9 Heat weld base in accordance with manufacturer's printed instructions.

3.6 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Remove excess adhesive from floor, base and wall surfaces without damage.
- .3 Clean floor and base surface to flooring manufacturer's printed instructions.
- .4 Sealing and waxing is not required.

3.8 PROTECTION

- .1 Protect new floors from damage until building turnover.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Use only water-based coating for linoleum.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This Section includes one resinous flooring system with epoxy body.
 - .1 Application Method: Multilayer Broadcast.

1.2 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-in-place Concrete
- .2 Section 03 35 00 – Concrete Finishing

1.3 REFERENCE STANDARDS

- .1 ASTM International:
 - .1 ASTM 307-03(2012), Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfaces.
 - .2 ASTM C413-01(2012), Standard Test Method for Absorption of chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - .3 ASTM C580-02(2012), Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - .4 ASTM C881/C881M-15, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - .5 ASTM D2240-15, Standard Test Method for Rubber Property-Durometer Hardness.
 - .6 ASTM D2794-93(2010), Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - .7 ASTM E648-17, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

1.4 SUBMITTALS

- .1 Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- .2 Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- .3 Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- .4 Maintenance Data: For resinous flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- .1 Installer Qualifications: Engage an experienced installer (Applicator) who is experienced in applying resinous quartz flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in

applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.

- .1 Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- .2 Contractor shall have completed at least three (3) projects of similar size and complexity.
- .2 Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten (10) years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- .3 Manufactured Field Technical Service Representatives: Resinous flooring manufacturer shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
- .4 Pre- installation Conference:
 - .1 General Contractor shall arrange a meeting not less than ten (10) days prior to starting work.
 - .2 Attendance:
 - .1 General Contractor
 - .2 Consultant
 - .3 Owner's Representative.
 - .4 Sub-contractor Installer.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .1 Deliver and store materials in manner to prevent damage.
 - .2 Ensure materials remain in original wrapping and containers until used.
- .2 All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.
- .3 Waste Management and Disposal:
 - .1 Dispose of waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 PROJECT CONDITIONS

- .1 Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

- .1 Maintain material and substrate temperature between 65 and 85 degrees F (18 and 30 degrees C) during resinous flooring application and for not less than 24 hours after application.
- .2 Lighting: Provide temporary lighting if permanent lighting is not in place. Simulate permanent lighting conditions during resinous flooring application.
- .3 Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- .4 Concrete substrate shall be properly cured for a minimum of thirty (30) days. A vapour barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.
- .5 Protection of finished flooring system from damage by subsequent trades shall be the responsibility of the Contractor.

1.8 WARRANTY

- .1 Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of substantial performance, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of one (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

Part 2 Products

2.1 RESINOUS FLOORING

- .1 Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include,
 - .1 Must comply with multiple layer broadcast epoxy base with integral quartz aggregate, coloured throughout. Liquid rich, slurry type systems will not be accepted, and will result in a disqualification from bid.
- .2 Products:
 - .1 The Basis of Design: Sikafloor Quartzite Broadcast System with Manufacturer's recommended primer and top coat.
 - .2 Acceptable Substitution: Stonshield SLT®. Substitution information must be provided for Consultant review prior to using another product. Accepted substitutions can be reviewed during construction.
- .3 System Characteristics:
 - .1 Colour and Pattern: Refer to drawings.
 - .2 Wearing Surface: Medium, aggregate size.
 - .3 Base: Shot blasted, 60 grit finish
 - .4 Integral Cove Base: 100 mm.

- .5 Overall System Thickness: Nominal 3 mm.
- .4 System Components: Manufacturer's standard components that are compatible with each other and as follows:
 - .1 Primer and Binder Coat:
 - .1 Material Basis: Sikafloor Duochem 9205. Acceptable substitution: Stonhard Standard Primer.
 - .2 Resin: Epoxy
 - .3 Formulation Description: Two (2) component, 100 percent solids.
 - .4 Application Method: Squeegee and roller.
 - .5 Number of Coats: One (1).
 - .2 Undercoat:
 - .1 Material design basis: Sikafloor Duochem 9205 and Quartzite Broadcast Aggregate system. Acceptable substitution: Stonshield Undercoat
 - .2 Resin: Epoxy
 - .3 Formulation Description: Two (2) component, 100 percent solids.
 - .4 Application Method: Rubber Squeegee or Spring Steel Squeegee.
 - .1 Thickness of Coats: nominal 3 mm.
 - .2 Number of Coats: Two (2).
 - .5 Aggregates: Colour Quartz Aggregate
 - .6 Pattern: Custom with minimum 3 aggregate colours.
 - .3 Top Coat Sealer:
 - .1 Material Basis: Sikafloor 2002. Acceptable Substitution: Stonkote CE4®.
 - .2 Resin: Epoxy
 - .3 Formulation Description: Two (2) component, 100% solids, UV Stable.
 - .4 Type: Clear.
 - .5 Finish: Gloss.
 - .6 Number of Coats: One (1).
 - .7 Texture Level: Medium.
- .5 System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

- .1 Tensile Strength: 9.2 MPa (1,300 psi) per ASTM C307.
- .2 Flexural Strength: 15.9 MPa (2,300 psi) per ASTM C580.
- .3 Water Absorption: < 0.1% per ASTM C413.
- .4 Impact Resistance: > 160 in. lbs. per ASTM D2794.
- .5 Flammability: Self-extinguish per ASTM D635.
- .6 Hardness: 85 to 90, Shore D per ASTM D 2240.

2.2 ACCESSORIES MATERIALS

- .1 Patching and Fill Material: Resinous product of or accepted by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- .2 Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.

Part 3 Execution

3.1 PREPARATION

- .1 General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral pH substrate for resinous flooring application.
- .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 resinous flooring.
 - .1 Mechanically prepare substrates as follows:
 - .1 Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - .2 Comply with ASTM C811 requirements, unless manufacturer's written instructions are more stringent.
 - .2 Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
 - .3 Verify that concrete substrates are dry.
 - .4 Verify that concrete substrates have neutral pH and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- .3 Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- .4 Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- .5 Treat control joints and other non-moving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

3.2 APPLICATION

- .1 General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - .1 Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - .2 Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - .3 At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - .1 Apply joint sealant to comply with manufacturer's written recommendations.
- .2 Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate. Immediately broadcast quartz silica aggregate into the wet coating using manufacturer's specially designed spray caster.
- .3 Integral Cove Base: Stonshield cove mortar, 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, of cove base. Round internal and external corners.
 - .1 Integral Cove Base: 100 mm high.
- .4 Apply by broadcast coat in accordance with Manufacturer's written instructions in thickness indicated for flooring system. Immediately broadcast quartz silica aggregate into the wet coating using manufacturer's specially designed spray caster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.
- .5 Apply topcoats in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 TERMINATIONS

- .1 Chase edges to "lock" the flooring system into the concrete substrate along lines of termination.
- .2 Penetration Treatment: Lap and seal resinous system onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.
- .3 Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.
- .4 Treat floor drains by chasing the flooring system to lock in place at point of termination.

3.4 JOINTS AND CRACKS

- .1 Treat control joints to bridge potential cracks and to maintain monolithic protection.
- .2 Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
- .3 Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.5 FIELD QUALITY CONTROL

- .1 Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.

3.6 CLEANING, PROTECTING, AND CURING

- .1 Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.
- .2 Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.
- .3 Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Definitions: Resinous epoxy floor coating system includes a 100% solids, Low VOC, two component, moisture-tolerant, pigmented, general service, epoxy primer and a 100% solids, Low VOC, two component, moisture tolerant, pigmented, general service epoxy topcoat.

1.2 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-in-place Concrete
- .2 Section 03 35 00 – Concrete Finishing
- .3 Section 07 92 00 - Joint Sealants

1.3 REFERENCES STANDARDS

- .1 ASTM International:
 - .1 ASTM C881/C881M-15, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - .2 ASTM D2240-15, Standard Test Method for Rubber Property-Durometer Hardness.
 - .3 ASTM D2369-10(2015), Standard Test Method for Volatile Content of Coatings
 - .4 ASTM D4060-14, Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
 - .5 ASTM D7234-12, Standard Test Method for Bond Strength of Epoxy Resin Systems used with Concrete Slant Shear
 - .6 ASTM F1869-16a, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - .7 ASTM F2170-16b, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Underwriter's Laboratory Canada:
 - .1 CAN/ULC-S102.2-10, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Manufacturer's Instructions: provide to indicate special handling criteria, installation sequence, cleaning procedures.

- .3 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for high build glazed coatings. Indicate VOC content.
- .4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit duplicate 75 x 75mm samples of each colour and finish coating applied to smooth hardboard.
- .5 Closeout Submittals:
 - .1 Provide maintenance data for coatings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

- .1 No request for substitution shall be considered that would change the generic type of floor system specified (i.e. 100% solids, two-component, epoxy coating). Materials of other manufactures may be substituted only on acceptance of Consultant. Request for substitution will only be considered only if submitted ten (10) days prior to bid date. Request will be subject to specification requirements described in this section.
- .2 Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
 - .1 Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 - .2 Contractor shall have completed at least three (3) projects of similar size and complexity.
 - .3 Pre-authorized installers: Desco, Sika, Stonhard, and Van Mason Coating Ltd.
- .3 Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, and topcoats, through one source from a single manufacturer, with not less than ten (10) years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- .4 Manufacturer Field Technical Service Representatives: Resinous flooring manufacturer shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
 - .1 Field Technical Services Representatives shall be employed by the system manufacture to assist, as required, in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.
- .5 Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

- .1 Apply full-thickness mockups on 10 m² floor area selected by Consultant.
- .2 Allow 24 hours for inspection of mock-up by Consultant and Owner before proceeding with coating work.
- .3 When accepted, mock-up will demonstrate minimum standard for this work. Accepted mockups may become part of the completed Work if undisturbed at time of Substantial Performance of the Work.
- .6 Pre-installation Conference:
 - .1 General contractor shall arrange a meeting not less than thirty (30) days prior to starting work. Attendance:
 - .1 General Contractor
 - .2 Consultant
 - .3 Owner's Representative.
 - .4 Manufacturer/Installer's Representative.
- .7 ISO 9001: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9001 registered quality system.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .1 Deliver and store materials in manner to prevent damage.
 - .2 Ensure materials remain in original wrapping and containers until used.
- .2 Waste Management and Disposal:
 - .1 Dispose of waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 PROJECT CONDITIONS

- .1 Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
 - .1 Maintain material and substrate temperature between 65 and 85 degrees F (18 and 30 degrees C) during resinous flooring application and for not less than 24 hours after application.
- .2 Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- .3 Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- .4 Concrete substrate shall be properly cured for a minimum of thirty (30) days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

- .5 Protection of finished flooring system from damage by subsequent trades shall be the responsibility of the Contractor.

1.8 WARRANTY

- .1 Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of one (1) full year from date of installation.

Part 2 Products

2.1 MATERIALS

- .1 Available Products: Subject to compliance with requirements, products that may be incorporated into the work include,
 - .2 Acceptable Manufacturers,
 - .1 Stonhard - Basis of Design, and Sika.
 - .3 Products: Subject to compliance with requirements:
 - .1 Stonhard; Stonkote GS4 c/w slip resistant texture. Basis of Design. Acceptable Substitution is Sikafloor 261 CA c/w slip resistant texture.
 - .4 System Characteristics:
 - .1 Color: Custom colour to match finish legend.
 - .2 Wearing Surface: Texture # 2
 - .3 Base: Shot blasted, 60 grit finish.
 - .4 Overall System Thickness: 3 mm (1/8")
 - .5 System Components: Manufacturer's standard components that are compatible with each other and as follows:
 - .1 Primer:
 - .1 Material Basis: Stonhard Standard Primer / Stonkote GS4®
 - .1 Resin: Epoxy
 - .2 Formulation Description: Two (2) component, 100 percent solids.
 - .3 Application Method: Squeegee and roller.
 - .4 Number of Coats: One (1).
 - .2 Wear Course:
 - .1 2 broadcast, sand saturated layers using 15 mil epoxy each layer. Sand to be 30 mesh round, not angular.
 - .3 Top Coat:
 - .1 Material Basis: Stonkote GS4®.
 - .2 Resin: Epoxy

- .3 Formulation Description: Two (2) component, 100% solids.
 - .4 Application Method: Squeegee and roller.
 - .5 Finish: Topcoat achieving medium texture. Provide samples for acceptance.
 - .6 Number of Coats: one (1).
- .4 Approvals: Components listed above are the basis of design intent; all bids will be compared to this standard including resin chemistry, color, surface, thickness, and installation procedures, including number of coats. Contractor shall be required to comply with all the requirements of the Specifications and all of the components required by the Specifications, whether or not such products are specifically listed above.
- .6 System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
- .1 Abrasion Resistance: 0.02 gm max. weight loss per ASTM D4060, CS-17
 - .2 Bond Strength: ASTM D7234, > 400psi (100% concrete failure)
 - .3 Hardness: 80 to 85, Shore D per ASTM D2240.
 - .4 VOC Content: 0 g/L per ASTM D2369
 - .5 Flammability: to CAN/ULC-S102.2; Flame Spread 0, Smoke Developed 34

2.2 ACCESSORY MATERIALS

- .1 Patching and Fill Material: Resinous product of or accepted by resinous flooring manufacturer and recommended by manufacturer for application indicated.
 - .1 Basis of Design: Stonhard "Stonset PM5". Acceptable Substitution is Sika Duochem 8107.
- .2 Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.
 - .1 Basis of Design: Stonhard "Stonflex MP7". Acceptable Substitution is Sikaflex 2c NS EZ Mix TG.

2.3 MIXES

- .1 Mix coatings according to manufacturer's instructions.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

- .1 General: Shot blast concrete to 60 grit finish. Provide clean, dry, and neutral pH substrate for resinous flooring application.
- .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 resinous flooring.
 - .1 Comply with ASTM C811/C881M requirements, unless manufacturer's written instructions are more stringent.
- .3 Bring damage to the attention of the Consultant. Upon instruction repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
- .4 Verify that concrete substrates are dry.
 - .1 Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
 - .2 Perform anhydrous calcium chloride test, ASTM F1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. of slab in 24 hours.
 - .3 Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- .5 Verify that concrete substrates have neutral pH and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- .6 Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- .7 Use patching and fill material to fill minor holes and depressions in substrates according to manufacturer's written instructions.
- .8 Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

3.3 APPLICATION

- .1 General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic surface of thickness indicated, uninterrupted except at expansion joints or other types of joints (if any), indicated or required.
- .2 Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates. Primer shall be applied in one coat at 6-8 mils thickness immediately after mixing using high quality medium nap rollers. Coordinate timing of primer application with application of flooring system to ensure optimum inter-coat adhesion.

- .3 Apply by broadcast coat in accordance with Manufacturer's written instructions in thickness indicated for flooring system. Immediately broadcast quartz silica aggregate into the wet coating using manufacturer's specially designed spray caster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.
- .4 Topcoat: Mix material according to manufacturer's recommended procedures. Topcoat material shall be applied in two coats at 6-8 mils per coat immediately after mixing using high quality medium nap rollers. Strict adherence to manufacturer's coverage rates shall be maintained.

3.4 FIELD QUALITY CONTROL

- .1 Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.
 - .1 Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - .2 Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - .3 If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.
- .2 Final installation will be subject to review and by both the Consultant and Owner. Deficiencies are to be documented for remedial action and sign off. Complete any requested remedial work as required to achieve acceptance.

