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PROJECT

Interior Fit Up Phase Two
Regina, Saskatchewan

Volume One

PROJECT No.	SET No.
30/2015	
DATE	
2017-02-03	

LIST OF DRAWINGS

ARCHITECTURAL

END OF SECTION

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises of renovating approximately 2775 m² of floor space on two floors of an occupied building. The project site is located in Regina, Saskatchewan and further identified as "Interior Fit Up Phase Two, Regina, SK".

.2 Moving Services:

.1 Work includes relocation of 52 staff within the building for temporary accommodation prior to and including final move of these staff to their final location within the building. Moving services within the building will include: equipment, boxed personal items and computers/monitors for each workstation from their existing space to temporary accommodation within new finished space in the building and then back to their new final workstations.

.2 Inventory and disassembly of existing modular furniture and screens, storage off-site, bringing workstations back to site (phased with work sequence) for reassembly, and set up of new and existing workstations will be performed by a separate Departmental Representative contractor.

.3 See table below for location of moves within building. Refer to Demolition Plans for "from" room number and new work floor plans for "to" room number.

Number of Staff	Moving From (ref. Demo. Plans)	Swing Space Location	Moving To (ref. New Plans)
44	225, 228, 231-233, 235-237, and 242	(ref. New Plans) 106 and 138	207-210 and 214-217
6	170	(ref. Demo Plans) 243-244	207-210 and 214-217
2	132	N/A	207-210 and 214-217

1.2 WORK SEQUENCE

.1 The General Contractor will be responsible for the coordination of all work.

.2 "Phase 1" Work as indicated on drawings has been undertaken under a previous contract. The Work under this contract includes the remaining areas of the building as described on the drawings.

.3 The Phase 2 Work is broken up into Priorities 1, 2 and 3, as indicated on the drawings. Delivery of the Priority areas are to be sequenced within the construction schedule.

.4 The Work includes the temporary set up of Commissionaire's space at the south end of the building.

.5 Sequence of moves for temporary accommodation of staff within the building is to be phased with sequence of construction of the Fit Up work.

1.3 CONTRACTOR USE OF PREMISES

.1 Coordinate use of premises under direction of Departmental Representative.

.2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.3 Cooperate with other contractors employed by the Departmental Representative for other work within the building.

1.4 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.4 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.5 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.

.6 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.9 Record locations of maintained, re-routed, and abandoned service lines.

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

END OF SECTION

Part 1 General

1.1 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Normal hours of operation are between 08:00 – 16:30, Monday to Friday.

.3 Noise generating activities and access to the occupied spaces are to be conducted outside of normal hours of operation.

1.2 EXISTING SERVICES AND BUILDING SYSTEMS

.1 Notify, Departmental Representative of intended interruption of services or building mechanical or electrical systems, and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services or disruption to electrical or mechanical systems, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimal.

.3 Carry out interruptions after normal working hours of occupants, preferably on weekends.

1.3 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16 - Construction Progress Schedules - Bar (GANTT) Chart.

.2 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

1.4 SECURITY CLEARANCES

.1 Contractor personnel must submit to local law enforcement verification by RCMP, prior to admittance to the facility site. The Client reserves the right to deny access to any facility / site or part thereof to any Contractor personnel, at any time.

.2 All access to the building is to be through a designated entrance. Personnel will be signed in daily at start of work shift and provided with pass, which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

.3 Security documents are attached at the end of the Section.

1.5 SECURITY ESCORT

.1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.

.2 Departmental Representative requires minimum 72 hours' notice to provide escort for personnel.

1.6 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. No smoking will be allowed in or around the building. Smoking is allowed only in areas indicated by Departmental Representative.

.2 Turn off vehicles when they are parked next to building.

1.7 OCCUPIED SPACES

.1 Intent of project schedule is that spaces designated for renovations for the interior fit up will be vacated in sequence to allow Work to proceed within unoccupied areas. Refer to Priority Phasing Plans for sequencing of work.

.2 Common spaces within the building must remain clear for pedestrian access within building by occupants. Common corridors must remain unencumbered so that access to exits are maintained throughout the construction period.

.3 Spaces adjacent to the renovated areas may be occupied. Full-height demising partitions must be in place prior to Work on the interior fit up commencing. Maintain heat and power to occupied spaces.

.4 Coordinate the work with the occupancy schedule of the building, which will be provided by the Departmental Representative. Schedule work outside of the occupancy schedule within the occupied spaces identified by the Departmental Representative.

1.8 SERVICE DISRUPTIONS

.1 Minimize duration of disruptions of mechanical system. Sequence work on ductwork to maintain operational mechanical system for as long as possible. Schedule work to take place outside of regular work hours.

END OF SECTION

RCMP F Division Office, Regina
Contractor/Consultant Information Sheet

PLEASE PRINT LEGIBLY / ALL INFORMATION MUST BE PROVIDED

General Contractor only: Upon completion of forms, please contact the RCMP – Cherylyn Shewchuk to make arrangements for submission of documents.

NOTE: SUB-CONTRACTORS ARE TO CONTACT THE GENERAL CONTRACTOR FOR INSTRUCTIONS AND/OR QUESTIONS REGARDING COMPLETION OF FORMS – NOT THE RCMP

CONTRACTORS/CONSULTANTS MUST PROVIDE THE FOLLOWING INFORMATION:	
1. Your Complete Legal Name: *(First/Middle or "no Middle Name"/ Last Name)*	
2. Name of Company That You Work For:	
3. Company Telephone Number:	
4. Project That You Are Working On: (*Name of Project/Building/City/Province*)	SRCL No.:
5. Access Period (Start & End Dates): (*If exact dates unknown, estimate start &end dates*)	

CONTRACTORS / CONSULTANTS - PLEASE NOTE THE FOLLOWING:

Should an RCMP Access tag/card be issued to you, please note the following;

1) You are the sole user of the access tag and it must be visibly worn while working on the site.
2) The access tag is non-transferrable / can not be used while working on projects other than the RCMP projects it was issued for.
3) The access tag must be returned to the RCMP issuing office or site foreman (if approved) at the end of each day.
4) No access to areas that you have not been cleared will be allowed and if found in these areas your clearance will be revoked and you will be removed from the site.

Employee Signature:	Signed on Date:

EMPLOYER TO REVIEW (not employee applicant of this form), COMPLETE AND SIGN:

In order to comply with Federal Government and RCMP policies and guidelines, in relation to the collection of personal information, the employer requesting the security checks must be satisfied that he/she can confirm the identity of the applicant.

The employer MUST ("employer" is your supervisor or a colleague of the company that you are employed by):

1) Request that their employees attend in person and provided two pieces of Identification.
2) Gov't issued ID MUST include full date of birth and name of the individual ie, Driver's Licence - Birth Certificate, Passport, Firearms Licence. (One piece of Gov't issued ID must include the photograph and if using the Drivers Licence copy both the photo portion as well as the signature portion.)
3) If the employee has changed his/her name, ID MUST be provided with both the current as well as past names.

Type of ID: 1)_____Number_____

2)_____Number_____

Employers Name: _____
(First Name and Last Name)

Employers Signature: _____

Date of signature: _____

…/2

Facilities Access Level 2 (FA2) clearance Applicants:

Documents noted in the box below must be provided with your FA2 clearance application (Facilities Access Level 2 Clearance Forms to be completed for FA2 clearances: 1. Contractor/ Consultant Information Sheet & 2. Form TBS 330-23E):

CONTRACTORS/CONSULTANTS MUST PROVIDE PHOTOCOPIES OF:

I HAVE ATTACHED THE FOLLOWING DOCUMENTS TO THE ABOVE NOTED FORMS:	**YES / NO**
1. Driver's License (a clear copy of both the front and back of the document on the same page, certified to be a true copy by their supervisor or colleague). ***Note:*** If you do not have a Driver's License, please provide other government issued photo identification (passport, treaty card). Note: the photo must be clear.	
2. Birth Certificate (a clear copy of both the front and back of the document on one page, certified to be a true copy by their supervisor or colleague). ***Note:*** If you do not have a Birth Certificate, please provide other government issued identification (ie. Health Card Card, passport, treaty card).	

RCMP Reliability Status (RRS) clearance Applicants:

Documents noted in the box below must be provided with your RRS clearance application (RRS Clearance Forms to be completed for RRS clearances: 1. Contractor/ Consultant Information Sheet, 2. Form TBS 330-23E, 3. Form TBS 330-60E & 4. Security/Reliability Pre-Interview Questionnaire):

CONTRACTORS/CONSULTANTS MUST PROVIDE PHOTOCOPIES OF:

I HAVE ATTACHED THE FOLLOWING DOCUMENTS TO THE ABOVE NOTED FORMS:	**YES / NO**
1. Driver's License (a clear copy of both the front and back of the document on the same page, certified to be a true copy by their supervisor or colleague). ***Note:*** If you do not have a Driver's License, please provide other government issued photo identification (passport, treaty card). Note: the photo must be clear.	
2. Birth Certificate (a clear copy of both the front and back of the document on one page, certified to be a true copy by their supervisor or colleague). **DOCUMENT MUST BE PROVIDED FOR RRS CLEARANCES – NO ALTERNATE DOCUMENTS.**	
3. Two sets of Fingerprints ("Roll and Ink" style) – must be obtained from a Corp of Commissionaires office.	

PLEASE CHECK WITH THE GENERAL CONTRACTOR IF YOU ARE UNSURE WHAT LEVEL OF SECURITY CLEARANCE YOU SHOULD BE APPLYING FOR.

Government of Canada / Gouvernement du Canada

PROTECTED (when completed)

PERSONNEL SCREENING, CONSENT AND AUTHORIZATION FORM

OFFICE USE ONLY		
Reference number	Department/Organization number	File number

NOTE: For *Privacy Act* Statement refer to Section C of this form and for completion instructions refer to attached instructions.
Please typewrite or print in block letters.