3.5 CLEANING, PROTECTING AND CURING

- .1 Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.
- .2 Contractor shall protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application.
- .3 Cleaning: Contractor shall remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 09 21 16 - Gypsum Board

1.2 REFERENCES STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-04, Architectural Coatings.
 - .2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .6 Underwriter Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Product Data: Submit manufacturer's technical data for each acoustic material required, including installation and maintenance instructions.
- .3 Samples for Verification: Submit the following samples for each acoustic treatment type specified for verification by Consultant of products supplied to the Project:

1.4 QUALITY ASSURANCE

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct one representative mock-up of each type acoustical wall treatment system.
- .3 Construct mock-up of one full panel minimum to indicate method of assembly, installation and fixing.
- .4 Construct mock-up where directed.

- .5 Allow 24 hours for inspection of mock-up by Consultant before proceeding with work.
- .6 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work if no deficiencies are noted by the Consultant..
- .7 Materials and products in accordance with Section 01 35 43 - Environmental Procedures.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Commence installation after building enclosed and dust-generating activities are completed.
- .2 Permit wet work to dry prior to commencement of installation.
- .3 Maintain uniform minimum temperature of 15 degrees C and relative humidity of 20-40% prior to, during and after installation.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Acoustical construction products must:
 - .1 Not require being labelled as poisonous, corrosive, flammable or explosive under Consumer Chemical and Container Regulations of the Hazardous Products Act.
 - .2 Be accompanied by detailed instructions for proper handling and maintenance so as to minimize health concerns.
- .2 Acoustic units – Fabric Faced, Impact Resistant 6 PCF Fibreglass
 - .1 Acoustic core material: to CAN/CGSB-92.1.
 - .1 Size: refer to drawings
 - .2 Fabric finish: as indicated.
 - .3 Flame spread class of 25 or less passing CAN/ULC – S102.
 - .4 NRC designation of 1.10.
 - .5 Metal support clips: roll formed galvanized steel to acoustic unit supplier's standard, allowing non-destructive de-mounting.
- .3 Cementitious wood fibre acoustic units: to CAN/CGSB-92.1.
 - .1 Standard units: 38 mm thick and as dimensioned on drawings, bevel-butted edged painted finish, standard white NRC designation of 0.85.
 - .2 Flame spread rating of 25 or less passing CAN/ULC S102.
 - .3 Urea-formaldehyde free.

- .4 Pre-approved manufacturer: Tectum
- .4 Adhesive: type recommended by acoustic unit manufacturer.
- .5 Staples, nails and screws: to CSA B111, non-corrosive finish, type recommended by acoustic unit manufacturer.
- .6 Select paints that provide reduced environmental impacts as described in section 09 91 23 - Interior Painting. Ensure that selected paint materials will not compromise the acoustical properties of wall treatments.

2.2 FABRICATION

- .1 Type 1 (AP1): Fabric faced demountable acoustic units:
 - .1 Fabric bonded to the face, edges and back of core, square of corners tailored, square edge profile.
 - .2 Colour to be from manufacturer's standard range.
- .2 Type 2 (AP2): Cementitious wood fibre acoustic units:
 - .1 Aspen wood fibres bonded with inorganic hydraulic cement binder.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Ensure substrate surface is straight to tolerance of plus or minus 3 mm over 3000 mm.
- .2 Install acoustic units to clean, dry and firm substrate using screws.
- .3 Install acoustic units plumb and aligned. Arrange units as indicated. Cut units to be at least 50 % of unit width.
- .4 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.
- .5 Install fibrous acoustical media and spacers over entire area behind perforated acoustic units.

3.3 FIELD QUALITY CONTROL

- .1 Inspections:
 - .1 Inspection and testing of acoustic application will be carried out by a third party inspection agency certified to perform inspections to confirm Sound Transmission Class (STC) ratings of designated acoustic rooms.
 - .2 Contractor will pay for inspections at completion of acoustic rooms, prior to Substantial Completion. Inspection costs to include travel, living allowance, site inspections, testing and reports.

- .3 If acoustic rooms perform lower than the noted STC ratings, Contractor to pay for all remediation to construction and retesting by the same inspection agency until STC levels are met.
- .4 Rooms 102, 103, 104, 109, 116, 131 and 132, 148, 168, 169, 170, and 171 are to be tested to STC 50. Rooms 131 and 132 are considered one (1) room. Rooms 169, 170, and 171 are considered one (1) room.

.2

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Keep acoustic installation and all components clean. Remove blemishes immediately.

3.5 PROTECTION

- .1 Use polyethylene cardboard to protect finished acoustical wall treatment from damage.
- .2 Remove prior to substantial completion.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENT

- .1 Section 05 05 19 – Common Work Results for Metalwork Finishing
- .2 Section 09 97 19 – Painting Exterior Metal Surfaces

1.2 REFERENCES STANDARDS

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current issue.
 - .2 Standard GPS-1-12, MPI Green Performance Standard.
 - .3 Standard GPS-2-12, MPI Green Performance Standard.
- .5 National Fire Code of Canada.
- .6 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications, SSPC Painting Manual 2005.
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2016, Architectural Coatings.
- .8 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractor: to have a minimum of five (5) years proven satisfactory experience. When requested, provide list of last three (3) comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

- .4 Conform to latest MPI requirements for exterior painting work including preparation and priming.
- .5 Materials: in accordance with MPI Painting Specification Manual Approved Products listing and from a single manufacturer for each system used.
- .6 Paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
- .7 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.
- .8 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 PERFORMANCE REQUIREMENTS

- .1 Environmental Performance Requirements:
 - .1 Provide paint products meeting MPI Environmentally Friendly E1 E2 E3 ratings based on VOC (EPA Method 24) content levels.
 - .2 Green Performance in accordance with MPI Standard GPS-1.

1.5 SCHEDULING

- .1 Submit work schedule for various stages of painting to Consultant for review. Submit schedule minimum of forty-eight (48) hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about building.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Upon completion, submit records of products used. List products in relation to finish system 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 Manufacturer's Material Safety Data Sheets (MSDS).

- .4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit duplicate 200 x 300mm sample panels of each paint special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards.
 - .2 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.
 - .3 Submit full range of available colours where colour availability is restricted.

1.7 QUALITY CONTROL

- .1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 When requested by Consultant or Paint Inspection Agency, prepare and paint designated surface, area, room or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When accepted, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 MAINTENANCE

- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one (1) 4 litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
 - .1 Deliver and store materials in original containers, sealed, with labels intact.
 - .2 Labels: to indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
 - .3 Remove damaged, opened and rejected materials from site.
 - .4 Provide and maintain dry, temperature controlled, secure storage.
 - .5 Observe manufacturer's recommendations for storage and handling.
 - .6 Store materials and supplies away from heat generating devices.
 - .7 Store materials and equipment in well ventilated area with temperature range 7°C to 30°C.
 - .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

- .9 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.
- .10 Remove paint materials from storage only in quantities required for same day use.
- .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .12 Fire Safety Requirements:
 - .1 Provide one 9kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
 - .2 Paint and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and regional levels of government.
 - .3 Material which 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 the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground, the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .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 Empty paint cans are to be dry prior to disposal or recycling (where available).
 - .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
 - .7 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by individuals, for verifiable re-use or re-manufacturing.

- .8 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.10 AMBIENT CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 degrees C for twenty-four (24) hours before, during and after paint application until paint has cured sufficiently.
 - .2 Where required, provide continuous ventilation for seven (7) days after completion of application of paint.
 - .3 Co-ordinate use of existing ventilation system with Owner and ensure its operation during and after application of paint as required.
 - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
 - .5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities to be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10°C.
 - .2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .4 Relative humidity is above 85% or when dew point is less than 3°C variance between air/surface temperature.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .2 Perform no painting work when maximum moisture content of substrate exceeds:
 - .1 12% for concrete and masonry (concrete block).
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
 - .3 Conduct moisture tests using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple cover patch test.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.

- .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
- .5 Do not apply paint when:
 - .1 Temperature is expected to drop below 10°C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
- .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
- .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations such that painted surfaces will have dried and cured sufficiently before occupants are affected.

Part 2 Products

2.1 MATERIALS

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems: to be products of single manufacturer.
- .3 Only qualified products with E2 E3 Environmentally Friendly ratings are acceptable for use on this project.
- .4 Use only MPI listed L rated materials.
- .5 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
 - .1 Be water-based water-soluble water clean-up.
 - .2 Be non-flammable biodegradable.
 - .3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
 - .4 Be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 Do not contain methylene chloride chlorinated hydrocarbons toxic metal pigments.
- .6 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet

requirements of applicable governmental acts, bylaws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

- .7 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .8 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61.0°C or greater.
- .9 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
 - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .10 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.
- .11 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.
 - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 COLOURS

- .1 Custom colours may be required based on paint manufacturer used. Refer to drawings.
- .2 Second coat in three-coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Consultant's written permission.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.

- .4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees/	Units @ 85 Degrees/
G1 – matte finish	0 to 5	max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	85	

- .2 Gloss level ratings of painted surfaces as specified.

2.5 EXTERIOR PAINTING SYSTEMS

- .1 Asphalt Surfaces: zone/traffic marking for drive and parking areas, etc.
 - .1 EXT 2.1A - Latex zone/traffic marking finish.
 - .2 EXT 2.1B - Alkyd zone/traffic marking finish.
- .2 Structural Steel and Metal Fabrications:
 - .1 EXT 5.1G - Pigmented polyurethane finish (over epoxy zinc rich primer and high build epoxy).
 - .2 EXT 5.1P - Pigmented polyurethane finish (over epoxy zinc rich primer).
- .3 Steel - High Heat: heat exchangers, breeching, pipes, flues, stacks, etc., with temperature range as noted
 - .1 EXT 5.2D - High heat resistant coating, maximum 593°C.
- .4 Galvanized Metal: not chromate passivated
 - .1 EXT 5.3D - Pigmented polyurethane finish for use in high contact/high traffic areas.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

- .1 Exterior repainting work: inspected by MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency minimum of one (1) week prior to commencement of work and provide copy of project repainting specification and Finish Schedule.
- .2 Exterior surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Consultant and Contractor in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .3 Where assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.
- .4 Where "special" repainting or recoating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer to provide as part of work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Owner.

3.3 PREPARATION

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Painting Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.
 - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water-based paints.
 - .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
- .4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminants from

surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

- .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .6 Do not apply paint until prepared surfaces have been accepted by Consultant.
- .7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

3.4 PROTECTION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Consultant.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Remove light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.
- .5 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .6 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas.

3.5 APPLICATION

- .1 Apply paint by brush roller, air sprayer, or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray Application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
- .4 Brush out immediately runs and sags.
- .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Consultant.
- .5 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Co-ordinate painting of exterior mechanical piping with Section 23 05 05 – Installation of Pipework.
- .2 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, duct work and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
- .3 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .4 Do not paint over nameplates.
- .5 Paint fire protection piping red.
- .6 Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.

3.7 FIELD QUALITY CONTROL

- .1 Inspection:
 - .1 Field inspection of exterior painting operations to be carried out by independent inspection firm as designated by Consultant.
 - .2 Advise inspection agency when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
 - .3 Cooperate with inspection firm and provide access to areas of work.
- .2 Manufacturer's Field Services:
 - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.9 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Material and installation of site applied paint finishes to new interior surfaces, including site painting of shop primed surfaces.
 - .2 Sustainable requirements for construction and verification

- .2 Related Requirements
 - .1 Section 09 96 00 – High Build Coating
 - .2 Section 09 91 23 – Exterior Painting

1.2 REFERENCES STANDARDS

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, current issue.
 - .2 Standard GPS-1-12, MPI Green Performance Standard.
 - .3 Standard GPS-2-12, MPI Green Performance Standard.
- .5 National Fire Code of Canada - 1995
- .6 Society for Protective Coatings (SSPC)
 - .1 SSPC Painting Manual, Volume 2, 8th Edition, Systems and Specifications Manual.
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2016, Architectural Coatings.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractor: minimum of five (5) years proven satisfactory experience. Provide list of last three (3) comparable jobs including, job name and location, specifying authority, and project manager.

- .2 Journeymen: qualified journeymen who have Tradesman Qualification Certificate of Proficiency engaged in painting work.
- .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.
- .2 Mock-Ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .1 Provide 3000 mm x 3000 mm mock-up. Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
 - .2 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
 - .3 Locate where directed.
 - .4 Allow twenty-four (24) hours for inspection of mock-up before proceeding with work.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Accepted mock-up may remain as part of finished work.

1.4 SCHEDULING

- .1 Submit work schedule for various stages of painting to Consultant for review. Submit schedule minimum of forty-eight (48) hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit electronic copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
- .3 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
 - .2 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.

- .3 Retain reviewed samples on site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .1 Lead, cadmium and chromium: presence of and amounts.
 - .2 Mercury: presence of and amounts.
 - .3 Organochlorines and PCBs: presence of and amounts.
- .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's application instructions.
- .7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one - four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Delivery, storage and protection: comply with Consultant requirements for delivery and storage of extra materials.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.

- .4 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with temperature range 7°C to 30°C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
 - .1 Provide one (1) 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC-approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .4 Separate for recycling and place in designated containers waste in accordance with Waste Management Plan.
 - .5 Place materials defined as hazardous or toxic in designated containers.
 - .6 Handle and dispose of hazardous materials in accordance with Regional and Municipal, regulations.
 - .7 Ensure emptied containers are sealed and stored safely.
 - .8 Unused paint and coating materials must be disposed of at official hazardous material collections site.
 - .9 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
 - .10 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
 - .11 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

- .12 To reduce amount of contaminants entering waterways, sanitary/storm drain systems, or into ground, follow these procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .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 approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .13 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .14 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by employees, for verifiable re-use or re-manufacturing.

1.8 SITE CONDITIONS

- .1 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless pre-approved written approval by Specifying body and product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10°C.
 - .2 Substrate temperature is above 32°C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is under 85% or when the dew point is more than 3°C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3°C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .6 Ensure that conditions are within specified limits during drying or curing process, until newly-applied coating can itself withstand normal adverse environmental factors.
 - .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of twenty-eight (28) days.
 - .2 12% for concrete and masonry (concrete block).
 - .3 15% for wood.
 - .4 12% for gypsum board.

- .3 Test for moisture using calibrated electronic moisture meter. Test concrete floors for moisture using cover patch test.
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .2 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .3 Additional interior application requirements:
 - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
 - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Consultant such that painted surfaces will have dried and cured sufficiently before occupants are affected.

Part 2 Products

2.1 MATERIALS

- .1 Materials and resources in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .3 Provide paint materials for paint systems from single manufacturer.
- .4 Only qualified products with E2 E3 Environmentally Friendly rating are acceptable for use on this project.
- .5 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .6 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual Approved Product listing.
- .7 Provide paint products meeting MPI Environmentally Friendly E2 E3 ratings based on VOC (EPA Method 24) content levels.
- .8 Use MPI listed materials having minimum E2 E3 rating where indoor air quality (odour) requirements exist.
- .9 Paints, coatings, solvents, cleaners, lubricants, and other fluids:
 - .1 Water-based.
 - .2 biodegradable.

- .3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
- .4 Manufactured without compounds which contribute to smog in the lower atmosphere.
- .5 Do not contain methylene chloride, chlorinated hydrocarbons, or toxic metal pigments.
- .10 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .11 Flash point: 61.0 degrees C or greater for water-borne surface coatings.
- .12 Ensure manufacture and process of water-borne surface coatings does not release:
 - .1 Matter in undiluted production plant effluent generating Biochemical Oxygen Demand (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.
- .13 Water-borne paints and stains, and water borne varnishes to meet minimum Environmentally Friendly E2 rating.

2.2 COLOURS

- .1 Colours: as indicated.
- .2 Where specific products are available in restricted range of colours, selection based on limited range unless noted otherwise.
- .3 Second coat in three-coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written acceptance from Consultant for tinting of painting materials.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
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Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as specified.

2.5 INTERIOR PAINTING SYSTEMS

- .1 Concrete horizontal surfaces: floors and concrete ceilings:
 - .1 INT 3.1A – Latex G5.
 - .2 INT 3.1P – Epoxy High Build G6.
- .2 Concrete masonry units:
 - .1 INT 4.2D – High performance architectural latex G3 finish.
 - .2 INT 4.2R – Epoxy High Build G6.
- .3 Structural steel and metal fabrications: columns, beams, joists:
 - .1 INT 5.1R High Performance Architectural latex G5.
- .4 Steel - high heat (boilers, furnaces, heat exchangers, breeching, pipes, flues, stacks, etc., with temperature range as noted):
 - .1 INT 5.2A - Heat resistant enamel finish, maximum 205 degrees C.
- .5 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
 - .1 INT 5.3M - High performance architectural latex G5 finish.
- .6 Wood Paneling and Casework: partitions, panels, shelving, millwork:
 - .1 INT 6.4M – W.B. Varnish, Clear acrylic G5.
- .7 Plaster and gypsum board: gypsum wallboard, drywall, sheet rock-type material and textured finishes:
 - .1 INT 9.2B - High performance architectural latex G3 finish.
- .8 Acoustic panels and tiles:
 - .1 INT 9.3E High performance architectural latex G1 finish.
- .9 Canvas and cotton coverings.
 - .1 INT 10.10 – Institutional low odour/VOC G5 finish.

2.6 SOURCE QUALITY CONTROL

- .1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.
 - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 EXAMINATION

- .1 High Build Coating to be inspected by MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency minimum of one (1) week prior to commencement of work and provide copy of project repainting specification and Finish Schedule. Surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Consultant and Owner in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .2 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .3 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple cover patch test. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .4 Maximum moisture content as follows:
 - .1 Gypsum board: 12%.

- .2 Concrete: 12%.
- .3 Concrete Block: 12%.
- .4 Wood: 15%.

3.4 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Consultant.
 - .2 Protect items that are permanently attached such as fire labels on doors and frames.
 - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place WET PAINT signs in occupied areas as painting operations progress.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove

traces of blast products from surfaces, pockets and corners to be painted by blowing with clean dry compressed air.

- .6 Touch up of shop primers with primer as specified.
- .7 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.5 APPLICATION

- .1 Method of application to conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects and provide better adhesion of coats.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish top, bottom, edges and cut-outs of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Coordinate painting of mechanical piping with Section 23 05 05 – Installation of Pipework
- .2 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .3 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .4 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .5 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .6 Do not paint over nameplates.
- .7 Keep sprinkler heads free of paint.
- .8 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .9 Paint fire protection piping red.
- .10 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .11 Paint natural gas piping yellow.
- .12 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .13 Do not paint interior transformers and substation equipment.

3.7 SITE TOLERANCES

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.8 FIELD QUALITY CONTROL

- .1 Interior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify Paint Inspection Agency a minimum of one (1) week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.
- .2 Interior surfaces requiring painting shall be inspected by Paint Inspection Agency who shall notify Consultant and General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.

- .3 Where 'special' painting, coating, or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Owner.
- .4 Standard of Acceptance:
 - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .5 Field inspection of painting operations to be carried out by independent inspection firm as designated by Consultant or Owner.
- .6 Advise Consultant when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been reviewed.
- .7 Cooperate with inspection firm and provide access to areas of work.
- .8 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Consultant.

3.9 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

END OF SECTION

1. General

1.1 RELATED REQUIREMENTS

- .1 Section 08 11 00 – Metal Doors and Frames
- .2 Section 08 32 00 Steel Detention Doors

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D638-14, Standard Test Method for Tensile Properties of Plastics.
 - .2 ASTM D1044-13, Standard Test Method for Resistance of Transmission Plastics to Surface Abrasion.
 - .3 ASTM E84-16, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .4 ASTM E96/E96M-16, Standard Test Method for Water Vapor Transmission of Materials.
- .2 Underwriters' Laboratory of Canada
 - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit product data in accordance with Division 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit proof that product does not exceed Flame Spread 25 and Smoke Developed 50 in conformance with CAN/ULC-S102 and carries ULC or cUL rating.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Division 01. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for high build glazed coatings. Indicate VOC content.
- .4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.
- .5 Provide duplicate 300 x 300 mm samples of each colour and finish, coating applied to plywood.

1.4 FIELD MOCK-UPS

- .1 Construct mock-ups in accordance with Division 01.
- .2 Apply coating of each metal door, frame and steel detention door.
- .3 Allow twenty-four (24) hours for inspection of mock-up by Consultant and Owner before proceeding with coating work.
- .4 Mock-ups are to be repeated as required by Consultant and Owner to establish and act as the level

of acceptance for finished work.

- .5 Accepted mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 ENVIRONMENTAL REQUIREMENTS

.1 Ventilation.

- .1 Provide ventilation continuously during and after coating application. Run system twenty-four (24) hours per day during application; provide continuous ventilation for seven (7) days after completion of application.
- .2 Ventilate enclosed spaces in accordance safety procedures to protect worker health and safety.

2. Products

2.1 MATERIALS

- .1 Interior high build coating materials: Sika, Base of Design Sikagard Duroplast 100 N. Acceptable substitution: Carboline Carboguard 890.
 - .1 Colours: Up to three custom colours to be selected by Consultant.
 - .2 Fire Hazard Classification, CAN/ULC S-102:
 - .1 Maximum Flame Spread 25
 - .2 Smoke Density 110
 - .3 Hardness Barcol: 60
 - .4 % solids by weight: 94
 - .5 Scrubbability: Unaffected at 10,000 cycles.
 - .6 Gloss ASTM D523: 16% increase after 10,000 cycles.
 - .7 Permeability: to ASTM E96/E96M, 0.89 perms max.
 - .8 Abrasion Resistance: to ASTM D4060 (using Taber Abrasion Test CS-17), 80mg weight loss.
 - .9 Elongation: to ASTM D638, minimum 3.5% at 350 microns thick (14 mils)
 - .10 Tensile Strength: to ASTM D638, 20.5 MPa minimum (2,975 psi)
 - .11 Chemical Resistance: resistant to sulphuric acid.
- .2 All material must have been tested in conformance with CAN/ULC-S102 and have ULC certification. UL and ATSM E84 testing alone will not be accepted.
- .3 Primer: Sika, Base of Design, Sikagard Cor-Pro 470 as recommended by high build coating manufacturer and coordinated with door, frame and steel detention door manufacturers. Acceptable substitution: Carboline Rustbond Primer.

2.2 MIXES

- .1 Mix coatings according to manufacturer's instructions.

3. Execution

3.1 FIELD QUALITY CONTROL

.1 Inspections:

- .1 Inspections and testing of High Build Coating (HBC) to be carried out by a third-party inspection agency, Master Painter's Institute (MPI) Accredited Paint Inspection Agency, (inspector) acceptable to specifying authority and local Painting Contractor's Association.
- .2 Contractor will coordinate three (3) HBC inspections before first application to review moisture levels, after primer application to review specification requirements, and after second HBC application. Inspection costs to include travel, living allowance, site inspections, testing and reports.
- .3 Contractor to schedule Paint Inspection Agency minimum of one (1) week prior to commencement of work. The scheduled work is not to commence before receiving the report and ensuring all criteria are met.
- .4 Surfaces requiring re-application: inspected by both painting contractor and Paint Inspection Agency who will notify Consultant and Owner in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .5 Owner review will determine level of acceptance from a mockup installation which may be used as part of the final application.

3.2 PREPARATION

- .1 Prepare surfaces in accordance with coating material manufacturer's instructions.
- .2 Mask surrounding surfaces to provide neat, clean juncture lines.
- .3 Protect adjacent surfaces and equipment from damage by overspray.
- .4 Doors and frames to be cleaned and prepared to provide 0.5 mil anchor profile using SP2 or SP3 method. Approved epoxy primer to be used and warranted by the high build coating manufacturer.
- .5 High build coating manufacturer to coordinate primers used on metal doors, frames and steel detention doors with high build coating finish as noted in the door schedule.

3.3 WALL APPLICATION

- .1 Apply coating to produce smooth surface, uniform in semi-gloss sheen, colour and finish, free from marks, dirt, particles, runs, crawls, curling, pinholes, air pockets and other defects and to achieve smoothness index in accordance with CAN/CGSB-1.186.
- .2 Apply two glaze coats to minimum total dry film thickness of 12 (250 microns) mils.
- .3 Verify thickness using appropriate gauges to the satisfaction of the Consultant.

- .4 Doors and frames to be spray finished after all work is complete.

3.4 CLEANING

- .1 Clean surfaces to coating manufacturer's printed instructions and following procedures identified in Division 01 and Section 09 91 23 – Interior Painting.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 22 00 – Concrete Unit Masonry

1.2 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.186-1996, High Performance Glazed Coating System, Interior.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C413-01(2006), Standard Test Method for Absorption of Chemical Resistant Mortars, Grouts and Monolithic Surfacing
 - .2 ASTM D-2794, Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
 - .3 ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness
 - .4 ASTM D2369, Standard Test Method for Volatile Content of Coatings
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-16, Architectural Coatings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions: provide to indicate special handling criteria, installation sequence and cleaning procedures. Manufacturer to certify in writing the installer is qualified to apply their wall coating system.
- .3 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01- Hazardous Materials. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for high build glazed coatings. Indicate VOC content.
- .4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit duplicate 400 x 200 mm samples of each colour and finish, coatings applied to gypsum dry-wall wallboard and porous concrete block.
- .5 Closeout Submittals:
 - .1 Provide maintenance data for coatings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 QUALITY ASSURANCE

- .1 No request for substitution shall be considered that would change the generic type of wall system specified (i.e. two-coat solvent-based, unmodified epoxy wall coating system). Equivalent materials of other manufacturers may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section.
- .2 Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous wall coating systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous wall coating manufacturer.
 - .1 Engage an installer who is certified in writing by resinous wall coating manufacturer as qualified to apply resinous wall coating systems indicated.
 - .2 Installer shall have completed at least 10 projects of similar size and complexity.
- .3 Source Limitations: Obtain primary resinous wall coating materials, including primers, resins, hardening agents, and topcoats, through one source from a single manufacturer, with not less than ten (10) years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- .4 Manufacturer Field Technical Service Representatives: Resinous wall coating manufacturer shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
 - .1 Field Technical Services Representatives shall be employed by the system manufacture to assist, as required, in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.
- .5 Mock-ups: Apply mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - .1 Apply full-thickness mock-ups on 10 m² wall area selected by Consultant.
 - .2 Allow seventy-two (72) hours for inspection of mock-up by Owner's Representative before proceeding with coating work.
 - .3 When accepted, mock-up will demonstrate minimum standard for this work. Accepted mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.
- .6 Pre-installation Conference:
 - .1 General contractor shall arrange a meeting not less than thirty (30) days prior to starting work. Attendance:
 - .1 General Contractor
 - .2 Architect/Owner's Representative.
 - .3 Manufacturer/Installer's Representative.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
 - .1 Deliver and store materials in manner to prevent damage.
 - .2 Ensure materials remain in original wrapping and containers until used.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 SITE CONDITIONS

- .1 Safety:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.
 - .2 Ensure no open flame heating devices are used.
 - .3 Discourage occupancy of treated space until volatile materials are no longer being emitted and there is no odour.
 - .4 Provide adequate respiratory protection to exposed individuals.
- .2 Ventilation:
 - .1 Provide ventilation continuously during and after coating application. Run system twenty-four (24) hours per day during application; provide continuous ventilation for seven (7) days after completion of application.
 - .2 Ventilate enclosed spaces in accordance with safety procedures to protect worker health and safety.
- .3 Project Conditions:
 - .1 Environmental Limitations: Comply with resinous wall coating manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous wall coating application.
 - .1 Maintain material and substrate temperature between 65°F and 85°F (18°C and 30°C) during resinous wall coating application and for not less than twenty-four (24) hours after application.
 - .2 Concrete or masonry substrates shall be properly cured for a minimum of twenty-eight (28) days and shall be tested to ensure relative humidity or water vapour emission rates are in accordance with Manufacturer's recommendations. A vapour barrier or exterior applied waterproofing membrane must be present for concrete walls below grade.
 - .3 Drywall / gypsum board substrates shall be finished to a Level 3 finish. All joint compound shall be setting type compound and shall be dried for the minimum period as per Manufacturer's recommendations prior to over coating.
 - .4 Utilities, including electric, water, heat (air temperature between 60°F and 85°F (16°C and 30°C) and finished lighting to be supplied by General Contractor. If permanent lighting is not in place, simulate permanent lighting conditions during resinous wall coating application.

- .5 Job area to be free of other trades during, and for a period of twenty-four (24) hours, after wall coating installation.
- .6 Protection of finished wall coating from damage by subsequent trades shall be the responsibility of the General Contractor.