A ADMINISTRATIVE INFORMATION (To be completed by the Authorized Departmental/Agency/Organizational Official)

☐ **New** ☐ **Update** ☐ **Upgrade** ☐ **Transfer** ☐ **Supplemental** ☐ **Re-activation**

The requested level of reliability/security check(s)

☐ Reliability Status ☐ Level I (CONFIDENTIAL) ☐ Level II (SECRET) ☐ Level III (TOP SECRET)

☐ Other _____

PARTICULARS OF APPOINTMENT/ASSIGNMENT/CONTRACT

☐ Indeterminate ☐ Term ☐ Contract ☐ Industry ☐ Other (specify secondment, assignment, etc.) _____

Justification for security screening requirement

Position/Competition/Contract number	Title		Group/Level (Rank if applicable)
Employee ID number/PRI/Rank and Service number (if applicable)	If term or contract, indicate duration period ▶	From	To
Name and address of department / organization / agency	Name of official	Telephone number ( )	Facsimile number ( )

B BIOGRAPHICAL INFORMATION (To be completed by the applicant)

Surname (Last name)	Full given names (no initials) underline or circle usual name used	Family name at birth

All other names used (i.e. Nickname)	Sex ☐ Male ☐ Female	Date of birth Y M D	Country of birth	Date of entry into Canada if born outside Canada Y M D

RESIDENCE (provide addresses for the last five years, starting with the most current) Home address	Daytime telephone number ( )	E-mail address

	Apartment number	Street number	Street name	Civic number (if applicable)	From Y M	To present
1	City	Province or state	Postal code	Country	Telephone number ( )	

	Apartment number	Street number	Street name	Civic number (if applicable)	From Y M	To Y M
2	City	Province or state	Postal code	Country	Telephone number ( )	

Have you previously completed a Government of Canada security screening form? ☐ Yes ☐ No	If yes, give name of employer, level and year of screening. Y

CRIMINAL CONVICTIONS IN AND OUTSIDE OF CANADA (see instructions)

Have you ever been convicted of a criminal offence for which you have not been granted a pardon? ☐ Yes ☐ No	If yes, give details. (charge(s), name of police force, city, province/state, country and date of conviction) ▪	
Charge(s)	Name of police force	City
Province/State	Country	Date of conviction ▶ Y M D

Government of Canada / Gouvernement du Canada

PERSONNEL SCREENING, CONSENT AND AUTHORIZATION FORM

PROTECTED (when completed)

Surname and full given names	Date of birth Y M D

C CONSENT AND VERIFICATION (To be completed by the applicant and authorized Departmental/Agency/Organizational Official)

Checks Required (See Instructions)	Applicant's initials	Name of official (print)	Official's initials	Official's Telephone number
1. ☐ Date of birth, address, education, professional qualifications, employment history, personal character references				( )
2. ☐ Criminal record check				( )
3. ☐ Credit check (financial assessment, including credit records check)				( )
4. ☐ Loyalty (security assessment only)				
5. ☐ Other (Law Enforcement Records Checks)				( )

The Privacy Act Statement
The information on this form is required for the purpose of providing a security screening assessment. It is collected under the authority of subsection 7(1) of the *Financial Administration Act* and the Government Security Policy (GSP) of the Government of Canada, and is protected by the provisions of the *Privacy Act* in institutions that are covered by the *Privacy Act*. Its collection is mandatory. A refusal to provide information will lead to a review of whether the person is eligible to hold the position or perform the contract that is associated with this Personnel Screening Request. Depending on the level of security screening required, the information collected by the government institution may be disclosed to the Royal Canadian Mounted Police (RCMP) and the Canadian Security Intelligence Service (CSIS), which conduct the requisite checks and/or investigation in accordance with the GSP and to entities outside the federal government (e.g. credit bureaus). It is used to support decisions on individuals working or applying to work through appointment, assignment or contract, transfers or promotions. It may also be used in the context of updating, or reviewing for cause, the reliability status, security clearance or site access, all of which may lead to a re-assessment of the applicable type of security screening. Information collected by the government institution, and information gathered from the requisite checks and/or investigation, may be used to support decisions, which may lead to discipline and/or termination of employment or contractual agreements. The personal information collected is described in Standard PIB PSU 917 (Personnel Security Screening) which is used by all government agencies, except the Department of National Defence PIB DND/PPE 834 (Personnel Security Investigation File), RCMP PIB CMP PPU 065 (Security/Reliability Screening Records), CSIS PIB SIS PPE 815 (Employee Security), and PWGSC PIB PWGSC PPU 015 (Personnel Clearance and Reliability Records) used for Canadian Industry Personnel. Personal information related to security assessments is also described in the CSIS PIB SIS PPU 005 (Security Assessments/Advice).

I, the undersigned, do consent to the disclosure of the preceding information including my photograph for its subsequent verification and/or use in an investigation for the purpose of providing a security screening assessment. By consenting to the above, I acknowledge that the verification and/or use in an investigation of the preceding information may also occur when the reliability status, security clearance or site access are updated or otherwise reviewed for cause under the Government Security Policy. My consent will remain valid until I no longer require a reliability status, a security clearance or a site access clearance, my employment or contract is terminated, or until I otherwise revoke my consent, in writing, to the authorized security official.

Please have the applicant check and initial all 5 boxes, then sign and date the form.

Signature _____ Date (Y/M/D) _____

D REVIEW (To be completed by the authorized Departmental/Agency/Organizational Official responsible for ensuring the completion of sections A, B and C)

Name and title	Telephone number
Address	Facsimile number

E APPROVAL (To be completed by authorized Departmental/Agency/Organizational Security Official only)

I, the undersigned, as the authorized security official, do hereby approve the following level of screening.

Reliability Status

☐ Approved Reliability Status ☐ Not approved

Name and title _____

Signature _____ Date (Y/M/D) _____

Security Clearance (if applicable)

☐ Level I ☐ Level II ☐ Level III ☐ Not recommended

Name and title _____

Signature _____ Date (Y/M/D) _____

Comments

PHOTO (for Level III T.S., and/or upon request - see instructions)

Part 1 General

1.1 ADMINISTRATIVE

.1 Project meetings will be scheduled throughout the progress of the work and at the call of Departmental Representative.

.2 Provide physical space and make arrangements for meetings.

.3 The Consultant shall chair meetings.

.4 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 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work: in accordance with Section 01 32 16 - Construction Progress Schedules - Bar (GANTT) 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.
- .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Owner provided products and work.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .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, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work, progress meetings will be held on a regular basis. Schedule to be determined.

.2 Contractor, major Subcontractors involved in Work, Departmental Representative, Consultant and Owner’s representatives are to be in attendance.

.3 Minutes of meetings will be recorded by the Consultant. Minutes will be distributed within 3 working days.

.4 Agenda for project meetings 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 to determine how these will affect the construction schedule and on completion date.
.12 Other business.

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 approved scope changes.

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

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete 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 Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

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

.2 Include scheduled activities for Commissioning (Cx) in the project schedule.

.3 Include scheduled activities for Training in the project schedule.

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

.5 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

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

1.3 SUBMITTALS

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

.2 Submit to Departmental Representative within 7 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Provide schedule in PDF format in sized so that description of work can be clearly read when printed out.

1.4 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1 Project milestone will be identified through discussion with the Contractor and Departmental Representative at the outset of the project.

1.5 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.

1.6 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 approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

END OF SECTION

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

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

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

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

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

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

1.2 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 where required in the specifications, shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Saskatchewan, 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 7 days for Departmental Representative's review of each submission.

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

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

.7 Accompany submissions with transmittal letter, 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 Departmental Representative's review, distribute copies.

.10 Submit 6 copies of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit 6 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit 6 copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit 6 copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit 6 copies of manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit 6 copies of manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit 6 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.17 Delete information not applicable to project.

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

.19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Departmental Represenetaive approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that

pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

.21 Electronic submission of Shop Drawings

.1 Electronic Shop Drawings (PDF format) shall not exceed 11x17 actual size. Electronic transfer of shop drawings relies on Architect and Engineering Consultants to print a record copy for their files - this can be done providing shop drawings do not exceed 11x17. Larger shop drawings would require hard copies for review.

.2 General Contractor to review shop drawing and place their electronic stamp signifying review.

.3 General Contractor to email all shop drawings to Architect with copy to Engineering Consultant as applicable.

.4 Engineering Consultant to review and place their electronic stamp / marks up, then email to Architect only (Engineering Consultant will not copy anyone else).

.5 Architect to check for coordination and transmit reviewed shop drawings by email to General Contractor.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address or to destination provided.

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

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

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

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control and as specified in each applicable Section.

END OF SECTION

Part 1 General

1.1 SITE PROTECTION

.1 Prevent damage to all existing items which are to remain (e.g. fencing, signs, trees, shrubs, turf, natural features, buildings, asphalt, surface or underground utility lines). Make good any damage.

.2 Preserve and protect existing benchmarks and survey monuments. Inform Departmental Representative immediately if benchmarks or survey monuments are encountered during construction. Make good any damage.

1.2 FINES AND PENALTIES

.1 Abuse to any plant material or unauthorized pruning or removal, in whole or in part, of plant material is not permitted.

.2 Be responsible to monitor all sub-trades for plant material abuse. Restitution for all damages found will be solely upon the Contractor.

.3 A fine for not less than plant material repair or replacement costs plus for loss of aesthetic or intrinsic value per individual plant, will be levied. The decision of the Departmental Representative in determination of damage will be final.

1.3 FIRES

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

1.4 DISPOSAL OF WASTES

.1 Burying of rubbish and waste materials on site is not permitted.