1.7 WARRANTY

- .1 Manufacturer shall furnish a single written warranty covering both material and workmanship, for a period of (1) full year from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

Part 2 Products

2.1 MATERIALS

- .1 Available Products: Subject to compliance with requirements, products that may be incorporated into the work include,
 - .1 Must comply with multiple layer, high build epoxy glazed wall coating. Water based, acrylic or urethane modified epoxy wall coatings will not be accepted.
- .2 Acceptable Manufacturers,
 - .1 Sika, Basis of Design. Acceptable substitutions by Stonhard.
- .3 Products: Subject to compliance with requirements:
 - .1 Sika: Sikagard Duroplast 100N. Basis of Design. Acceptable substitution: Stonglaze VSR.
- .4 System Characteristics:
 - .1 Color and Pattern: From Manufacturers standard colour palette.
 - .2 Surface: Smooth
 - .3 Overall System Thickness: nominal 12-15 mil
- .5 System Components: Manufacturer's standard components that are compatible with each other and as follows:
 - .1 Primer:
 - .1 Concrete Substrates:
 - .1 Material Basis of Design: Sikagard Duroplast EE. Acceptable substitution: Stonglaze E4.
 - .2 Resin: Epoxy
 - .3 Formulation Description: two-component, 68% percent solids.
 - .4 Application Method: Roller.
 - .5 Thickness of Coats: 20 mils wet film thickness.
 - .6 Number of Coats: Two (2), for higher absorbancy substrates.
 - .2 Block Filler:

- .1 Material Basis of Design: Sikaguard Duroplast EE. Acceptable substitution: Sanitile 500 by Carboline.
- .2 For extensive block filling use Sika Duochem 8107 over base block filler.
- .3 Resin: Epoxy
- .4 Formulation Description: Two-component, water-based, 53% solids.
- .5 Application Method: Roller or Airless Spray
 - .1 Thickness of Coats: 5-20 mils; film thickness dependent upon condition/porosity of substrate.
 - .2 Number of Coats: Two (2)
- .3 Wall Coating:
 - .1 Material Basis of Design: Sikagard Duroplast 100N. Acceptable substitution: Stonglaze E4.
 - .2 Resin: Epoxy
 - .3 Formulation Description: Two-component, 94% solids.
 - .4 Application Method: Roller or Airless Spray and Backroll.
 - .1 Thickness of Coats: nominal 5 - 6 mils.
 - .2 Number of Coats: Two.
 - .5 Surface: Smooth
- .4 Approvals:
 - .1 Components listed above are the basis of design intent; all bids will be compared to this standard including resin chemistry, color, surface, thickness, and installation procedures, including number of coats. Contractor shall be required to comply with all the requirements of the Specifications and all of the components required by the Specifications, whether or not such products are specifically listed above.
- .6 System Physical Properties: Provide resinous wall coating system with the following minimum physical property requirements when tested according to test methods indicated:
 - .1 Temperature Limitations: 60°C (Continuous) 93°C (Intermittent)
 - .2 Water Absorption: < 1% permeability in 24h ASTM C 413.
 - .3 Impact Resistance: > 11.6 lb-in per ASTM D3029.
 - .4 Flammability: Class A per ASTM E84.
 - .5 Flame Spread: 20 per CAN/ULC S102-10
 - .6 Smoke Developed: 40 per CAN/ULC S102-10
 - .7 Hardness: 80 to 85, Shore D per ASTM D 2240.
 - .8 VOC Content: < 100 g/L per ASTM D 2369

2.2 ACCESSORY MATERIALS

- .1 Patching and Fill Material: Resinous product of or approved by resinous wall coating manufacturer and recommended by manufacturer for application indicated.

- .1 Basis of Design: Sika Duochem 8107. Acceptable substitution: Stonhard “Stonset PM5”.
- .2 Joint Sealant: Type recommended or produced by resinous wall coating manufacturer for type of service and joint condition indicated.
 - .1 Basis of Design: Sikaflex 2c NS EZ Mix TG. Acceptable substitution: Stonhard “Stonflex MP7”.

2.3 MIXES

- .1 Mix coatings according to manufacturer's instructions.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

- .1 Prepare surfaces in accordance with CAN/CGSB-1.186 and coating material manufacturer's instructions.
- .2 Mask surrounding surfaces to provide neat, clean juncture lines.
- .3 Protect adjacent surfaces and equipment from damage by overspray.
- .4 Drywall / Gypsum Substrate: Drywall shall be level, true, plumb and finished to a Level 4 standard prior to application of wall coatings. The surface shall be inspected with critical lighting to ensure the substrate is ready for wall coating application. The surface shall be prepared by mechanical means and may include sanding, wiping and / or vacuuming for removal of bond inhibiting materials such as dust or other bond inhibiting material(s). General contractor shall approve wall finish to Level 3 and suitability for high gloss finish prior to coating application.
- .5 Concrete Substrate: Concrete preparation shall be by mechanical means and may include use of grinder and / or sander for removal of bond inhibiting materials such as curing compounds, dust, form release agents or laitance. Other contaminants not otherwise removed by means of mechanical surface preparation shall be removed by scrubbing with a heavy-duty industrial degreaser as recommended by High Build Coating Manufacturer and rinsing with clean water. General contractor shall approve concrete preparation to ICRI Concrete Surface Profile 1 minimum prior to coating application.
 - .1 Verify that concrete substrates are dry.
 - .1 Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
 - .2 Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.

- .2 Verify that concrete substrates have neutral pH and that resinous wall coating will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- .6 Resinous Materials: Mix components and prepare materials according to resinous wall coating manufacturer's written instructions.
- .7 Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

3.3 APPLICATION

- .1 General: Apply components of resinous wall coating system according to manufacturer's written instructions to produce a smooth surface, uniform in semi-gloss sheen, colour and finish, free from marks dirt, particles, runs, crawls, curling, pinholes, air pockets and other defects to achieve smoothness in accordance with CAN/CGSB-1.186-M89 and a monolithic wearing surface of thickness indicated.
 - .1 Coordinate application of components to provide optimum adhesion of resinous wall coating system to substrate, and optimum inter-coat adhesion.
 - .2 Cure resinous wall coating components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- .2 Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.
- .3 Apply minimum number of coats indicated for wall coating system and at spreading rates and methods of application recommended in writing by manufacturer. Actual number of coats is not significant to this section. High build glazed coating application will require extra coats until it has final acceptance from Owner based on article 3.4.1.6.

3.4 FIELD QUALITY CONTROL

- .1 Inspections:
 - .1 Inspections and testing of High Build Glazed Coating (HBGC) to be carried out by a third-party inspection agency, Master Painter's Institute (MPI) Accredited Paint Inspection Agency, (inspector) acceptable to specifying authority and local Painting Contractor's Association.
 - .2 Contractor will coordinate three (3) HBGC inspections; before first application to review moisture levels, after primer application to review specification requirements, and after second HBC application. Inspection costs to include travel, living allowance, site inspections, testing and reports.
 - .3 Contractor to schedule Paint Inspection Agency minimum of one (1) week prior to commencement of work. The scheduled work is not to commence before receiving the report and ensuring all criteria are met.
 - .4 Surfaces requiring re-application: inspected by both Contractor and Paint Inspection Agency who will notify Consultant and Owner in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered. Copy of reports to be sent to Owner and Consultant.

- .5 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
 - .1 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
 - .2 Maximum moisture content as follows:
 - .1 Concrete: 12%.
 - .2 Concrete Block: 12%.
- .6 Owner review will determine level of acceptance from a mockup installation which may be used as part of the final application.
 - .1 Finish to be free of icicles, barbs, drips, sharp edges, pin holes, and voids.
 - .2 Finish to be smooth and continuous, no exceptions.
 - .3 The entire scope will be reviewed to the above level and will not be accepted until all surfaces meet Owner's standards.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11- Cleaning.
 - .1 Clean surfaces to coating manufacturer's printed instructions.
- .2 Cure resinous wall coating materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of eighteen (18) hours.
- .3 Contractor shall protect resinous wall coating materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.
- .4 Cleaning: Contractor shall remove temporary covering and clean resinous wall coating just prior to final inspection. Use cleaning materials and procedures recommended by resinous wall coating manufacturer.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 05 05 19 – Common Work Results of Metalwork Finishing
- .2 Section 09 91 13 – Exterior Painting

1.2 REFERENCES STANDARDS

- .1 ASTM International
 - .1 ASTM A780/A780M-09(2015), Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - .2 ASTM D6386-16a, Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.
 - .3 ASTM D7803-12, Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.
- .2 The Master Painters Institute (MPI)
 - .1 Exterior Structural Steel and Metal Fabrications, current edition.
 - .1 EXT 5.1D, Alkyd.
 - .2 EXT 5.1G, Polyurethane, Pigmented (over epoxy zinc rich primer and high build epoxy).
- .3 Environmental Choice Program (ECP)
 - .1 CCD-047-98(R2005), Architectural Surface Coatings.
 - .2 CCD-048-98(R2006), Surface Coatings - Recycled Water-borne.
- .4 Federal Standard (FS)
 - .1 FED-STD-595B-17, Colours Used in Government Procurement.
- .5 The Society for Protective Coatings (SSPC)
 - .1 SSPC-SP 1-82(R2004), Solvent Cleaning.
 - .2 SSPC-SP 2-82(R2004), Hand Tool Cleaning.
 - .3 SSPC-SP 3-82(R2004), Power Tool Cleaning.
 - .4 SSPC-SP 7/NACE No. 4-07, Brush Off Blast Cleaning.
 - .5 SSPC-Vis-1-89, Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).
 - .6 SSPC-PA 2-04, Measurement of Dry Coat Thickness with Magnetic Gauges.
 - .7 SSPC Good Painting Practices, Volume 1, 4th Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit electronic copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports:
 - .1 Submit test reports showing compliance with specified performance characteristics and physical properties and in accordance with Section 01 45 00 - Quality Control.
- .6 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.4 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Develop Construction Waste Management Plan related to Work of this Section.

Part 2 Products

2.1 MATERIALS

- .1 Paint:
 - .1 Primer: MPI EXT 5.1C, primer, marine for steel.
 - .1 Primer for second coat: tinted sufficiently off finish colour of first coat to show where second coat is applied.
 - .2 Tinting material: compatible with primer and not detrimental to its service life.

- .2 Enamel: MPI EXT 5.1G, enamel, alkyd, marine, exterior; first coat black, colour No. 501-201; second coat black, colour No. 512-201. Colours to match FS-595B. If majority of paint application is to be by brushing, use paint to MPI EXT 5.1D.

.1 Table.

Colour	Coat	Colour Number
Grey	First	501-205
	Second	501-203
Grey	First	501-203
	Second	501-201
Green	First	503-209
	Second	503-208
Green	First	503-221
	Second	503-201
Brown	First	504-102 semi-gloss
	Second	504-101 semi-gloss
Blue	First	502-202 semi-gloss
	Second	502-101 semi-gloss
Black	First	501-201
	Second	512-201

- .3 Sand for sandblasting: to SSPC (Steel Structures Painting Council).

Part 3 Execution

3.1 PREPARATION

- .1 Remove existing loose and rusted paint from exterior metal surfaces.
- .2 New metal surfaces:
- .1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following:
- .1 Commercial blast cleaning: to SSPC-SP 6.
 - .2 Solvent cleaning: to SSPC-SP 1.
 - .3 Hand tool cleaning: to SSPC-SP 2.
 - .4 Power tool cleaning: to SSPC-SP 3.
 - .5 Brush-off blast cleaning: to SSPC-SP 7.
- .3 Compressed air to be free of water and oil before reaching nozzle.
- .4 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.
- .5 Apply paint after prepared surfaces have been accepted by Consultant.
- .6 Prior to starting paint application provide degree of cleanliness of surfaces to SSPC-Vis1.
- .1 Apply primer, paint, or pre-treatment after surface has been cleaned and before deterioration of surface occurs.
 - .2 Clean surfaces again if rusting occurs after completion of surface preparation.

- .7 Mixing paint:
 - .1 Do not dilute or thin paint for brush application.
 - .2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
 - .3 Do not mix or keep paint in suspension by means of air bubbling through paint.
 - .4 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.
- .8 Number of paint coats:
 - .1 New metal surfaces.
 - .1 Shop: 2 primer coats to minimum dry film thickness of 35 microns per coat.
 - .2 Field: 2 alkyd enamel coats to minimum dry film thickness of 25 microns per coat.

3.2 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Apply paint by spraying, brushing, or combination of both. Use sheepskins or daubers when no other method is practical in places of difficult access.
- .3 Use dipping or roller coating method of application when specifically authorized by Consultant in writing.
- .4 Where surface to be painted is not under cover, do not apply paint when:
 - .1 Air temperature is below 5 degrees C or when temperature is expected to drop to 0 degrees C before paint has dried.
 - .2 Temperature of surface is over 30 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.
 - .4 Surface to be painted is wet, damp or frosted.
 - .5 Previous coat is not dry.
- .5 Supply cover when paint must be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.
- .6 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .7 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .8 Brush application:

- .1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins.
 - .2 Brush out runs and sags.
 - .3 Remove runs, sags and brush marks from finished work and repaint.
- .9 Spray application:
- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.
 - .3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .4 Apply paint in uniform layer, with overlapping at edges of spray pattern.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.
 - .6 Remove runs, sags and brush marks from finished work and repaint.
- .10 Shop painting:
- .1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.
 - .2 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.
 - .3 Do not paint metal surfaces which are to be embedded in concrete.
 - .4 Paint metal surfaces to be in contact with wood with either full paint coats specified or three (3) shop coats of specified primer.
 - .5 Do not paint metal within 50 mm of edge to be welded. Give unprotected steel one coat of boiled linseed oil or other accepted primer after shop fabrication is completed.
 - .6 Remove weld spatter before painting.
 - .7 Protect machine finished or similar surfaces that are not to be painted but that do require protection, with coating of rust inhibitive petroleum, molybdenum disulphide, or other coating.
 - .8 Copy previous erection marks and weight marks on areas that have been shop painted.
- .11 Field painting:
- .1 Paint steel structures as soon as practical after erection.
 - .2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
 - .3 Field paint surfaces (other than joint contact surfaces) which are accessible before erection but which are not to be accessible after erection.

- .4 Apply final coat of paint after concrete work is completed. If concreting or other operations damage paint, clean and repaint damaged area. Remove concrete spatter and droppings before paint is applied.
- .5 Where painting does not meet with requirements of specifications, remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.
- .12 Handling painted metal:
 - .1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.
 - .2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests, Inspections:
 - .1 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC-PA 2.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.5 PROTECTION

- .1 Protect painted surfaces from damage during construction.
- .2 Protection of surfaces:
 - .1 Protect surfaces not to receive paint.
 - .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
 - .3 Protect cleaned and freshly painted surfaces from dust to acceptance of Consultant.
- .3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 10 11 23 – Tack Boards

1.2 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 DAF 45-03, Designation System for Aluminum Finishes.
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A135.4-2004, Hardboard Standard.
- .3 ASTM International
 - .1 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A924/A924M-10a, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .4 Porcelain Enamel Institute (PEI)
 - .1 PEI 501 Properties of Porcelain Enamel.
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .6 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for whiteboards and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Installation Drawings:
 - .1 Submit installation drawings.
 - .2 Indicate location, type, size, panel arrangement, backing, hardware, anchor or mounting details, frame or trim and accessories.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect whiteboards from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21- LEED Requirements.
- .5 Packaging Waste Management: remove for reuse by manufacturer of packaging materials, crates, as specified in Construction Waste Management Plan in accordance with Section 01 35 21- LEED Requirements.

Part 2 Products

2.1 MATERIALS

- .1 Laminating adhesive: to manufacturer's standard.
- .2 Joint reinforcement: concealed mechanical jointing system to provide straight, rigid, continuously supported, tight butt, flush joints at surface.
- .3 Anchor clips, brackets and fasteners: concealed type recommended by whiteboard manufacturer for fixed mounting.
- .4 Facings:
 - .1 Steel sheet: A porcelain enamel.
- .5 Core:
 - .1 Fibreboard: to CAN/ULC-S706,
 - .2 CAN/CSA-Z809 or FSC or SFI certified.
- .6 Backing:
 - .1 0.10 tempered aluminum foil to fixed wall mounted panels.
- .7 Sizes and locations as per drawings.

2.2 COMPONENTS

- .1 Extruded aluminum: aluminum Association alloy AA6063-T5. Minimum 1.5 mm thick.

- .2 Whiteboard trim: perimeter trim or frame map rail with cork insert, bottom rail with integral chalk trough and end closures, panel dividers, of manufacturer's standard sections appropriate for installation conditions

2.3 ACCESSORIES

- .1 Manufacturer's standard accessories.
- .2 Map hooks: every 600 mm on centre.