.2 Disposal of waste, or volatile materials such as mineral, spirits, oil or paint thinner, into waterways, storm or sanitary sewers prohibited.

.3 Remove rubbish, waste products and debris in accordance with regulations of authorities having jurisdiction.

1.5 CARE OF EXISTING PLANT MATERIAL

.1 Use all means necessary to protect plant materials before start up and during construction.

.2 Do not disturb the existing grade or store heavy equipment within the drip line of existing trees. If access is required within the drip line of existing trees, then protect the access route with a moveable timber bridge to cushion/spread weight of vehicles over a greater surface area. Departmental Representative to approve access route and timber bridge construction before work begins.

.3 Protection of branches that are interfering with construction: All branches that pose temporary interference to the process of construction, are to be tied up or back under the supervision of the Departmental Representative. Bindings thus provided will be removed as soon as feasible by the completion of construction (or phase of construction) to reduce possible water sprouting or structural damage.

.4 Pruning trees that are interfering with construction: Remove interfering branches, without injury to trunks only when directed by the Departmental Representative. The Departmental Representative will determine all trees which require pruning, the extent of pruning allowed, and will identify the amount of compensatory pruning required for loss of roots or tops. The Contractor will adhere to limitations of on-site construction movement around identified trees.

.5 Monitor condition of trees, in particular, possible wind damage or snow load damage to branches that are tied up.

.6 Wash foliage should excessive construction dust build up on plant material.

1.6 TRAFFIC PROVISIONS AND STORAGE

.1 Determine interference of trees and their root zones before moving equipment or supplies on site to avoid any damage to trees.

.2 Traffic provisions:

.1 Use only approved access routes for vehicular and heavy pedestrian movement. Parking areas shall be pre-designated at each construction site.

.2 Contractor responsible to provide soil aeration of compacted tree root areas through holes bored into the soil at the direction of the Departmental Representative.

.3 Storage:

.1 Store construction materials, fuels, chemicals, etc., in approved areas only.

.2 Store equipment, soil, building materials and debris beyond the drip-line of trees.

1.7 EXCAVATING ADJACENT TO EXISTING TREES

.1 Locate and stake locations of electrical service, utility lines, and other underground construction.

.2 Excavations within 2.0 metres of trees will be permitted only with prior approval of the Departmental Representative. Prior to excavating, all tree roots along the side to be exposed must be severed with a trencher to a depth of 500mm along the line of excavation. Prune all exposed roots with a sharp pruning tool, in order to provide a clean severance of roots.

.3 Excavations beyond two (2) metres from trees do not require trenching. Immediately after excavation, prune all exposed roots with a sharp pruning tool, in order to provide a clean severance of roots. Place a tarp over excavation wall to prevent exposed roots from drying out. Backfill around tree roots as soon as possible.

1.8 HERBICIDES / PESTICIDES

.1 Use only with approval of Departmental Representative and Owner and in strict accordance with applicable regulations and manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Province of Saskatchewan

.1 Occupational Health and Safety Act, 1993, S.S. 2005.

1.2 SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Requirements and Section 02 81 01 - Hazardous Materials.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.

.8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

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

1.3 FILING OF NOTICE

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

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

.1 Schedule and administer Health and Safety Meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.7 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Regulations, 1996.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 HAZARDOUS MATERIALS

.1 Where the contractor is in doubt or suspicious material is encountered, stop work and advise the Departmental Representative immediately.

1.11 UNFORSEEN HAZARDS

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

1.12 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have site-related working experience specific to activities associated with overhead work.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work .

1.13 POSTING OF DOCUMENTS

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

1.14 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

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

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.16 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.17 WORK STOPPAGE

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

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.

1.3 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

.2 Smoking on site is restricted to within personal vehicles or designated smoking locations.

END OF SECTION

Part 1 General

1.1 INSPECTION

.1 Allow Departmental Representative and Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative or Consultant, instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will 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, Departmental Representative shall pay cost of examination and replacement.

1.2 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.

1.3 PROCEDURES

.1 Notify appropriate agency and Departmental Representative 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.

1.4 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative 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 Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.5 REPORTS

.1 Submit two (2) copies of inspection and test reports to Departmental Representative.

.2 Provide copies to subcontractor of work being inspected or tested.

1.6 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.7 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 Departmental Representative and as specified in specific Section.

.3 Prepare mock-ups for Departmental Representative and 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 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.

.6 Mock-ups may remain as part of Work.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.3 WATER SUPPLY

.1 Departmental Representative will make available a continuous supply of potable water for construction use.

1.4 TEMPORARY HEATING AND VENTILATION

.1 Maintain temperatures of minimum 10 degrees C in unoccupied areas where construction is in progress.

.2 Maintain occupied spaces to comfort range of 18°-22°C

.3 Ventilating:

- .1 Disable air return ventilation from renovation areas or provide MERV 11 filtration at ducted returns.
- .2 Provide dust screens at all air pathways above ceilings around renovated areas to prevent spread of dust through building.
- .3 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .4 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .5 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .6 Ventilate storage spaces containing hazardous or volatile materials.
- .7 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.4 Permanent heating system of building, to be used when available. Be responsible for damage to heating system if use is permitted.

.5 On completion of Work for which permanent heating system is used, provide service maintenance to system at discretion of the Departmental Representative.

.6 Pay costs for maintaining temporary heat, when not using permanent heating system. Owner will pay utility charges when temporary heat source is existing building equipment.

.7 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.

.8 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 maintain temporary lighting throughout project. Existing lighting and power systems may be utilized.

1.6 TEMPORARY COMMUNICATION FACILITIES

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

1.7 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by Authorities Having Jurisdiction and governing codes, regulations and bylaws.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

1.2 SUBMITTALS

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

1.3 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 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.

1.4 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs.

1.5 HOISTING

.1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Hoists and cranes to be operated by qualified operator.

1.6 ELEVATORS

.1 Designated existing elevator to be used by construction personnel for transporting of materials only. Co-ordinate use with Departmental Representative.

.2 Provide protective coverings for finish surfaces of cars and entrances.

1.7 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Refer to extent of Contractor laydown area in drawings. 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 Limited parking will be available on site. Parking arrangements will be provided by the Departmental Representative at project start up.

.2 Provide and maintain adequate access to project site.

1.9 OFFICES

.1 Provide and maintain, during the entire progress of the Work, a suitable office on the site, for own use, with suitable tables or benches for the examination of drawings, specifications, etc., and where all notices and instructions from the Consultant may be received and acknowledged. Provide suitable meeting space for site meetings. Provide adequate heating, ventilating and lighting. Location of these offices to be coordinated with the Departmental Representative.

.2 Provide marked and fully stocked first-aid case in a readily available location.

1.10 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.

1.11 SANITARY FACILITIES

.1 Contractor shall provide temporary sanitary facilities for the use by the workers. Location of facilities outside of building to be designated by the Departmental Representative.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.12 CONSTRUCTION SIGNAGE

.1 No signs or advertisements, other than warning signs, are permitted on site.

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC AND PEDESTRIANS

.1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.2 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

.3 Protect travelling public from damage to person and property.

.4 Do not block roads without obtaining approval to do so from the Departmental Representative.

.5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.6 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

1.14 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 on an on-going basis.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.2 GUARD RAILS, BARRICADES, AND SIGNAGE

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide Construction Zone warning and access control signage.

1.3 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Design enclosures to withstand wind pressure and snow loading.

1.4 DUST TIGHT SCREENS AND DUST MITIGATION

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public. Dust tight screens must continue from floor slab to underside of structure and be installed tight to substrates and around interferences in order to block transmission of dust.

.2 Maintain and relocate protection until such work is complete.

.3 Maintain negative pressure in area of dust generating work. Exhaust directly to the exterior.

.4 Provide walk-off mats inside renovation area and maintain so these to keep them clean.

.5 Provide protection of flooring immediately outside Work area within public corridor area for duration of renovation work.

1.5 HARD WALL SCREENS

.1 Provide floor to underside of structure partitions between renovated areas and occupied spaces in the building to prevent noise transmission.

.2 Partitions shall be minimum 12.7 gypsum board both sides metal studs with batt insulation in all stud cavities.

.3 Maintain in place until noise generating activities are complete in renovated area.

.4 Existing partitions may be left in place to provide hard wall screens.

1.6 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, 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 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

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

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 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, steel members, doors and frames 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 Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.4 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

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 Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative 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 Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative 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 Departmental Representative, whose decision is final.

1.7 CO-ORDINATION

.1 Ensure co-operation 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 wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.9 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate 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 Departmental Representative 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.

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.

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 Departmental Representative.

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 of disturbance to Work, and/or building occupants.

.2 Obtain Departmental Representative approval prior to any disruptions to services.

.3 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.

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 FORMS

.1 Special forms required during the course of this Work may include the following. Forms will be supplied by the Departmental Representative.

- .1 Hot work.
- .2 Confined space entry.
- .3 Site steam protocol.
- .4 Ground disturbance.

1.3 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 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.

1.5 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 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping or firestopping sealant material using UL or ULC rated assembly in accordance with manufacturer's instructions.

.12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

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

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

1.1 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.2 Provide “walk-off” mats where required to control dust from tracking out of areas being renovated to public areas or other areas of the building.

.3 Vacuum mats and surrounding area daily and as needed where dust has been tracked from renovated areas.

.4 Remove waste materials from site at daily regularly scheduled times. Do not burn waste materials on site.

.5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.6 Provide on-site containers for collection of waste materials and debris.

.7 Dispose of waste materials and debris off site.

.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 When Work is Substantially Performed 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. Remove debris and surplus materials from accessible concealed spaces.

.3 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.4 Vacuum carpet in renovated areas and where construction traffic occurs. If heavily soiled carpeting shall be commercially steam cleaned. This will be at the discretion of the Departmental Representative.