2.4 FABRICATION

- .1 Fabricate Whiteboard panels to sizes indicated.
- .2 Make finished panels flat and rigid [and fit with joint reinforcement].
- .3 Fit joints between abutting chalkboard panels with joint reinforcement except where covering trim is required.
- .4 Install trim on panels in factory. Make mitres and joints to hair-line fit, free of rough edges. Use concealed brackets to reinforce and hold joints tight and flush.
- .5 Overlap trim 6 mm onto panels.
 - .1 Include closed ends for troughs open-end extrusions.
- .6 Factory fit assemblies too large for shipment to site in one piece, disassemble for delivery and site assembly.

2.5 FINISHES

- .1 Whiteboard writing surfaces:
 - .1 Porcelain enamel: to Porcelain Enamel Institute Standard PEI 501 regards durability, smoothness of texture, colour continuity. Gloss factor of 6-8 as measured by 45 degree glossmeter:
 - .1 Surface finish for liquid marker pens:
 - .2 Surface finish for and suitable for use as a projection screen
 - .3 Unaffected by solvents and reagents such as benzene, gasoline, acetone, xylol, 10% caustic soda, lacquer thinner.
 - .4 Resist impact to 32 kg/cm (Gardner Impact Tester).
 - .5 Withstand 180 degree bend on itself without cracking or loss of bond.
- .2 Aluminum trim finishes:
 - .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
 - .1 Clear anodic finish: designation AA-31
 - .2 Appearance and properties of anodized finishes: to Aluminum Association Architectural Class 1.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for whiteboard installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 INSTALLATION

- .1 Install whiteboards in accordance with manufacturer's instructions, parallel to floor with uniform vertical surface plumb and level, to provide rigid, secure writing surface.
- .2 Install framing around panels.
 - .1 Make mitres and joints to hair-line fit, free of rough edges.
 - .2 Use concealed brackets to reinforce and hold joints tight and flush.
 - .3 No exposed fasteners permitted.
 - .4 Overlap trim 6 mm onto panels.
- .3 Mechanical attachment:
 - .1 To concrete or solid masonry: use lag screw and expansion bolts or screws and fibre plugs as appropriate for stresses involved.
 - .2 To hollow masonry: use toggle bolts or equivalent.
 - .3 To wood or sheet metal: use screws.
 - .1 Secure into framing members in stud walls.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 10 11 13 – White Boards

1.2 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 41-GP-30M-82, Wall coverings, Vinyl-Coated Fabrics.
- .2 Sustainable Forestry Initiative (SFI)
 - .1 SFI-2010-2014 Standard.
- .3 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2010, Standard Method of Test for Surfaces Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for tackboards and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Installation Drawings:
 - .1 Submit installation drawings.
 - .2 Indicate location, type, size, panel arrangement, backing, hardware, anchor or mounting details, frame or trim and accessories.
- .4 Samples:
 - .1 Submit duplicate 300 x 300 mm sample of tackboard.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Surface burning characteristics of materials: listed and labelled by an organization accredited by Standards Council of Canada.
- .2 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect [tackboards]from [nicks, scratches, and blemishes].
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove and return of packaging materials as specified in Construction Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Bulletin board: Forbo colour noted on finished plan.
- .2 Sizes and locations as per drawings.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for tack board 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.

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 INSTALLATION

- .1 Adhesive attachment:
 - .1 Use recommended adhesive applied using spot method with daubs 40 mm diameter x 25 mm high at 200 mm on centre each way to adhere tackboard to wall. Press firmly into adhesive to ensure adhesion.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 09 96 00 – High Build Coating

1.2 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
 - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M-15, Standard Specification for Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
 - .3 ASTM B32-16, Standard Specification for Solder Metal.
 - .4 ASTM B456-11e1, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- .3 CSA Group
 - .1 CSA W47.2-11(R2015), Certification of Companies for Fusion Welding of Aluminum.
 - .2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
 - .3 CSA W59.2-M1991(R2013), Welded Aluminum Construction.
- .4 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI SSF 6-2012, Sheet Steel Facts #6, Metallic Coated Sheet Steel for Structural Building Products.
- .5 Green Seal (GS)
 - .1 GS-11-2011e2, Standard for Paints and Coatings.
 - .2 GS-36-2013e2.1, Adhesives for Commercial Use.
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .7 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1113-2016, Architectural Coatings.
 - .2 SCAQMD Rule 1168-2005, Adhesive and Sealant Applications.
- .8 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #76, Quick Dry Alkyd Metal Primer.
 - .2 MPI #96, Quick Dry Enamel Gloss.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for signage and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta, Canada.
 - .2 Submit catalogue sheets with templates to scale.
 - .3 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, mounting methods, schedule of signs.
 - .4 Submit drawn-to-scale details for individually fabricated lettering indicating word and letter spacing.
- .4 Samples:
 - .1 Submit representative sample of each type sign, sign image and mounting method including, but not limited to: graphics, cast letters, and wall plates fixed mounting installation method.
- .5 Sustainable Design Submittals:
 - .1 Sustainability: in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .3 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of pre-consumer and post-consumer content, and total cost of materials for project.
 - .4 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants, and paints and coatings used in building, showing compliance with VOC and chemical component limits or restriction requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.

1.5 QUALITY ASSURANCE

- .1 Welding Certification in accordance with CSA W47.2.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21- Construction / Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Stainless steel: brushed finish.
- .2 Acrylic sheet: polymethylmethacrylate (PMMA) cast sheet suitable for intended use in sign fabrication, colours to be from manufacturer's standard range.
- .3 Engraving sheet: lamacoid 3.2 mm thick plastic sheet, black with white text.
- .4 Electrical components: CSA approved as indicated.
- .5 Self-stick foam tape: 352.4 kg/m³ density polyurethane open-cell foam tape for sign purposes, with synthetic self-stick adhesive on both sides.
 - .1 Width: to suit sign sizes.
- .6 Adhesives, paints, sealants and solvents for acrylic sheet: type recommended by sheet manufacturer for applicable condition.
 - .1 Maximum VOC limit compliant to GS-36 Standard and SCAQMD Rule 1168.
- .7 Acrylic top-coat: clear, non-yellowing, exterior grade, satin finish, acrylic polyester resin protective coating, compatible with acrylic surface of type recommended by sheet manufacturer.
 - .1 Maximum VOC limit compliant to GS-11 Standard and SCAQMD Rule 1113.

2.2 SIGN GRAPHICS

- .1 Sign graphics: well defined, arranged for balanced appearance, and properly word and letter spaced.
- .2 Cut and spray process: mask surfaces, accurately cut-out image, spray apply uniform coating to obtain opaque finish.

- .3 Engraving: apply sign letters and numerals using pantograph mechanical engraving machine to obtain incised paint-filled letters.
- .4 Self-stick vinyl film: individual letters and numerals and symbols die cut from 0.1mm thick white, black, and red integral colour, matte finish, exterior grade PVC film, with self-stick adhesive backing.

2.3 DOOR PLATES

- .1 Fabricate sign faces of extruded acrylic sheet, Consultant to select colour from manufacturer's standard range.
 - .1 Size: as indicated.
- .2 Sign graphics: apply by cut and spray.
- .3 Fixed mounting: use self-stick foam tape.
- .4 Pictographs: cut-out figures without backgrounds.

2.4 DOOR NUMBER PLATES

- .1 Fabricate number plates for doors of engraving sheet for lamacoids.
 - .1 Size: as shown on drawings.
- .2 Engrave 30 mm high, single line numerals incised to expose contrasting coloured core.

2.5 HIGH BUILD COATING

- .1 Provide high build coating in accordance with Section 09 96 00 – High Build Coating.
- .2 Prepare stencils for lettering and numerals as provided in accepted shop drawings.

2.6 FABRICATION

- .1 Fabricate signs in accordance with details, specifications and shop drawings.
- .2 Build units square, true, accurate to size, free from visual or performance defects.
- .3 Fit and securely join sections to obtain tight, closed joints.
- .4 Allow for thermal movement without distortion of components.
- .5 Exposed fasteners as noted permitted where indicated with tamperproof fasteners.
- .6 Polish exposed edges of metal to smooth, slightly convex profile.
- .7 Do steel welding to CSA W59.
 - .1 Finish exposed welds flush and smooth.
- .8 Apply bituminous paint to aluminum in contact with dissimilar metals, concrete or masonry.
- .9 Manufacturer's nameplates on sign surface permitted in non-visible locations in completed work.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Manufacturer's Instructions: compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
- .2 Erect and secure signs plumb and level at elevations indicated Consultant.
- .3 Comply with sign manufacturer's installation instructions and accepted shop drawings.
- .4 Mechanical attachment:
 - .1 To wood: use tamperproof screws.
 - .2 Mechanical fasteners on exterior: non-staining, non-ferrous type.
 - .3 Fabricate special fasteners as required for installation conditions.
 - .4 Mechanical fasteners and methods of attachment subject to Consultant's acceptance.
- .5 Adhesive attachment:
 - .1 Use self-stick adhesive foam tape to manufacturer's instructions to fix sign and prevent rocking.
 - .2 Keep tape maximum 1.6 mm from edges.
 - .3 Use adhesive recommended by manufacturer for flat cut anodized aluminum numerals above doorframes.
- .6 High build coating:
 - .1 Apply high build coating lettering and numerals after high build coating is accepted without deficiencies in rooms and doors as noted by Owner and Consultant.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
 - .1 Leave signs clean.
 - .2 Remove debris from interior of sign boxes.

- .3 Touch up damaged finishes.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-In-Place Concrete

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measurement for supply and installation of signboards and, sign supports will be based on each complete sign installation.

1.3 REFERENCES STANDARDS

- .1 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, (5th Edition).
- .2 ASTM International
 - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A276/A276M-17 Standard Specification for Stainless Steel Bars and Shapes.
 - .3 ASTM B209M-14, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .4 ASTM B 210M-12, Standard Specification for Aluminum-Alloy Drawn Seamless Tubes (Metric).
 - .5 ASTM B 211M-12e1, Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire (Metric).
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 62-GP-11M, Standard for Marking Material, Retroreflective, Enclosed Lens, Adhesive Backing.
- .4 CSA International
 - .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA O80 Series-15, Wood Preservation.
 - .3 CSA O121-17, Douglas Fir Plywood.
 - .4 CSA W47.2-11 (R2015), Certification of Companies for Fusion Welding of Aluminum.
 - .5 CAN/CSA-Z809-08, Sustainable Forest Management.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11-11, Paints and Coatings.

- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2016, Architectural Coatings.
- .7 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for traffic signage, including product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that construction wastes were recycled or salvaged.
 - .2 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-005.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 43 – Environmental Procedures.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Structural deflections and vibration in accordance with American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

2.2 MATERIALS

- .1 Flexible Sign supports:
 - .1 Base plates for concrete mounted signs: 230 mm square (7ga.) standard steel base plate.
 - .2 Carbon steel torsion spring with zinc coated bolts.
 - .3 Corrosion resistant barrier with powder coat finish.
 - .4 Posts: to CSA G40.21, 1.8 m long, 40 mm diameter post. Hot dipped galvanized: to ASTM A 123/A 123M.
 - .5 Fasteners: bolts, nuts, washers and other hardware for roadside signs to be galvanized steel.
- .2 Sign supports:
 - .1 Base plates for natural ground mounted signs: to ASTM B209M.
 - .2 Steel posts: to CSA G40.21, 3.2 m long, heavy gauge pipe, measuring 50 mm diameter. Metal thickness: 4.5 mm. Hot dipped galvanized: to ASTM A123/A123M. Signboards:
- .3 Aluminum sheet: to ASTM B 209M, precut to required dimensions.
 - .1 Thickness for signboards up to 750 mm wide: 1.6 mm minimum.
- .4 Connecting straps and brackets: to ASTM B 209M.
- .5 Aluminum materials: to ASTM B 209M.
 - .1 Reflective sheeting and tape: to CAN/CGSB 62-GP-11M. Adhesive, class RA2 reflectivity. Request sign colour information for production of shop drawings.
 - .2 Clear varnish protective coat: MPI-EXT 6.4H.

2.3 FABRICATION

- .1 Signboards:
 - .1 Aluminum blanks:
 - .1 Degrease, etch and bonderize with chemical conversion coating.
 - .2 Clean surfaces with xylene thinner. Dry.
 - .3 For aluminum signboards that are to be painted before installation, spray and bake face of signboards with two (2) coats of enamel in accordance with MPI-EXT 5.4A.
- .2 Reflective background sheeting and lettering:
 - .1 Cut and apply in accordance with manufacturer's instructions.

- .2 Apply adhesive coated material with heat lamp vacuum applicator or by squeeze roll application method. Apply pressure sensitive material with roller or squeegee.
 - .3 Edge wrap sheeting on each extrusion prior to bolting extrusions. Match pieces of sheeting from different rolls for each signboard to ensure uniform appearance and brilliance by day and night.
 - .4 Reflective signboard faces may be prepared using silk screen transparent ink.
 - .5 Non-reflective lettering and symbols: cut from vinyl film as specified in CGSB 62-GP-9M.
 - .6 Clean signboards completely and apply transparent tape over top edge and extending 25 mm minimum down back and front of signboard.
 - .7 Protect finished signboard faces with one coat of clear varnish.
- .3 Sign identification:
- .1 Apply sign number and date of installation with 25 mm high stencil painted black letters on lower left back face of each signboard.

Part 3 Execution

3.1 INSTALLATION

- .1 Sign support:
 - .1 Erect supports as indicated. Permissible tolerance: 30 mm maximum departure from vertical for direct buried supports. Where separate concrete footings have been placed, erect posts with base plates resting on levelling nuts and restrained with nuts and washers. Permissible tolerance: 12 mm maximum departure from vertical.
 - .2 Coat underside of base plate with corrosion protective paint before installation. Connect shoe base to shaft with inside and outside fillet welds.
 - .3 Close open aluminum tubes and posts with aluminum cap. Cut oblong holes in shoe bases to drain condensation. Install aluminum bolt cover on each base plate restraining nut.
 - .4 Erect posts plumb and square to details as indicated.
 - .5 Single channel steel posts:
 - .1 Drive to required depth without damage to posts.
 - .2 If rock or concrete is encountered, drill hole to required depth and set post in sand.
 - .3 In finished concrete surfaces, backfill with concrete or grout. Protect from adverse conditions until cured.

3.2 CORRECTING DEFECTS

- .1 Correct defects, identified by Consultant, in sign message, consistency of reflectivity, colour or illumination. Correct angle of signboard for optimum performance during night conditions to acceptance of Consultant.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by traffic signage installation and salvage operations.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 10 28 10 – Washroom Accessories

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A653/A653M-15w1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A924/A924M-17, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.36-97, General Purpose Interior Alkyd Varnish.
 - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
 - .3 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .4 CAN/CGSB-1.104-91, Semigloss Alkyd Air Drying and Baking Enamel.
- .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-11, Standard for Paints and Coatings.
 - .2 GS-36-13e2.1, Standard for Adhesives for Commercial Use.
- .4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for toilet and urinal partitions and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit electronic copies of WHMIS MSDS in accordance with Section 01 35 43- Environmental Procedures. Indicate VOCs:
 - .1 For caulking materials during application and curing.
 - .2 For adhesives.
 - .3 For laminates.
- .3 Shop Drawings:
 - .1 Submit installation drawings.