.5 Clean and wax areas of resilient sheet and tile flooring in renovated areas, where required by specification section.

.6 Dust all horizontal surfaces, clean all glass and wipe down walls in renovated areas.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.2 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.3 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.4 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.

.5 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.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 Returning reusable items including pallets or unused products to vendors.

.6 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.7 Separate Condition: refers to waste sorted into individual types.

.8 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.9 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.

.10 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.11 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.2 SUBMITTALS

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

1.3 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not limited to:

- .1 Destination of materials listed.
- .2 Deconstruction/disassembly techniques and sequencing.
- .3 Schedule for deconstruction/disassembly.
- .4 Location.
- .5 Security.
- .6 Protection.
- .7 Clear labelling of storage areas.
- .8 Details on materials handling and removal procedures.

.3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.4 Describe management of waste.

.5 Identify opportunities for reduction, reuse, and recycling of materials.

.6 Post WRW or summary where workers at site are able to review content.

.7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

.8 Monitor and report on waste reduction.

1.4 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

- .1 Transport to users of material for recycling.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.

.1 Ship materials to site operating under Certificate of Approval.

1.5 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Protect surface drainage, mechanical and electrical from damage and blockage.

.3 Separate and store materials produced during dismantling of structures in designated areas.

.4 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

.3 Provide waybills for separated materials.

1.6 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil, and paint thinner into waterways, storm, or sanitary sewers.

1.7 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility and where required provide temporary security measures approved by Departmental Representative.

1.8 SCHEDULING

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

Part 2 Execution

2.1 APPLICATION

.1 Do Work in compliance with WRW.

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

2.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

Part 1 General

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Departmental Representative Inspection.

.2 Departmental Representative Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.

.4 Certificates required by Fire Commissioner and Utility companies have been submitted.

.5 Operation of systems have been demonstrated to Owner's personnel.

.6 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative, Consultants and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

.5 Where re-inspection is required due to uncompleted deficiencies, the time required by the Departmental Representative and Consultants will be recorded and reimbursement of this time may be charges back to the Contractor by deducting from amounts retained.

1.2 CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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 Copy will be returned after final inspection, with Departmental Representative's comments.

.4 Revise content of documents as required prior to final submittal.

.5 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, final copies of operating and maintenance manuals in English.

.6 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.

.7 Furnish evidence, if requested, for type, source and quality of products provided.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at Contractor’s own expense.

.9 Pay costs of transportation.

1.2 FORMAT

.1 Organize data as instructional manual.

.2 Provide three (3) bound hard copies and two (2) PDF copies on DVD or CD of the Project Record Documents (Maintenance Manual).

.3 Provide one bound original of the Commissioning Manual.

.4 Binders: cloth, hard covered, expandable, loose leaf paper size 219 x 279 mm. Colour “black”.

.5 Identify each binder with type or printed title on cover and spine, to read, 'Project Record Documents'; ‘title of project’ and identify subject matter of contents. Lettering to be “gold” colour.

.6 Provide draft manual for Consultant Review. This is an addition to the required copies. Consultant may choose to keep the draft manual for their use and reference.

.7 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.8 Provide printed title on DVD/CD version to coincide with title on bound version.

.9 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.10 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.11 Text: manufacturer's printed data, or typewritten data.

.12 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.3 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Shop Drawings: illustrating details of a portion of work.

.4 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.5 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.6 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.

1.4 AS-BUILTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one 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 inspection by Departmental Representative.

.6 Turn over final as-built record drawings to Departmental Representative within 15 working days after Substantial Performance of the project.

1.5 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of opaque drawings, provided by Departmental Representative.

.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: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: 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 specifications sections.

1.6 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, shut-down, 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 co-ordination 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.

.15 Additional requirements: as specified in individual specification sections.

1.7 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.

1.8 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 location as directed; place and store.

.4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.9 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 location as directed; place and store.

.4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.10 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

1.11 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 Departmental Representative.

1.12 WARRANTIES AND BONDS

.1 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.2 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:

.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 days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.3 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.4 Respond in a timely manner to oral or written notification of required construction warranty repair work.

.5 Written verification will follow oral instructions. Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.13 PRE-WARRANTY CONFERENCE

.1 Meet with Departmental Representative, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Departmental Representative.

.2 Departmental Representative will establish communication procedures for:

.1 Notification of construction warranty defects.

.2 Determine priorities for type of defect.

.3 Determine reasonable time for response.

.3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.

.2 Refer to all project Specification Sections for detailed description of commissioning requirements.

.3 Acronyms:

.1 Cx - Commissioning.
.2 Cx Authority – Commissioning Authority.
.3 EMCS - Energy Monitoring and Control Systems.
.4 O&M - Operation and Maintenance.
.5 PI - Product Information.
.6 PV - Performance Verification.
.7 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

.1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:

.1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
.2 Ensure appropriate documentation is compiled into the O&M manual.
.3 Effectively train O&M staff.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

.1 Commissioning (Cx) Plan. The Contractor will be responsible for developing the Commissioning (Cx) Plan.

.2 The parties responsible for Cx activities shall be identified in the Commissioning (Cx) Plan.

.3 Cx to be a line item of Contractor's cost breakdown.

.4 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.5 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the installed systems are proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.

.6 Departmental Representative will issue Interim Acceptance Certificate when:

.1 Completed Cx documentation has been received, reviewed for suitability and approved by Cx Authority.

.2 Equipment, components and systems have been commissioned.

.3 O&M training has been completed.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Consultant and Cx Authority, to ensure effective performance.

.2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.5 PRE-CX REVIEW

.1 Before Construction:

.1 Review contract documents, confirm by writing to Departmental Representative:

.1 Adequacy of provisions for Cx.

.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:

.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:

.1 Have Cx Plan up-to-date.

.2 Ensure installation of related components, equipment, sub-systems, systems is complete.

.3 Fully understand Cx requirements and procedures.

.4 Have Cx documentation shelf-ready.

.5 Understand completely design criteria and intent and special features.

.6 Submit complete start-up documentation to Departmental Representative.

.7 Have Cx schedules up-to-date.

.8 Ensure systems have been cleaned thoroughly.

.9 Complete TAB procedures on systems; submit TAB reports to Departmental Representative for review and approval.

.10 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit:

.1 Name of Contractor's Cx agent.

.2 Draft Cx documentation.

.3 Preliminary Cx schedule.

.2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.

.3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.

.4 Provide additional documentation relating to Cx process required by Departmental Representative.

1.8 COMMISSIONING DOCUMENTATION

.1 Refer to individual equipment Specification Sections for (Cx) forms: Installation Check Lists, Product Information (PI) and Performance Verification (PV) forms for requirements.

.2 Consultant and Cx Authority to review and approve Cx documentation.

.3 Provide completed and approved Cx documentation to Departmental Representative.

1.9 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules.

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Approval of Cx reports.

.2 Verification of reported results.

.3 Repairs, retesting, re-commissioning, re-verification.

.4 Training.

1.10 COMMISSIONING MEETINGS

.1 Cx meetings will be held following project meetings and as specifically requested.

.2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.

.3 Cx meetings will be held on a regular basis until commissioning deliverables have been addressed.

.4 At approximately 50% completion stage a separate Cx scope meeting will be held to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:

.1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.

.2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.

.5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Contractor, who will record and distribute minutes.

.7 Ensure subcontractors and relevant manufacturer representatives are present at 50% and subsequent Cx meetings and as required.

1.11 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.12 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days notice prior to commencement.

.2 Departmental Representative may witness start-up.

.3 Consultant and Cx Authority will witness testing for PV.

.4 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.13 MANUFACTURER'S INVOLVEMENT

.1 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative.

.1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.

.2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.

.2 Integrity of warranties:

.1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.

.2 Verify with manufacturer that testing as specified will not void warranties.

.3 Qualifications of manufacturer's personnel:

.1 Experienced in design, installation, and operation of equipment and systems.

.2 Ability to interpret test results accurately.

.3 To report results in clear, concise, logical manner.

1.14 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up and testing in following distinct phases:

.1 Included in delivery and installation:

.1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.

.2 Visual inspection of quality of installation.

.2 Start-up: follow accepted start-up procedures.

.3 Operational testing: document equipment performance.

.4 System PV: include repetition of tests after correcting deficiencies.

.5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from Consultant and Cx Authority after distinct phases have been completed and before commencing next phase.

.4 Documents require tests on approved PV forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:

.1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.

.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.

.3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.

.1 Rejected equipment to be remove from site and replace with new.

.2 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.

.2 Start-up documentation to include:

- .1 Factory and on-site test certificates for specified equipment.
- .2 Pre-start-up inspection reports.
- .3 Signed installation/start-up check lists.
- .4 Start-up reports,
- .5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.16 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.

.2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.

.3 Operate and maintain systems for length of time required for commissioning to be completed.

.4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.17 TEST RESULTS

.1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.

.2 Provide manpower and materials, assume costs for re-commissioning.

1.18 START OF COMMISSIONING

.1 Notify Departmental Representative at least 14 days prior to start of Cx.

.2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.19 INSTRUMENTS / EQUIPMENT

.1 Submit to Departmental Representative for review and approval:

- .1 Complete list of instruments proposed to be used.
- .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date, and calibration accuracy.

.2 Provide the following equipment as required:

- .1 2-way radios.
- .2 Ladders.

.3 Equipment as required to complete work.

1.20 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:

.1 Under actual operating conditions, over entire operating range, in all modes.

.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

.4 EMCS trending to be available as supporting documentation for performance verification.

1.21 WITNESSING COMMISSIONING

.1 Consultant and Cx Authority to witness activities and verify results following the Contractor’s performance verification.