- .2 Indicate fabrication details, plans, elevations, hardware, finishes, and installation details.
- .4 Samples:
 - .1 Submit duplicate 300 x 300 mm samples of panel showing finishes, edge and corner construction and core construction.
 - .2 Submit duplicate representative samples of each hardware item, including brackets, fastenings and trim.
- .5 Sustainable Design Submittals:
 - .1 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial content.
 - .2 Regional Materials: submit evidence that project incorporates regional materials and products.
 - .3 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants, paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.
 - .4 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, off ground, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect toilet and urinal compartments from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

- .5 Packaging Waste Management: remove for reuse and return of packaging materials, padding, and pallets, as specified in[Construction Waste Management Plan in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Toilet and urinal compartments.
- .2 Sheet steel: to ASTM A653/A653M with Commercial Quality ASTM A924/A924M.
- .3 Minimum steel core thickness:
 - .1 Doors and panels: 0.80 mm.
 - .2 Pilaster: 1.0 mm.
 - .3 Reinforcement: 3.0 mm.
- .4 Head rails: clear anodized, extruded aluminum, anti-grip design tubular steel, cast end preformed socket brackets.
- .5 Stainless steel sheet metal: to ASTM A167, Type 304.
- .6 Pilaster shoe: 0.80 mm thick stainless steel, 100 mm high.
- .7 Attachment: galvanized tamperproof type screws and bolts.

2.2 COMPONENTS

- .1 Hinges:
 - .1 Heavy duty, non-lubricating, nylon bushings.
 - .2 Material/finish: stainless steel casting.
 - .3 Swing: inward and outward, refer to plans.
 - .4 Return movement: gravity, non-rising.
 - .5 Adjustable to hold door open at any angle up to 90 degrees.
 - .6 Emergency access feature.
- .2 Latch set: combination latch, door-stop, keeper and bumper, with emergency access feature, chrome plated non-ferrous.
- .3 Wall and connecting brackets: stainless steel extrusion or casting.
- .4 Coat hook: combination hook and rubber door bumper, chrome-plated non-ferrous.
- .5 Door Pull: 150 mm door pull, chrome-plated

2.3 FABRICATION

- .1 Doors and panels: 25 mm thick, two (2) steel sheets, faces bonded to honeycomb core 800 mm wide x 2000 mm high panel.
- .2 Pilasters: 25 mm thick, constructed same as door, to suit space between walls 2200 mm high.

2.4 FINISHES

- .1 Clean, degrease and neutralize steel components with phosphate or chromate treatment.
- .2 Spray apply primer to CAN/CGSB-1.81, 1 coat.
 - .1 Primer: VOC limit 250 g/L maximum to SCAQMD Rule 1113 and GS-11.
- .3 Spray apply finish enamel to CAN/CGSB-1.104, Type 2, semi-gloss, 2 coats, minimum 0.025 mm thick.
 - .1 Enamel Finish: VOC limit 50 g/L maximum to SCAQMD Rule 1113 and GS-11.
- .4 Finish: doors and pilaster/panels same colour.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

- .1 Ensure wood backing is in place in walls to fasten toilet compartments.

3.3 ERECTION

- .1 Do work in accordance with manufacturer's written instructions.
- .2 Partition erection.
 - .1 Install partitions secure, plumb and square.
 - .2 Leave 12 mm space between wall and panel or end pilaster.
 - .3 Anchor mounting brackets to masonry-concrete surfaces using screws and shields, to blocking/backing must be provided hollow walls to steel supports with bolts in threaded holes.
 - .4 Attach panel and pilaster to mounting brackets with self-drilling sheet metal screws.
 - .5 Provide for adjustment of floor braced pilasters variations with screw jack through steel saddles made integral with pilaster.
 - .1 Make adjustment and attachment of pilasters through 16 mm steel channel fastened to floor.
 - .1 Conceal floor fixings with stainless steel shoes.
 - .6 Equip doors with hinges, latch set, and each stall with coat hook with combination bumper mounted on door, mounting heights 1,400 mm above finished floor.
 - .1 Adjust and align hardware for easy, proper function. Set door open position at full open.
 - .7 Equip out swinging doors with door pulls on inside of door, mounting heights 1,200 mm above finished floor.

- .3 Floor supported partition erection:
 - .1 Secure pilasters to floor with pilaster supports anchored with 50 mm minimum penetration in structural floor.
 - .2 Level, plumb and tighten installation with levelling device.
 - .3 Secure pilaster shoes in position.
 - .4 Set tops of doors level with tops of pilasters when doors are in closed position.

3.4 ADJUSTING

- .1 Adjust doors and locks for optimum, smooth operating condition.
- .2 Lubricate hardware and other moving parts.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
 - .1 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
 - .2 Clean aluminum with damp rag and approved non-abrasive cleaner.
 - .3 Clean and polish hardware and stainless components.
- .3 Waste Management: separate waste materials for in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 08 99 - Rough Carpentry for Minor Works.

1.2 REFERENCES STANDARDS

- .1 ASTM International
 - .1 ASTM A240/A240M-16a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .2 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM A924/A924M-17, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - .4 ASTM B456-17, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.
- .3 CSA International
 - .1 CAN/CSA-B651-12 (R2017), Accessible Design for the Built Environment.
 - .2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped by Contractor.
 - .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.
- .4 Sustainable Standards Certification:
 - .1 Low-Emitting Materials:
 - .1 Submit listing of laminate adhesives used in building, verifying that they contain no urea-formaldehyde.
 - .2 Submit VOC of laminate adhesives used in building, verifying that they contain no urea-formaldehyde.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect washroom accessories from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Sheet steel: to ASTM A653/A653M with ZF001 designation zinc coating.
- .2 Stainless steel sheet metal: to ASTM A240/A240M, with brushed finish.
- .3 Stainless steel tubing: as per components listed below.
- .4 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.
- .5 Substitutions may be provided for review by Consultants of all components listed in this Section. Components by the same manufacturer as possible.

2.2 COMPONENTS

- .1 Toilet Tissue Dispenser: Bobrick Surface Mounted Twin Jumbo-Roll Toilet Tissue Dispenser, Two Rolls, approximately 530 mm long x 330 mm high x 135 mm wide. Keyed tumbler lock; will dispense second roll once first roll is empty. 304 stainless steel, brushed finish. Based on Frost 169.
- .2 Semi-Recessed Waste Receptacle: Frost 330 Semi-Recessed Wall Unit, approximately 438 mm wide x 762 mm high x 203 mm deep. Recessed wall of 0.7 mm stainless steel. Removable, stainless steel waste receptacle. Based on Frost 330.
- .3 Soap Dispenser: 125 mm wide x 125 mm high x 255mm deep, manual foam soap dispenser. Based on Frost 702.
- .4 Sanitary Napkin Disposal: Stainless steel, Type 304 finish. Based on Frost 622.

- .5 Shower Rod Curtain Accessories Size: 1780 mm x 1830 mm, 8-gauge thick, 100% non-toxic PEVA Bathtub Curtain, cold crack- and mildew-resistant, based on Frost 1144-503; chrome shower rod 1828 mm x 30 mm diameter, based on Frost 1145-72SS; hold back hook and chain, based on Frost 1144-500; stainless steel curtain hooks, based on Frost 1144-501L.
- .6 Flip Down Shower Seat: Phenolic Top, all stainless tubular steel supports, Bobrick B-5191.
- .7 Grab Bar, Horizontally- or Vertically-Mounted Grab Bar: 610 mm long, 30 mm diameter x 12 ga. wall tubing of Type 304 stainless steel having #4 finish, screw attachment, concealed flange, flanges welded to tubular bar, provided with steel back plates and all accessories, peened finish at area of hand grip. Based on Frost 1001SP.
- .8 Grab Bar, Horizontally Mounted Shower Grab Bar: 900 mm long, 30 mm diameter x 12 ga. wall tubing of type 304 stainless steel having #4 finish, screw attachment, concealed flange, flanges welded to tubular bar, provided with steel back plates and all accessories, peened finish at area of hand grip. Based on Frost 1001.
- .9 Angled Grab Bar: 610 horizontal and 610 angled portion at 60 degrees to horizontal, 30 mm diameter x 12 ga. wall tubing of Type 304 stainless steel having #4 finish, screw attachment, concealed flange, flanges welded to tubular bar, provided with steel back plates and all accessories, peened finish at area of hand grip. Based on Frost 1002SP.
- .10 B-76717 Classic Series Single Robe Hook: satin stainless steel finish. Flange is 50 mm x 50mm, projects 40 mm from wall. Provide two 2 per shower stall and where also indicated on the drawings.
- .11 Towel bar: 90 mm x 460 mm x 75 mm stainless steel, screw concealed mounting system. Based on Frost 1140S.
- .12 Paper towel dispenser: Surface-Mounted Roll Paper Towel Dispenser, high impact resin; translucent grey housing with stainless steel hinger pins. Keyed lock at top. Based on Bobrick B-72860.
- .13 Floor mat: 305 mm x 305 mm tiles, fully modular slip resistant locker room drainage mat with beveled ramps and corners, colour black. Based on Uline Lok-Tyle.

2.3 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one (1) sheet of stock, free of joints.
- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CAN/CSA-G164.
- .7 Shop assemble components and package complete with anchors and fittings.

- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide steel anchor plates and components for installation on studding and building framing.

2.4 FINISHES

- .1 Chrome and nickel plating: to ASTM B456, polished finish.
- .2 Baked Enamel: Condition metal by applying one (1) coat of metal conditioner to CGSB 31-GP-107Ma, apply one (1) coat Type 2 primer and bake, apply two (2) coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Consultant.
- .3 Manufacturer's or brand names on face of units not acceptable.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrates and surfaces to receive toilet and bathroom accessories previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to toilet and bathroom accessories installation.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Install and secure accessories rigidly in place as follows:
 - .1 Stud walls: install plywood backing to stud prior to gypsum board finish.
 - .2 Hollow masonry units: use toggle bolts drilled into wall cavity.
 - .3 Solid masonry: use bolt with lead expansion sleeve set into drilled hole.
- .2 Use tamper proof screws/bolts for fasteners.
- .3 Fill units with necessary supplies shortly before final acceptance of building.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.4 PROTECTION

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

3.5 SCHEDULE

- .1 Locate accessories as shown on drawings.

END OF SECTION

Part 1. General

1.1 RELATED SECTIONS

- .1 Section 03 30 00 – Cast-In-Place Concrete
- .2 Section 05 50 00 – Metal Fabrications
- .3 Division 26 - Electrical

1.2 REFERENCE STANDARDS

- .1 ASTM C645-14e1, Standard Specification for Nonstructural Steel Framing Members.
- .2 CSA W47.2-M1987(R2009), Certification of Companies for Fusion Welding of Aluminum.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Division 01.
- .2 Shop Drawings and Product Data: include signage proof, plan, elevations, and sections of sign, connection devices between components and recommended installation procedures. Included also all information and dimensions. Drawings of mechanical and electrical boxed, concealed routing and services.
- .3 Confirm all graphics, fonts and logos conform with Owner standards prior to submitting shop drawings.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for illuminated signs for incorporation into manual.

1.5 QUALITY ASSURANCE

- .1 Welding Certification in accordance with CSA W47.2.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Prevent damage to signs and components during delivery, storage, and handling. Provide any protective material required, include cardboard and plastic covering.
- .2 Schedule delivery as required to provide appropriate secure storage to prevent damage or vandalism.

Part 2. Products

2.1 ILLUMINATED SIGN BOX

- .1 Provide Owner approved double-faced freestanding sign, RCMP Model 2-B, as manufactured by Pattison Sign Group (1-800-661-2493, Tel: 613-247-7762 Fax: 613-247-7763) complete with posts and baseplates. Provide 120V, 1-phase power. No substitutions permitted. Graphics will be provided by Owner after Contract award.
- .2 Sign to be one (1) independent sign box mounted on common HSS Steel fabricated posts.

2.2 EXTERIOR SIGN GRAPHICS

- .1 Sign graphics to be well defined, arranged for balanced appearance, and properly word and letter spaced. Silk Screen process: apply multi-colour photographic produced silk screen printed images to face side of transparent sign faces.
- .2 Sign face to be translucent, U/V resistant, Lexan intended for use in sign fabrication. Provide foam seal gaskets to fix Lexan securely in place without potential for rattling or wind deflection.

2.3 PAINT FINISHES

- .1 Sign paint finish to be prefinished sheet aluminum (baked enamel), RCMP Blue, Pantone PMS 287.
- .2 Posts to be painted with epoxy paint finish, dark blue colour to match Owner standards.

2.4 FABRICATION - GENERAL

- .1 Fabricate signs in accordance with Owner approved details, specifications and shop drawings. Fabricate Sign box and posts and related components as one coordinated unit to be delivered to site and mounted to piles.
- .2 Build units square, true, accurate to size and free from visual or performance defects.
- .3 Accurately fit and securely join sections to obtain tight, closed joints. Allow for thermal movement without potential for distortion of components. Grind all welds smooth.
- .4 Exposed fasteners are to be avoided, and where necessary be located in inconspicuous locations accepted by consultant. Fasteners to be of same colour as adjacent materials.
- .5 Apply bituminous paint to aluminum in contact with dissimilar materials.

- .6 Manufacturers nameplates to be affixed only in inconspicuous locations and are not permitted on sign face, top or sides of signs.
- .7 Include for all accessories required for a complete installation. All exposed fasteners to be tamperproof. Provide three (3) tamperproof fastener tools to be turned over to owner for access and servicing of sign.

Part 3. Execution

3.1 SITE MEASUREMENTS

- .1 Take site measurements of existing building to confirm dimensions, level and alignment of installed piling, prior to starting work. Verify prior to installation and adjust sign dimensions to match installed piles.

3.2 INSTALLATION, GENERALLY

- .1 Install partitions and all component parts, in accordance with manufacturer's instructions and as specified. Provide all electrical hook-ups for sign luminaire fixtures.
- .2 Install signs, plumb, square and level. Accurately fit and fasten all components to one another. Adjust and shim as required to ensure a plumb, level installation.
- .3 Cover sign until the building is occupied by the Owner.

3.3 TOUCH-UP AND CLEANING

- .1 Touch-up finished surfaces with matching colour paint following finished installation.
- .2 Clean all surfaces to be free of adhesives, soil and other contaminants. Trim all fillers neat and flush without damaging signs.
- .3 Replace and components damaged as a result of mishandling during transportation or installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 08 99 – Rough Carpentry for Minor Works

1.2 REFERENCES STANDARDS

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A1008/A1008M-16, Standard Specification for Steel, Cold-Rolled, Carbon, Structural, High-Strength Low-Allow, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - .2 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Allow-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM A924/A924M-17, Standard Specification for General Requirements for Steel Sheet, Metallic coated by the Hot-dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-44.40-2001, Steel Clothing Locker.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and data sheets for metal lockers and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate on drawings: type and class of locker, thicknesses of metal, fabricating and assembly methods, tops, rods, hooks, shelves, bases, trim, numbering, filler panels, end/back panels, doors, handles, locking method, ventilation method finishes.
- .4 Sustainable Standards Certification:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction / Demolition Waste Management and Disposal.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer, post-industrial content, and total cost of materials for project.
 - .3 Regional Materials: submit evidence that project incorporates regional materials.

1.4 DELIVERY, STORAGE AND HANDLING

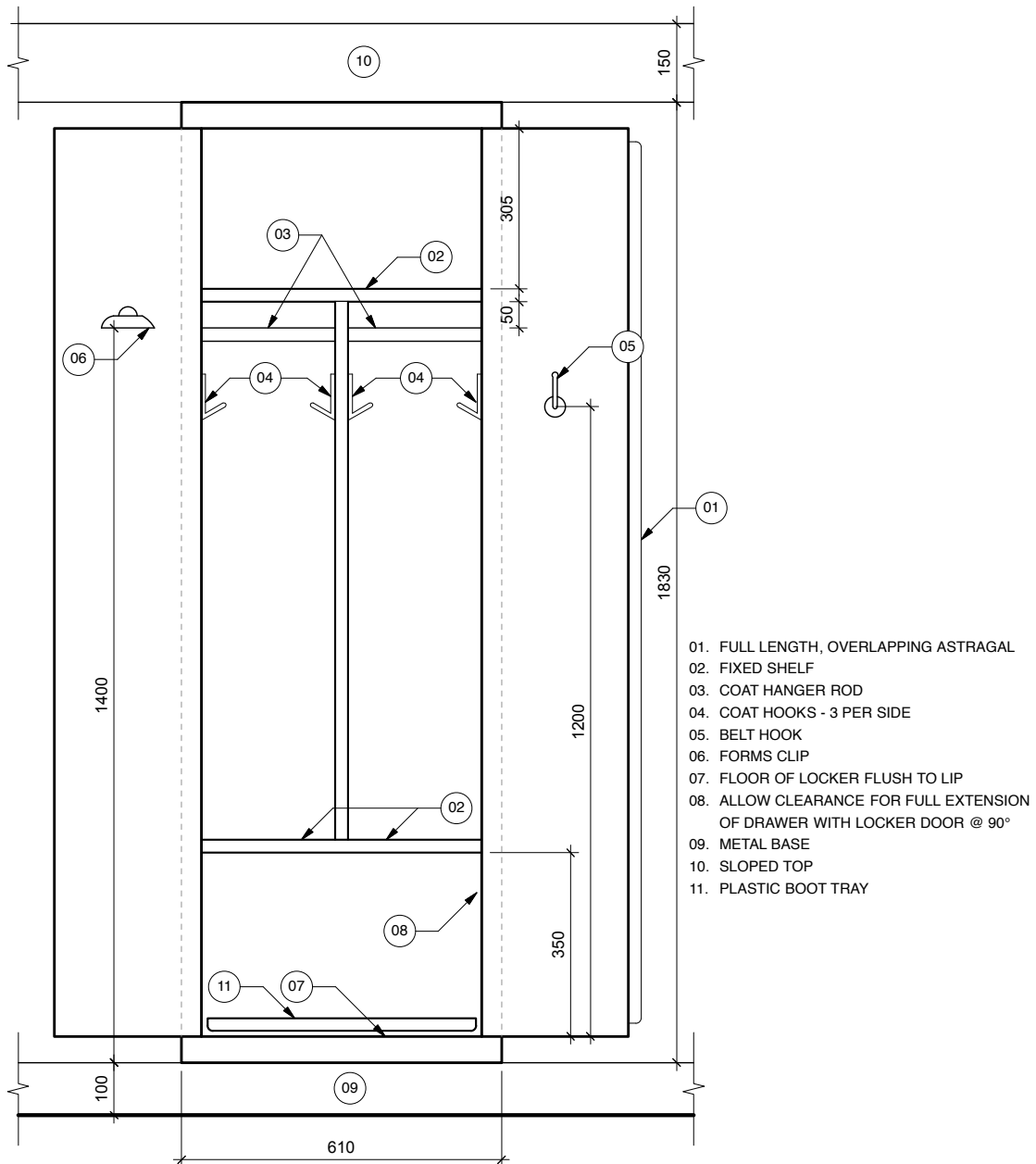
- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect metal lockers from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MANUFACTURED UNITS

- .1 Provide all miscellaneous accessories and fasteners as required to rigidly secure all lockers specified into position. Ensure backing requirements are coordinated and that all fastening methods are concealed or are aesthetically of high quality in terms of finish, alignment and method.
- .2 Provide all miscellaneous trim as required to provide a finished installation where a recessed or semi-recessed installation is requested. Finish trims shall match the colour of the locker unless otherwise noted. Provide finished end panels and spacing fillers for all locker types with matching colour and concealed fastening methods to suit floor plan layouts.
- .3 Provide sloped tops to locker types L1, L2, L3, L4, and L5. Colour to match locker frame.
- .4 Construct wood base to raise lockers from the ground, the height of the scheduled floor base.
- .5 **Type L1** – Police Lockers: to CAN/CGSB-44.40, Type 1-Single full-height locker, Class 2 - A bank of two or more lockers, freestanding. See attached drawing for locker configuration.
 - .1 Size: 460 mm wide x 610 mm deep x 1829 mm high,
 - .2 Assembly: welded, 1.30 mm frames and hinge reinforcement.
 - .3 Top: sloped, 0.80 mm.
 - .4 Doors: two leaves, one-piece double-wall envelope construction, steel thickness - outer skin 0.80 mm, inner skin 0.70 mm., hinges 1.60 mm.

- .5 Sides and backs: 0.70 mm.
- .6 Door handle: recessed handle steel with bright chromium nickel-plated finish, with 2.60 mm. hasp for padlock
- .7 Accessories: 19 mm diam. steel hanger rods with chromium finish, 100 mm steel base, steel end panels, steel trim including corner angles, jamb trim, fillers, number plates, coat hooks, belt hook, note clip, number plates including any miscellaneous shown on attached drawing.
- .8 Boot drip tray: removable 528 mm wide x 558 mm deep x 38 mm high black PVC.
- .9 Finish: Baked Enamel, up to three (3) door colours, one (1) frame/body colour will be selected by Consultant from manufacturer's standard range.



- .6 **Type L2** –Lockers: to CAN/CGSB-44.40; size 406 w x 610 d x 1830 h (16”w x 24”d x 72”h) three (3) compartment. Banks of lockers as indicated on drawings.
- .1 Body: 0.60 mm (24 ga.) sides and back, 0.70 mm (22 ga.) top and perforated bottom thick cold rolled steel, full length reversed door stop.
 - .2 Frame: 1.5 mm (16 ga.) thick formed steel channel, double layered in front, welded one piece construction, notched frame for rigid shelf support, 1.9 mm (14 ga.) thick 5 knuckle hinges.
 - .3 Doors: Perforated 0.9 mm thick cold rolled steel outer panel, 0.6 mm thick cold rolled steel inner panel for welded sandwich panel, additional tack welds top and bottom of door, black polypropylene handle box flush with door face, prepared for number plates, rubber bumper silencers.
 - .4 Finish: Baked enamel. One (1) door colour, one (1) frame/body colour will be selected by Consultant from manufacturers standard range.
 - .5 Accessories: Provided three (3) flat hooks, sloped top trim, number plates, padlock hasp, 0.70 mm (22 ga.) colled rolled steel shelf.
 - .6 Acceptable Substitution: Shanahan’s Apex three Tier Locker.
- .7 **Type L3** – Lockers: to CAN/CGSB-44.40-92, size 406 w x 610 d x 1830 h (16”w x 24”d x 72”h) four (4) compartment. Banks of lockers as indicated on drawings.
- .1 Body: 0.60 mm (24 ga.) sides and back, 0.70 mm (22 ga.) top and perforated bottom thick cold rolled steel, full length reversed door stop.
 - .2 Frame: 1.5 mm (16 ga.) thick formed steel channel, double layered in front, welded one piece construction, notched frame for rigid shelf support, 1.9 mm (14 ga.) thick 5 knuckle hinges.
 - .3 Doors: Perforated 0.9 mm thick cold rolled steel outer panel, 0.6 mm thick cold rolled steel inner panel for welded sandwich panel, additional tack welds top and bottom of door, black polypropylene handle box flush with door face, prepared for number plates, rubber bumper silencers.
 - .4 Finish: Baked enamel. One (1) door colour, one (1) frame/body colour will be selected by Consultant from manufacturers standard range.
 - .5 Accessories: Provided three (3) flat hooks, sloped top trim, number plates, padlock hasp, 0.70 mm (22 ga.) colled rolled steel shelf.
 - .6 Acceptable Substitution: Shanahan’s Apex Four Tier Locker.
- .8 **Type L4** – Lockers: to CAN/CGSB-44.40-92, size 406 w x 610 d x 1830 h (24”w x 18”d x 72”h) two-compartment; ¼ upper and ¾ lower doors. Banks of lockers as indicated on drawings.
- .1 Body: 0.60 mm (24 ga.) sides and back, 0.70 mm (22 ga.) top and perforated bottom thick cold rolled steel, full length reversed door stop.
 - .2 Frame: 1.5 mm (16 ga.) thick formed steel channel, double layered in front, welded one-piece construction, notched frame for rigid shelf support, 1.9 mm (14 ga.) thick 5 knuckle hinges.
 - .3 Doors: Perforated 0.9 mm thick cold rolled steel outer panel, 0.6 mm thick cold rolled steel inner panel for welded sandwich panel, additional tack welds top and bottom of door, black polypropylene handle box flush with door face, prepared

- .4 for number plates, rubber bumper silencers.
 - .4 Finish: Baked enamel. One (1) door colour, one (1) frame/body colour will be selected by Consultant from manufacturers standard range.
 - .5 Accessories: Provided three (3) flat hooks, sloped top trim, number plates, padlock hasp, 0.70 mm (22 ga.) colled rolled steel shelf.
 - .6 Acceptable substitution: Shanahan's Apex Double Tier Locker.
- .9 **Type L5** –Lockers: Lockers: to CAN/CGSB-44.40, lockers with openings 380 mm wide x 230 mm deep x 140 mm high to hold metal boxes 360 mm x 220 mm x 130 mm high (14" x 8.5" x 5" high), 20 compartments required, surface mounted. Based on Manufacturer SpaceSaver EDHGS10155.15 Surface Mounted locker.
- .1 Body: 0.70 mm thick cold rolled steel, continuously lock formed back and sides.
 - .2 Frame: 1.6 mm thick formed steel channel, welded one piece construction, notched frame for rigid shelf support, 1.8 mm thick 5-knuckle hinges.
 - .3 Doors: 1.6 m thick cold rolled steel outer panel, 1.0 mm thick cold rolled steel inner panel for welded sandwich panel construction with sound abating honeycomb core, black polypropylene handle box flush with door face, prepared for number plates, rubber bumper silencers, ventilation louvres top and bottom.
 - .4 Finish: Baked enamel. One (1) door colour, one (1) frame/body colour will be selected by Consultant from manufacturers standard range.
 - .5 Accessories: Number plates and padlock hasps.
- .10 **Type L6** – Lockers: to CAN/CGSB-44.40-92, Manufacturere: Groupe Lincora; product number GRC-6-1618721; size 406 w x 610 d x 1830 h (18" w x 24" d x 72" h) two (2) compartment. Banks of lockers as indicated on drawings.
- .1 Body: 0.60 mm (24 ga.) sides and back, 0.70 mm (22 ga.) top and perforated bottom thick cold rolled steel, full length reversed door stop.
 - .2 Frame: 1.5 mm (16 ga.) thick formed steel channel, double layered in front, welded one piece construction, notched frame for rigid shelf support, 1.9 mm (14 ga.) thick 5 knuckle hinges.
 - .3 Doors: Perforated 0.9 mm thick cold rolled steel outer panel, 0.6 mm thick cold rolled steel inner panel for welded sandwich panel, additional tack welds top and bottom of door, black polypropylene handle box flush with door face, prepared for number plates, rubber bumper silencers.
 - .4 Finish: Baked enamel. One (1) door colour, one (1) frame/body colour will be selected by Consultant from manufacturers standard range.
 - .5 Accessories: Provided three (3) flat hooks, sloped top trim, number plates, padlock hasp, 0.70 mm (22 ga.) colled rolled steel shelf.
 - .6 Acceptable Substitution: Shanahan's Apex Six Tier Locker.
- .11 **Type L7** - Lockers: Model EDHGS-10 635 mm wide x 816 mm high x 165 mm deep (25" x 32" x 6") surface mounted installation, recessed ten (10) door unit c/w locks, as manufactured by Spacesaver. (1-800-255-8170)
- .12 **Type L8** – Lockers: Model EDHGF-04 635 mm wide x 358 mm high x 165 mm deep (25" x 14" x 6") flush installation, recessed four (4) door unit c/w locks, as manufactured by Spacesaver. (1-800-255-8170)

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive metal lockers in accordance with manufacturer's instructions prior to metal locker installation.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Assemble and install lockers in accordance with manufacturer's written instructions.
- .2 Securely fasten lockers to grounds and nailing strips.
- .3 Install wall trim around recessed locker banks.
- .4 Install filler panels (false fronts) where indicated and where obstructions occur.
- .5 Install finished end, back panels to exposed ends, backs of locker banks.
- .6 Install locker numbers locks. No duplicate numbers in the same space. Numbering will be provided by the Consultant on shop drawings.

3.3 ADJUSTING

- .1 Adjust metal lockers for correct function and operation in accordance with manufacturer's written instructions.
- .2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Section Cast-in-Place Concrete

1.2 REFERENCES STANDARDS

- .1 ASTM International
 - .1 ASTM B241/B241M-16, Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
- .2 Standards Council of Canada
 - .1 CAN/CSA-B72-M87 (R2013), Installation Code for Lightning Protection Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for flagpoles and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered in Ontario or licensed in the Province of Alberta.
 - .2 Indicate dimensions, finishes, base jointing, anchoring and support systems, cleats, halyard boxes, trucks, finials and base collar for flagpoles.
 - .3 Submit an electronic copy of drawings of flagpoles and bases, showing general layout, jointing and complete anchoring and supporting systems.
- .4 Manufacturer's Instructions: submit manufacturer's installation instructions for each type of flagpole.
 - .1 Construction Waste Management: remove packaging as described in Section 01 74 19 - Waste Management and Disposal.
 - .2 Recycled Content: provide a product containing recycled materials if possible.
 - .3 Regional Materials: provide a product containing regional materials if possible.

1.4 QUALITY ASSURANCE

- .1 Provide each flagpole as complete unit produced by single manufacturer, including fittings, accessories, bases and anchorage devices.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Spiral wrap each flagpole with heavy Kraft paper, wood strip and steel band, or polyethylene wrap and pack in tubing for shipment.
 - .2 Deliver flagpole in two (2) pieces.
 - .1 When more than one (1) piece is required, provide precision joints with self aligning internal splicing sleeve arrangement.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in a dry location, in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect flagpoles from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Aluminum:
 - .1 Aluminum Association alloy AA 6063-T5 seamless extruded aluminum tubing.
 - .2 Fabricated from seamless extruded tubing in accordance with ASTM B241, alloy 6063 T6, having minimum tensile strength not less than 20 MPa and a yield point of 17 MPa. Heat treated and age hardened after fabrication.
- .2 Isolation coating: alkali-resistant bituminous paint or epoxy resin solution.