1.22 AUTHORITIES HAVING JURISDICTION

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.3 Provide copies to Departmental Representative within 10 days of test and with Cx report.

1.23 COMMISSIONING CONSTRAINTS

.1 Commissioning will be undertaken on new equipment and modified equipment provided under this contract. Where these are tied into existing building systems the Cx will need to be coordinated with the building operator.

1.24 EXTRAPOLATION OF RESULTS

.1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.25 EXTENT OF VERIFICATION

.1 Tenant areas:

.1 Provide manpower and instrumentation to verify up to 100% of reported results.

.2 Number and location to be at discretion of Departmental Representative.

.3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

.4 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.

.5 Perform additional commissioning until results are acceptable to Consultant and Cx Authority.

1.26 REPEAT VERIFICATIONS

.1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:

.1 Verification of reported results fail to receive Consultant's or Cx Authority approval.

.2 Repetition of second verification again fails to receive approval.

.3 Departmental Representative deems Contractor's request for second verification was premature.

1.27 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.28 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.

.2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.29 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx leave systems in normal operating mode.

.2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Cx Authority.

1.30 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.31 TRAINING

.1 Provide training in accordance with Section 01 91 41 - Commissioning (Cx) - Training and requirements of Contract Specification Sections.

.2 Refer to requirements of ES/SOW-0101 Statement of Work for Procurement and Installation of Electronic Security Systems (CSC) and ES/SOW-0102 Statement of Work for Quality Control for Procurement and Installation of Electronic Security Systems (CSC).

1.32 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.33 OCCUPANCY

.1 Cooperate fully with Departmental Representative during stages of acceptance; facility will remain fully occupied.

1.34 INSTALLED INSTRUMENTATION

.1 Use instruments installed under Contract for TAB and PV if:

.1 Accuracy complies with these specifications.

.2 Calibration certificates have been deposited with Departmental Representative.

.2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.35 PERFORMANCE VERIFICATION TOLERANCES

.1 Application tolerances:

.1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Unless noted otherwise in this contract Specifications, to be within +/- 10% of specified values.

.2 Instrument accuracy tolerances:

.1 To be of higher order of magnitude than equipment or system being tested.

.3 Measurement tolerances during verification:

.1 Unless noted otherwise in this contract Specifications actual values to be within +/- 2 % of recorded values.

1.36 OWNER'S PERFORMANCE TESTING

.1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

Part 2 Schedules

2.1 SCHEDULE OF ARCHITECTURAL SYSTEMS

.1 Electronic door hardware

2.2 CX SCHEDULE FOR MECHANICAL SYSTEMS

.1 Produce schedule of Cx activities in bar chart format to a scale that will ensure legibility. Bar chart to indicate:

.2 Sequences of testing equipment and systems, interrelationship between tests, duration of tests and training periods.

.3 Cx resources which will be committed to this project to ensure completion by prescribed dates.

.1 Training Plan.

.2 Cx Documentation Plan.

.3 Water/fire mains and related site fire hydrants:

.4 Commission as soon as installation is complete, using procedures described in NFPA reference standards to provide protection for exterior envelope of new building during construction.

.5 Wet pipe sprinkler systems:

.1 Test completed systems in accordance with NFPA 13.

.6 Plumbing systems:

.1 To be filled, then proceed with flushing, cleaning and disinfection processes.

.2 Test plumbing and piping systems installed under this project

.7 HVAC systems:

.1 Ductwork, piping and conduit systems that will be concealed to be tested and certified to specified standards before being concealed. This work is specified in relevant technical sections of Division 23.

.2 HVAC systems to be initially started up, "bumped" in a stand-alone mode and pre-start-up inspections completed.

.3 Start after dust-producing construction procedures have been completed and areas are dust-free.

.4 Start HVAC to replace temporary heating systems after Consultant's written approval.

.5 Operate HVAC to permit TAB and ensure full compliance with contract documents when weatherstripping, caulking and sealing of exterior envelope has been completed, and interior partitions and doors are installed and ceiling return plenums are in place.

.8 Hydronic systems:

.1 To be filled, then undertake cleaning and flushing processes.

.2 Commission at same time as HVAC systems are being TAB'd.

.9 HVAC and related hydronic systems:

.1 Test in conjunction with EMCS, and fire and smoke detection systems.

.10 Vibration isolation and seismic control measures:

.1 Test these measures at same time as connected system.

.11 Equipment and systems subject to specified codes and standards or subject to approval of an authority having jurisdiction:

.1 Commission equipment and systems in accordance with those requirements.

.2 Where testing is required as part of a regulatory process, and where Cx procedures are fully developed, are appropriate to project, ensure tests as required by such codes are performed. Departmental Representative to witness tests as part of Quality Assurance role.

.12 EMCS:

.1 Testing and Cx to be specified in Section 25 01 11 - EMCS: Start-Up, Verification and Commissioning, which defines conditions for acceptance.

.2 Point-by-point and end-to-end testing to be carried out by installation Contractor, monitored by Consultant and CxA and verified as part of system verification.

.3 Demonstration of operation of systems under operating conditions and over full operating range to take place prior to 30-day test period and to be witnessed by Consultant and CxA. Includes simulated opposite-season tests. EMCS programming and operation to be verified after HVAC systems have been TAB'd and to include specified 30-day test period.

.13 To reduce VOC concentrations to acceptable levels:

.1 Flow rates of outside air into HVAC systems to be adjusted as required during Cx, and as necessary after occupancy.

.14 Commission Mechanical systems and associated equipment as follows:

.1 Plumbing systems:

.1 Installation and Operation of all working plumbing fixtures installed under this project.

.2 All piping installed to serve fixtures.

.2 HVAC and exhaust systems:

.1 HVAC systems

.2 Exhaust systems.

.3 Dedicated DX Systems

.3 .3 Fire and life safety systems:

.1 Wet pipe sprinkler systems.

.2 Preaction sprinkler systems.

.3 Fire extinguishers.

.4 EMCS (Energy Management Control System:

.1 Entire EMCS system affected by scope of work from graphic to device (point-to-point) performance verification.

.15 Product Information forms and Performance Verification will be carried out on the following mechanical systems. Product information form are only required for new equipment specified under scope of work:

.1 All VAV boxes and air valves affected by scope of work (PV sample provided) – 30% to be reviewed with Cx Agent after commissioning is complete.

.2 All new control dampers installed – 100% to be reviewed with Cx Agent after commissioning is complete.

.3 Exhaust fans EF-32 (PV and PI sample provided) – 100% to be reviewed with Cx Agent after commissioning is complete.

.4 Existing air handling unit (PV sample provided) – 100% to be reviewed with Cx Agent after commissioning is complete.

.5 Radiation: 30% to be reviewed with Cx Agent after commissioning is complete.

.6 Testing and Air Balancing Report: 30% to be reviewed with Cx Agent after commissioning is complete.

2.3 SCHEDULE OF ELECTRICAL SYSTEMS

.1 The following is a listing of the building electrical systems to be commissioned:

.1 Low Voltage Lighting Systems

.2 Low Voltage Switchboards

.3 Panelboards Breaker Type

.4 Motor Starters To 600 V

.5 Lighting

.6 Emergency Lighting

.7 Exit Signs

.8 Fire Alarm Systems

.9 Communication Cable Inside Building

2.4 INTEGRATED LIFE SAFETY SYSTEMS

.1 Upon completion of individual system tests, test for integration of life safety systems upon

.1 Loss of power

.2 Fire alarm signal

.2 Electronic Hardware: Test integration with fire alarm event.

.3 Fire Protection Systems: test integrated systems to verify that components work together as designed.

.4 Performance of HVAC, fire protection, EMCS and systems forming part of integrated systems to be verified after systems has been TAB'd to ensure compliance with prescribed requirements.

.5 Fire alarm call out, horn strobes.

.6 Emergency lighting, exit signage.

END OF SECTION

Part 1 General

1.1 INSTALLATION/START-UP CHECK LISTS

.1 Include the following data:

.1 Product manufacturer's installation instructions and recommended checks.

.2 Special procedures as specified in relevant technical sections.

.3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Departmental Representative supplemental additional data lists may be required for specific project conditions.

.3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.

.4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Departmental Representative. Check lists will be required during Commissioning and will be included in O&M Manual at completion of project.

.5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.2 PRODUCT INFORMATION (PI) REPORT FORMS

.1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the Cx Manual at completion of work.

.2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Consultant and Cx Authority approvals.

1.3 PERFORMANCE VERIFICATION (PV) FORMS

.1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.

.2 PV report forms include those developed by Contractor, and records the measured data and readings taken during functional testing and Performance Verification procedures.

.3 Prior to PV of integrated system, complete the PV forms of related systems and obtain Consultant's and Cx Authority approval.

1.4 COMMISSIONING FORMS

.1 Example forms are included appended to this Section.

.2 The Consultant will develop and provide the Contractor with final project-specific Commissioning forms in hard-copy format complete with specification data.

.3 Revise items on Commissioning forms to suit project requirements.

1.5 COMMISSIONING VERIFICATION PROCESS

.1 Use Commissioning forms to verify installation and record performance of equipment and systems.

.2 Strategy for Use:

.1 Consultant provides Contractor project-specific Commissioning forms with Specification data included.

.2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.

.3 Confirm operation as per design criteria and intent.

.4 Identify variances between design and operation and reasons for variances.

.5 Verify operation in specified normal and emergency modes and under specified load conditions.

.6 Record analytical and substantiating data.

.7 Reported results will be verified by the Consultant and Cx Authority.

.8 Form to bear signatures of recording technician and reviewed and signed off by Consultant and Cx Authority.

.9 Submit immediately after tests are performed.

.10 Reported results in true measured SI unit values.

.11 Originals of completed forms are to be retained on site during start-up, testing and commissioning period. Maintain in Commissioning Manual binder.

.12 Forms to be hard copy with type written results in Commissioning Manual Binder.

END OF SECTION

Project Name: Interior Fit-Up	**Project #:** 30/2015
	Component Form #:

Component Verification Form

System:	*Equipment:*	*Section:* / *Tag:*
HVAC	**EXHAUST FAN**	**EF-32**

INSTALLED EQUIPMENT DATA:

Manufacturer	
Type	
Model Number	
Serial Number	

LOCATION DATA:

Building	
Area Served	
Equip Location	

PERFORMANCE DATA:

	Specified	Shop Drawings	Required Modification	Installed
Fan:				
Fan Type	Inline		-	Eng: ☐ Con: ☐
Air Flow	530 L/s (1,124 CFM)	(0 CFM)	-	Eng: ☐ Con: ☐
E.S.P.	125 Pa (0.50 in.w.c.)	(0.00 in.w.c.)	-	Eng: ☐ Con: ☐
Sound	Sones		-	Eng: ☐ Con: ☐
Motor Size	0.37 kW (0.50 hp)	(0.00 hp)	-	Eng: ☐ Con: ☐
Voltage / Phase	208V/60/3 phase		-	Eng: ☐ Con: ☐
Motor Type	Belt Drive		-	Eng: ☐ Con: ☐
Control				
Options:				
Seals	Neoprene		-	Eng: ☐ Con: ☐
Backdraft Damper	Yes		-	Eng: ☐ Con: ☐
Isolators	Spring		-	Eng: ☐ Con: ☐

Comments

SIGN-OFFS:

Contractor: _____ Date: _____

Engineer: _____ Date: _____

CxA: _____ Date: _____

1. TEST PURPOSE

.1 To test all components of the air handling unit to ensure that the system and all associated sub-systems operate as intended during normal and abnormal operating conditions.

.2 To document that the system operation performs as intended.

.3 To highlight required modifications and corrections to the system operation and allow those corrections to take place prior to substantial completion and turn over to owner.

.4 To ensure that the system and all sub-systems operates as required and intended and document that operation before turning over to the owner.

2. Test Prerequisites

.1 Controls:

- .1 As-built points lists have been submitted and reviewed. ---------- ☐ ☐
- .2 All associated controls have been verified point to point including: inputs, outputs, valves, actuators, interlocks, time delays, failure modes, restart modes, schedules, reset schedules, graphics and trending. ---------- ☐ ☐
- .3 All sensors have been calibrated. ---------- ☐ ☐
- .4 All sequences of operation at both extremes and at midpoints have been verified. ---------- ☐ ☐
- .5 All manual overrides and jumpers have been removed to allow for automatic operation. ---------- ☐ ☐
- .6 All hardware interlocks and safeties (if any) are operational. ---------- ☐ ☐
- .7 Trending within the BMS is operational. ---------- ☐ ☐

3. Equipment Tested

- .1 Supply Fan SF-1 and SF-1a
- .2 Exhaust Fan EF-29
- .3 Exhaust Fan EF-30
- .4 Pump P-5 and P-5a
- .5 Pump P-22
- .6 Humidifiers Hum-1 and Hum-1a

4. Schedules

.1 Establish trend logs where required to verify operation and provide supporting documentation.

.2 Occupied/Unoccupied Schedule

- .1 Weekday Schedule----------ON OFF

- .2 Weekend Schedule----------ON OFF

- .3 Holiday Schedule----------ON OFF

.3 S/A Temperature Discharge Reset Schedule

.1 Upper Limit

.1 Outside Temperature ---------- _____ ---------- ^{O}C

.2 S/A Setpoint---------- ---------- ^{O}C

.2 Lower Limit

.1 Outside Temperature ---------- _____ ---------- ^{O}C

.2 S/A Setpoint---------- ---------- ^{O}C

.4 Humidification Reset Schedule

.1 Upper Limit

.1 Outside Temperature ---------- _____ ---------- ^{O}C

.2 Humidification Setpoint ---------- --------%RH

.2 Lower Limit

.1 Outside Temperature ---------- _____ ---------- ^{O}C

.2 Humidification Setpoint ---------- --------%RH

5. Verification of field temperature devices.

.1 HRC Leaving Air Temperature (after HRC coil):

.1 Temperature indicated through BMS---------- OC

.2 Actual measured temperature ---------- _____ ^{O}C

.2 Preheat Leaving Air Temperature (after Pre-heat coil):

.1 Temperature indicated through BMS---------- OC

.2 Actual measured temperature ---------- _____ ^{O}C

.3 Outdoor Air Temperature (prior to HRC):

.1 Temperature indicated through BMS---------- _____ ^{O}C

.2 Actual measured temperature ---------- _____ ^{O}C

.4 Supply Air Temperature:

.1 Temperature indicated through BMS---------- _____ ^{O}C

.2 Actual measured temperature ---------- _____ ^{O}C

6. Verification of static pressure.

.1 Verify and record readings at static pressure sensing locations with certified manometer. Compare measurements with DDC readings.

.2 Supply SPS ___ (location):

.1 Pressure indicated through BMS ---------- _____Pa

.2 Actual measured pressure ---------- _____Pa

.3 Supply SPS ___ (location):

.1 Pressure indicated through BMS ---------- _____Pa

.2 Actual measured pressure ---------- _____Pa

.4 Exhaust SPS ___ (location):

.1 Pressure indicated through BMS ---------- _____Pa

.2 Actual measured pressure ---------- _____Pa

.5 Exhaust SPS ___ (location):

.1 Pressure indicated through BMS ---------- _____Pa

.2 Actual measured pressure ---------- _____Pa

7. System Start Up (coordinate with freeze stat test)

.1 Following Freeze Stat

.1	Confirm outside air damper is fully closed	☐	☐
.2	Confirm mixed air damper is fully open	☐	☐
.3	Confirm exhaust air damper is fully closed	☐	☐
.4	Confirm fans are off	☐	☐

.2 Start-up system

.1	Verify system is in 100% recirculation	☐	☐
.2	Schedule system on	☐	☐
.3	Verify AHU SF starts a minimum speed and ramps slowly to setpoint	☐	☐
.4	Verify EF-30 starts a minimum speed and ramps slowly to setpoint	☐	☐
.5	Verify EF-29 damper opens when AHU fan status is on	☐	☐
.6	Verify EF-29 damper end switch is proven before fan starts	☐	☐
.7	Verify EF-29 fan starts	☐	☐
.8	Verify dampers move to ventilation position	☐	☐

8. Static Pressure Control

.1 Ensure system is in occupied and at capacity ☐ ☐

.2 Reduce cooling load in several zones

.1	Supply fans slow down as airflow decreases	☐	☐
.2	Exhaust fans slow down as airflow decreases	☐	☐
.3	Supply fan controls to index static pressure run (SPS ____)	☐	☐
.4	Exhaust fan controls to index static pressure run (SPS ____)	☐	☐

.3 Change index run

.1	Adjust zone cooling requirement to change index run (SPS ____ & ____)	☐	☐
.2	Static pressure control switches to new index run	☐	☐
.3	Supply fan controls to index static pressure run	☐	☐
.4	Exhaust fan controls to index static pressure run	☐	☐

.4 Test all other supply pressure control points

.1	Override SP reading to be index run for third supply run (SPS ____)-	☐	☐
.2	Static pressure control switches to third run ----------	☐	☐
.3	Override SP reading to be index run for fourth supply run (SPS ____)	☐	☐
.4	Static pressure control switches to third run ----------	☐	☐
.5	Override SP reading to be index run for fifth supply run (SPS ____) -	☐	☐
.6	Static pressure control switches to third run ----------	☐	☐
.7	Override SP reading to be index run for sixth supply run (SPS ____)-	☐	☐
.8	Static pressure control switches to third run ----------	☐	☐
.9	Ensure all SPS overrides are reset ----------	☐	☐

.5 Test all other exhaust pressure control points

.1	Override SP reading to be index run for third exhaust run (SPS ____)	☐	☐
.2	Static pressure control switches to third run ----------	☐	☐
.3	Override SP reading to be index run for fourth exhaust run (SPS ____)	☐	☐
.4	Static pressure control switches to third run ----------	☐	☐
.5	Override SP reading to be index run for fifth exhaust run (SPS ____)	☐	☐
.6	Static pressure control switches to third run ----------	☐	☐
.7	Override SP reading to be index run for sixth exhaust run (SPS ____)	☐	☐
.8	Static pressure control switches to third run ----------	☐	☐
.9	Ensure all SPS overrides are reset ----------	☐	☐

.6 Set entire system occupied

.1	Supply fan controls to index static pressure run----------	☐	☐
.2	Exhaust fan controls to index static pressure run ----------	☐	☐

9. Discharge Air Control (Heating – no defrost required):

.1	Cooling coil valves are locked in the closed position----------	☐	☐
.2	HRC coil pump is on ----------	☐	☐
.3	HRC Three-way valve modulates to maintain setpoint----------	☐	☐
.4	Modify temperature reading above setpoint, valve modulates to control	☐	☐
.5	Reset override ----------	☐	☐
.6	Verify pumps P-5 and P-5A are on ----------	☐	☐
.7	Valves are modulating to maintain setpoint ----------	☐	☐
.8	Increase setpoint to full heating ----------	☐	☐
.9	Valve modulate to full heating----------	☐	☐
.10	Decrease setpoint until 2/3 valve closes ----------	☐	☐
.11	Decrease setpoint further, 1/3 valve modulates to control ----------	☐	☐

.12 Record Water Temperatures

Entering Water Temperature---------- OC

Leaving Water Temperature ---------- OC

.13 Reset overrides and record Water Temperatures

Entering Water Temperature---------- OC

Leaving Water Temperature ---------- OC

10. Discharge Air Control (Cooling):

.1 Ensure Chilled Water plant is fully operational.