2.2 DESIGN CRITERIA

- .1 Flagpole, bases and anchorage devices to resist minimum wind velocity of 145 km/h unflagged and minimum 100 km/h flagged.
- .2 Description:
 - .1 Exposed Height: 7.6 m (25'-0").
 - .2 Butt Diameter: 114 mm (4 ½").
 - .3 Top Diameter: 66 mm (2.6").
 - .4 Options and Accessories: Internal halyard, internal locking door, finial, flash collar, galvanized tilting hinge base.
 - .5 Flag Size: 1,143 x 2,286 mm (45" x 90") maximum.

2.3 FABRICATION

- .1 Fabricate 7,620 mm long flagpole as complete unit including tilt base anchorage and fittings.

2.4 ACCESSORIES

- .1 Finial: standard ball shape.
- .2 Truck assembly: non-fouling, revolving double truck assembly, with sealed or ball bearings, finish to match flagpole.
- .3 Halyard: internal, two continuous halyards per flagpole; stainless steel aircraft cable. Retaining loop and weights for internal halyard, stainless steel.
- .4 Swivel snaps: two per halyard; galvanized steel with neoprene or vinyl covers.
- .5 Cleat box: one per cleat; finish to match flagpole. Furnish hasp for padlock, hinged cover, and tamperproof screws. Include lockable cleat box.
- .6 Lightning protection: ground spike conforming to CAN/CSA B72.

2.5 FIELD FABRICATION

- .1 Fabricate ground-set foundation assembly counterbalanced tilt installation of flagpole. Include locking lug on tilt pole.
- .2 Fabricate mountings of galvanized steel where encased in concrete.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for flagpole 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.

3.2 INSTALLATION

- .1 Shop apply isolation coating to metal surfaces of flagpole and base that will be encased in concrete.
- .2 Install flagpoles, base assemblies and fittings to shop drawings and manufacturer's instructions.
- .3 Check and adjust installed fittings for smooth operation of halyards.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.4 PROTECTION

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

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submit shop drawings for each specified item, clearly showing assembly and finishes.
- .2 Include installation details, method and location of all fastenings, anchorage, hardware, and all required accessories.

Part 2 Products

2.1 STEEL BIKE RACK

- .1 “Downtown Rack”, 50 mm square continuous tube, standard gauge, powder coat finish, as manufactured by Dero Bike Rack Company (Ph: 1-888-337-6729, Fax: 1-612-331-2731), www.dero.com.
- .2 Quantity: Two (2) required.

2.2 INSTITUTIONAL STOOL

- .1 304 mm diameter x 38 mm deep, 1.6 mm thick Type 304 stainless steel seat with #3 finish. Reinforce with 200 mm x 200 mm x 4.8 mm thick steel plate, stitch welded to underside of seat and pedestal. Edges of seat bottom to be rounded and smooth. No square edges.
- .2 51 mm Schedule 40 (60mm outside diameter) pipe support column welded to 200 mm x 200 mm x 6 mm thick base plate with four (4) 12 mm dia. holes. Overall height from floor to top of seat 450 mm.
- .3 Weld all joints and grind smooth. Square steel edges
- .4 Prime painted support column and base plate.
- .5 Quantity: One (1) required.

2.3 CONCRETE SPLASH PAD

- .1 Concrete splash pad, 610 mm x 310 mm, precast product. Weight 25 kg.
- .2 Quantity: One (1) per downspout.

2.4 CONCRETE SIDEWALK BLOCK

- .1 Concrete sidewalk block, 610 mm x 760 mm x 45 mm thick, precast product. Weight 46.5 kg.
- .2 Colour: Grey
- .3 Provide 25 mm rigid insulation to place blocks on for roof applications.

2.5 SHIPS LADDER

- .1 Structural steel flush tread hatch access model ship’s ladder, 68 degree steep incline, 4,800 mm high x 2082 mm horizontal run. 610 mm wide x 152 mm deep tread.
- .2 Finish: Galvanized.

2.6 PLASTIC PIPE SLEEVES FOR BOLLARDS

- .1 Sure Guard (Canadian Affiliate of Post Guard) polyethylene plastic pipe sleeves for steel pipe bollards. Manufactured by Encore Commercial Products Inc.
 - .1 Five (5) year UV stabilizer warranty.
 - .2 Thickness: 3 mm.
 - .3 Reflective Tape: 2 strips of 3M Series reflective tape recessed, 150 mm apart.
 - .4 Tensile Strength: 4,000 psi.
 - .5 Colours: Yellow post with red tape.

2.7 PERFORATED CLADDING

- .1 Vicwest corrugated perforated cladding:
 - .1 Hole size and spacing: 6 mm x 9.5 mm (1/4" x 3/8")
 - .2 Open Air: 40.3%
 - .3 Thickness: 22 gauge.
 - .4 Locations: Garbage enclosure gates and roof top mechanical unit partial enclosure
- .2 Vicwest flat perforated cladding:
 - .1 Hole size and spacing: 6 mm x 9.5 mm (1/4" x 3/8")
 - .2 Open Air: 40.3%
 - .3 Locations: Clerestory ventilation grilles.

2.8 WALL BUMPERS

- .1 Wallguard Protector Series 2210.1, extruded EPDC rubber bumper.
 - .1 Length: 800 mm, placed vertically.
 - .2 Height: 300 mm above finished floor.
 - .3 Fasteners: 13 mm diameter x 140 mm long wedge bolt. 3 per bumper.
 - .4 Colour: Black.
- .2 Dinoflex Sport Mat
 - .1 Size: 965 x 965 x 12 mm thick
 - .2 Colour: 50% Beige – 5522
 - .3 Adhere to wall.

2.9 KENNEL INSULATED DOOR

- .1 Kennel Clad Metal Insulated Guillotine Kennel Door.
 - .1 Door/Sliding Panel: Polypropylene air-cell centre, clad with 18 ga. aluminum sheets. Door opening size: 337 mm wide x 406 mm high.
 - .2 Perimeter Frame: Reinforcing C-Channel with hidden wall and floor seals and offset fin/brush weather seal.
 - .3 Vertical Frame Rails: both sides of the wall opening.

- .4 Pulley/Eyebolt Assembly: PVC covered cable looped from eye-bolt on door and eye-bolt and pulleys on the wall, beyond the travel distance of the door, directly above the one on the door.
- .5 Provide Kennel Clad Bite Guard to shield the cable from dog access.

2.10 FROSTED PARTITION

- .1 3Form SimpleSpec Partitions.
 - .1 Panel: 13 mm thick, clear colour, Supermatte finish both sides. Cut panels to suit frame system at top of millwork and acoustic ceiling tile.
 - .2 Frameless partitions with top and bottom channels.
 - .1 System: 200.25 SimpleSpec: Varia frameless partitions with top and bottom channels, and align brackets.

Part 3 Execution

3.1 PREPARATION

- .1 Ensure that framing is installed and prepared before installation of equipment.
- .2 Finished assemblies shall be complete in every respect, square, true to size and details, and free from distortion, twist or other defects, which could affect their strength, operation, or appearance. Factory-applied finishes shall be uniform, smooth and without blemish.

3.2 INSTALLATION

- .1 All items shall be installed plumb, square, properly spaced, rigidly coupled and adequately anchored maintaining uniformed clearances and accurate alignment.
- .2 Where possible, anchors, braces, coupling brackets, etc. shall be fully concealed. Where drilling, cutting or abutting finished surface is required, the cut portion shall be covered with suitable shoes, collars, escutcheon plates or other finished accessories, as required.
- .3 Protect adjacent finishes from damage when placing materials.

3.3 SCHEDULE

- .1 Place bike racks in locations indicated, or as directed by Consultant, secured to sidewalk with surface-mounted anchors with epoxy adhesive to anchors and base of mount in contact with concrete.
- .2 Secure institutional stool to concrete floor using roundhead security screws with epoxy adhesive, 150 mm minimum embed length, provided with unit, to locations indicated on drawings.
- .3 Place concrete splash pads under down spouts on grade. Grade to slope away from the building.
- .4 Secure ships ladder to concrete slab and roof structure. Manufacturer to engineer fasteners.
- .5 Verify steel pipe cores are set true, aligned in concrete. Center two (2) foam strips over bollard. Slide pipe sleeve over the bollard and foam.

- .6 Perforated cladding on metal gate supports on garbage enclosure. Sizes to be confirmed after shop drawings for supports have been reviewed.
- .7 Wall bumpers are to have three (3) per garage bay.
- .8 Wall sport mat to be installed in room 002.
- .9 Kennel Door to be installed in room 143.
- .10 Frosted Partitions within area 105.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 08 44 13 – Glazed Aluminum Curtain Walls
- .2 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES STANDARDS

- .1 Spring Tempered Aluminum: Aluminum Association alloy AA6011.
- .2 Aluminum Extrusions: Aluminum Association alloy AA6063-T5.

1.3 DESIGN REQUIREMENTS

- .1 Roller blinds to be a side-by-side double roller blind with blackout fabric to the exterior and shading fabric to the interior.
- .2 Design roller blinds to following requirements:
 - .1 Be designed in a manner that allows wear susceptible parts to be replaceable by either the user or the manufacturer.
 - .2 A guarantee of at least five (5) years of available replacement parts following discontinue of the products manufacture.
- .3 Be designed in a manner that permits effective disassembly of components in order to permit recycling of materials for which recycling markets exist.
- .4 Include stamps on all major plastic components indicating composition code to facilitate recycling efforts.

1.4 SUBMITTALS

- .1 Instruction for replacing and repairing worn parts, including inventory numbers for parts and procedures for order replacement parts.
- .2 Shop drawings reviewed by the consultant including finish materials and colour.
- .3 Instructions on where recyclable parts can be returned or delivered for recycling.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate dimensions in relation to window jambs, operator details, head and sill anchorage details, hardware and accessories details.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit one representative working sample of each type of roller blind.
- .3 Submit duplicate samples of manufacturer's standard colours for selection by Consultant. One sample to be retained by Consultant.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste materials in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.

1.8 WARRANTY

- .1 Five (5) year warranty on fabric. One (1) year warranty on parts and motors.

Part 2 PRODUCTS

2.1 MATERIALS AND FABRICATION

- .1 Blackout fabric: 4-ply opaque blackout fabric.
- .2 Shading Fabric: woven extruded reinforced vinyl coated polyester yarn, 0.76 mm (0.030") thick, max. 3% open area.
- .3 End Bracket: 77 mm x 96 mm two-piece moulded Acrylonitrile Butadiene Styrene (ABS).
- .4 Fascia: 1.7 mm thick, clear anodized extruded aluminum mounted to end brackets with back fascia for between mullion mounting.
- .5 Double Roller Axle: minimum 133 mm x 154 mm thick extruded aluminum one-piece profile designed to suit window span; integral slotted spline to retain the fabric edge, reinforce the tube along its entire length to serve as locking device for the sprocket clutch assembly.
- .6 Drive Assembly: factory set for size and travel of shades; capable of field adjustment from exterior of shade without disassembly; with built-in shock absorber system to prevent chain breakage.
- .7 Exterior Hem Bar: clear anodized extruded aluminum with plastic end finials. Hem bar shall contain an internal pocket to allow for 4 mm vertical movement.
- .8 Manual Chain Operator: aluminum sprocket wheel driven by an endless #10 stainless steel bead chain of 90-pound test. Inertia braking system principle to allow for adjustment-free, non-drifting, smooth, controlled operation with positive stop action at any point of travel.
- .9 Standard of Acceptance: Solarfective Teleshade or accepted substitution.

2.2 MANUAL BLINDS

- .1 Blackout fabric: 4-ply blackout with an embossed vinyl face and back; Colour: B05 Grey. Fire Classification: NFPA 701 Small Scale
- .2 Shading Fabric: woven extruded reinforced vinyl coated polyester yarn, 0.76 mm (0.030") thick, max. 3% open area, colour to be selected by Consultant from manufacturer's standard range.
- .3 Standard of Acceptance: Solarfective

Part 3 EXECUTION

3.1 INSTALLATION

- .1 Install blinds at all exterior windows except at glass block locations.
- .2 Units to be full width of windows in a single unit.
- .3 Include centre brackets where necessary to prevent deflection of headrail.
- .4 Adjust to provide for operation without binding.
- .5 Use non-corrosive metal fasteners for installation, concealed in final assembly.
- .6 Adjust fabric, drive assembly and chain to provide smooth operation and to fit tightly in closed position.
- .7 Gaps between blinds in a glazing unit are to be places at mullion locations.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 30 00 – Cast-in-Place Concrete
- .2 Section 09 30 00 – Tiling
- .3 Section 09 65 16 – Resilient Sheet Flooring

1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM A276/A276M-17, Standard Specifications for Stainless Steel Bars and Shapes.
 - .2 ASTM A653/A653M-15e1, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM A924-17, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - .4 ASTM B221-14, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .5 ASTM D2047-11, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.

1.3 COORDINATION WITH CONCRETE FLOOR SLAB PLACEMENT

- .1 Entry mat is to be recessed in concrete floor slab to be flush with floor material adjacent.

1.4 ACTION AND INFORMATION SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include installation and maintenance instructions.
- .3 Shop Drawings:
 - .1 Show layout and sections of typical installations, details at edges showing adjacent material, anchors, and accessories, and field measurements of slab recess.
- .4 Samples:
 - .1 Submit not less than 150 x 150 mm square sections of material and 150 mm length of frame material in selected colour and finish.
- .5 Manufacturer's Written Instructions:
 - .1 Submit in accordance with Section 04 05 00 – Common Work Results for Masonry.
- .6 Sustainable Design Submittals:
 - .1 Construction Waste Management:

- .1 Submit project Waste Management Plan highlighting recycling and salvage requirements in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle floor mats in accordance with Section 01 61 00 – Common Product Requirements
- .2 Packaging Waste Management:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.6 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: provide in accordance with Section 01 78 00 – Closeout Submittals.
- .2 Warranty Documentation: Manufacturer to offer five (5) year warranty against defects in materials and workmanship.

Part 2 Products

2.1 ENTRY MAT SYSTEM

- .1 Provide manufacturer specified, or accepted substitutions.
- .2 Provide for total entry mat zone indicated on drawings (closest to exterior entry doors), EM 1: Edgewood Matting. Debris Trap Supreme, 13 mm thick mat.
- .3 Mat Module Dimensions: 292 mm x 445 mm.
- .4 Colour: #27, Dark Grey.
- .5 Floor recess edging: Provide continuous Schluter strip to perimeter of concrete and built-up floor recesses. Mitre cut all corner joints.

Part 3 Execution

3.1 PREPARATION

- .1 Substrate must be flat and level to tolerance of no more than 3 mm in 3 m.
- .2 Examine the substrates and conditions under which work is to be performed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 Lay mats after installation of finish flooring.
- .2 Dimensions to be confirmed on site prior to manufacturing.
- .3 Coordinate top of product surfaces with swinging doors to maintain under-door clearance.

3.3 CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning; supplemented as follows.
 - .1 Remove traces of primer, grout, caulking, and fill materials.

3.4 PROTECTION

- .1 Protect floor mat installation in accordance with Section 01 61 00 – Work Product Requirements.
- .2 Provide temporary filler of plywood or fibreboard in recessed slab and cover frames with protective plywood flooring. Maintain protection until dust generating construction and exterior work is complete.

END OF SECTION