.2 Put AHU into free cooling

- .1 Cooling coil valves are locked in the closed position ---------- ☐ ☐
- .2 HRC coil pump is off ---------- ☐ ☐
- .3 HRC Three-way valve is in by-pass around coil ---------- ☐ ☐
- .4 Economizer damper modulates to maintain desired setpoint ---------- ☐ ☐
- .5 Confirm free cooling is utilized when Outside air is cooler than return air with offset ---------- ☐ ☐

.3 Put AHU into mechanical cooling

- .1 Heating coil valves are locked in the closed position ---------- ☐ ☐
- .2 Verify pumps P-5 and P-5A are off ---------- ☐ ☐
- .3 HRC coil pump is on ---------- ☐ ☐
- .4 HRC Three-way valve is in full reclaim ---------- ☐ ☐
- .5 Modify SAT reading below setpoint, valves modulate to control ------ ☐ ☐
- .6 Increase setpoint to full cooling (add load if required) ---------- ☐ ☐
- .7 Valves modulate to full cooling ---------- ☐ ☐
- .8 Record Water Temperatures
  - Chilled Water Temperature ---------- OC
  - Leaving Water Temperature ---------- OC
- .9 Decrease setpoint until 2/3 valve closes ---------- ☐ ☐
- .10 Decrease setpoint further, 1/3 valve modulates to control ---------- ☐ ☐
- .11 Reset overrides and record Water Temperatures
  - Chilled Water Temperature ---------- OC
  - Leaving Water Temperature ---------- OC

11. Heat Recovery (Defrost Control):

.1 With system in Winter Heat Recovery

- .1 Record Water Temperatures
  - HRC-4 Leaving Water Temperature Gauge ---- ^{O}C
  - EMCS HRC-4 Leaving Water Temperature ---- ^{O}C
  - HRC-4 Mixed Water Temperature Gauge ------ ^{O}C
  - EMCS HRC-4 Mixed Water Temperature ------ ^{O}C
- .2 Decrease HRC-4 mixed water temperature to 0.5 Deg.C. ---------- ☐ ☐
- .3 Three-way valve modulates to increase mixed water temperature ----- ☐ ☐
- .4 Record Water Temperatures
  - HRC-4 Leaving Water Temperature Gauge ---- ^{O}C
  - EMCS HRC-4 Leaving Water Temperature ---- ^{O}C
  - HRC-4 Mixed Water Temperature Gauge ------ ^{O}C
  - EMCS HRC-4 Mixed Water Temperature ------ ^{O}C
- .5 Reset Overrides ---------- ☐ ☐

12. Humidification:

.1 Ensure humidification is fully operational.

.2 Put AHU into humidification

- .1 Humidifiers modulate to maintain setpoint ---------- ☐ ☐
- .2 Increase setpoint, humidifiers modulate to maintain ---------- ☐ ☐
- .3 Reset override ---------- ☐ ☐

.3 Humidification High Limit

- .1 Override high limit setpoint on H-1 below current SAH ---------- ☐ ☐
- .2 Humidifier H-1 modulates to maintain ---------- ☐ ☐
- .3 Override high limit setpoint on H-1a below current SAH ---------- ☐ ☐
- .4 Humidifier H-1a modulates to maintain ---------- ☐ ☐
- .5 Reset overrides ---------- ☐ ☐

.4 Humidification Enable

- .1 Set OAT above enable setpoint ---------- ☐ ☐
- .2 Humidification disables ---------- ☐ ☐
- .3 Reset override, humidification enables ---------- ☐ ☐

13. Failure Mode Testing Procedures

.1 Freezestat:

- .1 Manipulate control to simulate freezestat.
  - .1 Freeze Setpoint (5 Deg.C.) ---------- ---------- ☐ ☐
  - .2 Supply Fan Off ---------- ---------- ☐ ☐
  - .3 Exhaust Fan Off ---------- ---------- ☐ ☐
  - .4 Heat Recovery on ---------- ---------- ☐ ☐
  - .5 Heating Valves open ---------- ---------- ☐ ☐
  - .6 Coil Circ Pumps On ---------- ---------- ☐ ☐
  - .7 Alarm at Operator Work Screen ---------- ---------- ☐ ☐
- .2 Reset Freeze Alarm
  - .1 Fan system remains off ---------- ---------- ☐ ☐
- .3 Command Fan system on
  - .1 Confirm system starts under control ---------- ---------- ☐ ☐
  - .2 Banner shows return to normal ---------- ---------- ☐ ☐

.2 Supply Fan Failure:

- .1 Switch Power Off at Disconnect for SF-1
  - .1 Critical alarm after delay: ---------- ---------- ☐ ☐
  - .2 Record Delay ---------- _____ mins
  - .3 Supply fan SF-1a stays operational ---------- ---------- ☐ ☐

.2 Switch Power Off at Disconnect for SF-1a
- .1 Critical alarm after delay: ---------- ---------- ☐ ☐
- .2 Record Delay ---------- _____ mins
- .3 EF-30 fan turns off---------- ---------- ☐ ☐
- .4 Outside air damper closes (AHU-1)---------- ---------- ☐ ☐
- .5 Outside air damper closes (EF-30) ---------- ---------- ☐ ☐

.3 Turn Power back on at SF-1
- .1 Fan systems start (AHU-1 and EF-30)---------- ---------- ☐ ☐
- .2 EMCS shows return to normal for SF-1. -------- ---------- ☐ ☐
- .3 SF-1a remains in alarm.---------- ---------- ☐ ☐

.4 Turn Power back on at SF-1a
- .1 Fan system starts ---------- ---------- ☐ ☐
- .2 EMCS shows return to normal.---------- ---------- ☐ ☐

.3 Exhaust Fan Failure (EF-30):

.1 Switch Power Off at Disconnect
- .1 Critical Alarm---------- ---------- ☐ ☐
- .2 Record Delay ---------- _____ mins
- .3 AHU supply fans turn off ---------- ---------- ☐ ☐
- .4 Outside air damper closes (AHU-1)---------- ---------- ☐ ☐
- .5 Outside air damper closes (EF-30) ---------- ---------- ☐ ☐

.2 Turn Power back on at EF-30
- .1 Fan system starts ---------- ---------- ☐ ☐
- .2 EMCS show return to normal.---------- ---------- ☐ ☐

.4 Exhaust Fan Failure (EF-29):

.1 Switch Power Off at Disconnect
- .1 System Alarms---------- ---------- ☐ ☐
- .2 Record Delay ---------- _____ mins

.2 Turn Power back on at EF-30
- .1 Fan system starts ---------- ---------- ☐ ☐
- .2 EMCS show return to normal.---------- ---------- ☐ ☐

.5 Heating Coil Circ Pump Failure

.1 Switch Power Off at Disconnect
- .1 Pump goes off---------- ---------- ☐ ☐
- .2 No change in system operation---------- ---------- ☐ ☐
- .3 Alarm message at Operator Work Station------- ---------- ☐ ☐
- .4 Alarm printout provided ---------- ---------- ☐ ☐

.2 Turn Power On
- .1 Pump starts ---------- ---------- ☐ ☐
- .2 Printer and banner show return to normal. ------ ---------- ☐ ☐

.6 Temperature Alarms:

.1 Increase discharge temperature above 25 Deg.C.

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.2 Decrease discharge temperature below 7 Deg.C.

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.3 Reset override, and acknowledge alarms.

.4 Increase Heating Coil discharge temperature above 25 Deg.C.

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.5 Decrease Heating Coil discharge temperature below 7 Deg.C.

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.6 Reset override, and acknowledge alarms.

.7 Increase Heating Recovery water temperature above 40 Deg.C.

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.8 Decrease Heating Recovery water temperature below 0 Deg.C.

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.9 Reset override, and acknowledge alarms.

.7 High Supply Static:

.1 Supply air static high limit _____kPa ---------- ☐ ☐

.2 Set high limit below static pressure

.1 Alarm at Operator Work Station for both SF-1 and SF-1a---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.3 Reset static high limit

.1 System returns to normal ---------- ---------- ☐ ☐

.8 Filter Alarm (Filter 1):

.1 Filter alarm limit kPa

.2 Set high limit below filter pressure

.1 Alarm at Operator Work Station for both SF-1 and SF-1a---------- ☐ ☐

.2 Record Delay ---------- ---------- mins

.3 Reset override ---------- ☐ ☐

.9 Filter Alarm (Filter 2):

.1 Filter alarm limit kPa

.2 Set high limit below filter pressure

.1 Alarm at Operator Work Station for both SF-1 and SF-1a---------- ☐ ☐

.2 Record Delay ---------- ---------- mins

.3 Reset override ---------- ☐ ☐

.10 Filter Alarm (Filter 7):

.1 Filter alarm limit kPa

.2 Set high limit below filter pressure

.1 Alarm at Operator Work Station for both SF-1 and SF-1a---------- ☐ ☐

.2 Record Delay ---------- ---------- mins

.3 Reset override ---------- ☐ ☐

.11 Filter Alarm (Filter 8):

.1 Filter alarm limit kPa

.2 Set high limit below filter pressure

.1 Alarm at Operator Work Station for both SF-1 and SF-1a---------- ☐ ☐

.2 Record Delay ---------- ---------- mins

.3 Reset override ---------- ☐ ☐

.12 Heating Coil pump failure:

.1 Switch Power Off at Disconnect for P-5

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.3 Pump P-5a stays operational---------- ---------- ☐ ☐

.2 Turn Power back on at P-5

.1 Pump starts ---------- ---------- ☐ ☐

.2 banner show return to normal.---------- ---------- ☐ ☐

.3 Switch Power Off at Disconnect for P-5a

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.3 Pump P-5 stays operational ---------- ---------- ☐ ☐

.4 Turn Power back on at P-5a

.1 Pump starts ---------- ---------- ☐ ☐

.2 banner show return to normal.---------- ---------- ☐ ☐

.13 Heat Recovery Coil pump failure:

.1 Switch Power Off at Disconnect for P-22

.1 System alarms after delay: ---------- ---------- ☐ ☐

.2 Record Delay ---------- _____ mins

.3 HRC valve by-pass coil---------- ---------- ☐ ☐

.2 Turn Power back on at P-22

.1 Pump starts ---------- ---------- ☐ ☐

.2 banner show return to normal.---------- ---------- ☐ ☐

.14 Exhaust Humidity Alarms:

- .1 Decrease exhaust air high humidity alarm setpoint below current ----- ☐ ☐
  - .1 System alarms after delay: ---------- ---------- ☐ ☐
  - .2 Record Delay ---------- _____ mins
- .2 Increase exhaust air low humidity alarm setpoint above current ------- ☐ ☐
  - .1 System alarms after delay: ---------- ---------- ☐ ☐
  - .2 Record Delay ---------- _____ mins
- .3 Reset override, and acknowledge alarms.

.15 Supply Humidity Alarms:

- .1 Decrease supply air high humidity alarm setpoint below current ------ ☐ ☐
- .2 System alarms after delay (SF-1 and SF-1a):
  - .1 Record Delay ---------- _____ mins
- .3 Increase supply air low humidity alarm setpoint above current -------- ☐ ☐
- .4 System alarms after delay (SF-1 and SF-1a):
  - .1 Record Delay ---------- _____ mins
- .5 Reset override, and acknowledge alarms.

.16 Maintenance runtime:

- .1 Supply Fan SF-1
  - .1 Confirm EMCS tracks runtime ---------- ---------- ☐ ☐
  - .2 Record maintenance alarm time ---------- _____ hours
- .2 Supply Fan SF-1a
  - .1 Confirm EMCS tracks runtime ---------- ---------- ☐ ☐
  - .2 Record maintenance alarm time ---------- _____ hours
- .3 Exhaust Fan EF-29
  - .1 Confirm EMCS tracks runtime ---------- ---------- ☐ ☐
  - .2 Record maintenance time ---------- _____ hours
- .4 Exhaust Fan EF-30
  - .1 Confirm EMCS tracks runtime ---------- ---------- ☐ ☐
  - .2 Record maintenance time ---------- _____ hours
- .5 Pump P-5
  - .1 Confirm EMCS tracks runtime ---------- ---------- ☐ ☐
  - .2 Record maintenance time ---------- _____ hours
- .6 Pump P-5a
  - .1 Confirm EMCS tracks runtime ---------- ---------- ☐ ☐
  - .2 Record maintenance time ---------- _____ hours
- .7 Pump P-22
  - .1 Confirm EMCS tracks runtime ---------- ---------- ☐ ☐
  - .2 Record maintenance time ---------- _____ hours

.17 Damper Endswitch alarms:

.1 Air Handling Unit AHU-1

.1 Confirm AHU-1 alarms when endswitch does not prove ---------- ☐ ☐

.2 Record alarm time ---------- _____ hours

.2 Exhaust Fan EF-29

.1 Confirm EF-29 alarms when endswitch does not prove ---------- ☐ ☐

.2 Record alarm time ---------- _____ hours

.3 Exhaust Fan EF-30

.1 Confirm EF-30 alarms when endswitch does not prove ---------- ☐ ☐

.2 Record alarm time ---------- _____ hours

Comments

SIGN-OFFS

Contractor: _____ Date:_____

Engineer:_____ Date:_____

CxA:_____ Date:_____

1. TEST PURPOSE

.1 To test operation of the terminal units and installation of the new Energy Management Control System to ensure that they operate as intended during normal and abnormal operating conditions.

.2 To document that each terminal device tested performs as intended.

.3 To highlight required modifications and corrections to terminal device operation and allow those corrections to take place prior to substantial completion and turn over to owner.

.4 To verify that the point-to-point commissioning carried out by the contractor was completed and successful based on a sampling of the spaces utilizing this control sequence.

2. Test Prerequisites

.1 Test prerequisites ---------- C ☐ E ☐

.1 All test prerequisites are completed and form submitted ---------- ☐ ☐

.2 Note any prerequisites not completed at time of test and identify reason for continuing with test despite prerequisites not

---------- being complete

_____

_____

_____

_____

_____

.3 Establish trend logs where required to verify operation and provide supporting documentation.

3. Equipment Located in Spaces:

.1 List of all terminal unit equipment serving space and being controlled by sequence of operation:

.1 Supply Valve (s) 1.7, 1.9, 1.12, 1.14, 1.15, 1.17, 1.19, 1.20, 1.21, 1.22, and 1.23

.2 Exhaust Valve(s) EV1.61

.3 Reheat Coil(s) 1.7, 1.9, 1.14, 1.15, 1.17, 1.19, 1.20, 1.21, 1.22, and 1.23

.4 Perimeter Radiation Valve(s)

.5 Thermostat(s)

4. Schedule

.1 Occupied/Unoccupied Schedule ---------- C ☐ E ☐

.1 Follows unoccupied/occupied schedule for associated air handling unit: ---------- ☐ ☐

.2 Occupancy Override ---------- C E

.1 Thermostat Occupancy override functions on stat 1 (SV1.7):---------- ☐ ☐

.1 Override time set to? ---------- _____ minutes

.2 Thermostat Occupancy override functions on stat 1 (SV1.9):---------- ☐ ☐

.1 Override time set to? ---------- _____ minutes

.3 Thermostat Occupancy override functions on stat 1 (SV1.12): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.4 Thermostat Occupancy override functions on stat 1 (SV1.14): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.5 Thermostat Occupancy override functions on stat 1 (SV1.15): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.6 Thermostat Occupancy override functions on stat 1 (SV1.17): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.7 Thermostat Occupancy override functions on stat 1 (SV1.19): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.8 Thermostat Occupancy override functions on stat 1 (SV1.20): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.9 Thermostat Occupancy override functions on stat 1 (SV1.21): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.10 Thermostat Occupancy override functions on stat 1 (SV1.22): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

.11 Thermostat Occupancy override functions on stat 1 (SV1.23): ------ ☐ ☐

.1 Override time set to? ---------- -----minutes

5. Sensor Calibration Verification

.1 Temperature Sensors

.1 Space Temperature (thermostat 1 – SV1.7):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.2 Space Temperature (thermostat 2 – SV1.9):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.3 Space Temperature (thermostat 2 – SV1.12):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.4 Space Temperature (thermostat 2 – SV1.14):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.5 Space Temperature (thermostat 2 – SV1.15):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.6 Space Temperature (thermostat 2 – SV1.17):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.7 Space Temperature (thermostat 2 – SV1.19):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.8 Space Temperature (thermostat 2 – SV1.20):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.9 Space Temperature (thermostat 2 – SV1.21):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.10 Space Temperature (thermostat 2 – SV1.22):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.11 Space Temperature (thermostat 2 – SV1.23):

.1 Temperature indicated through BMS ---------- _____ ---------- °C

.2 Actual measured temperature _____ ---------- °C

.12 Air Discharge temperature (SV1.7):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.13 Air Discharge temperature (SV1.9):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.14 Air Discharge temperature (SV1.12):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.15 Air Discharge temperature (SV1.14):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.16 Air Discharge temperature (SV1.15):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.17 Air Discharge temperature (SV1.17):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.18 Air Discharge temperature (SV1.19):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.19 Air Discharge temperature (SV1.20):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.20 Air Discharge temperature (SV1.21):

.1 Temperature indicated through BMS _____ ---------- °C

.2 Actual measured temperature ---------- °C

.21 Air Discharge temperature (SV1.22):
- .1 Temperature indicated through BMS _____ °C
- .2 Actual measured temperature ---------- °C

.22 Air Discharge temperature (SV1.23):
- .1 Temperature indicated through BMS _____ °C
- .2 Actual measured temperature ---------- °C

.2 Air Flows

.1 Airflow (SV1.7)
- .1 Specified Occupied Maximum Airflow ---------236 L/s
- .2 Occupied airflow indicated at EMCS ----------_____----------L/s
- .3 Occupied airflow shown on TAB report --------_____----------L/s
- .4 Specified Occcupied Minimum Airflow --------94 L/s
- .5 Unoccupied airflow shown EMCS ----------_____----------L/s
- .6 Specified Unoccupied Airflow ----------35 L/s
- .7 Unoccupied airflow shown EMCS ----------_____----------L/s

.2 Maximum Airflow (SV1.9)
- .1 Specified Occupied Maximum Airflow ---------236 L/s
- .2 Occupied airflow indicated at EMCS ----------_____----------L/s
- .3 Occupied airflow shown on TAB report --------_____----------L/s
- .4 Specified Occcupied Minimum Airflow --------94 L/s
- .5 Unoccupied airflow shown EMCS ----------_____----------L/s
- .6 Specified Unoccupied Airflow ----------35 L/s
- .7 Unoccupied airflow shown EMCS ----------_____----------L/s

.3 Maximum Airflow (SV1.12)
- .1 Specified Occupied Maximum Airflow ---------94 L/s
- .2 Occupied airflow indicated at EMCS ----------_____----------L/s
- .3 Occupied airflow shown on TAB report --------_____----------L/s
- .4 Specified Occcupied Minimum Airflow --------38 L/s
- .5 Unoccupied airflow shown EMCS ----------_____----------L/s
- .6 Specified Unoccupied Airflow ----------14 L/s
- .7 Unoccupied airflow shown EMCS ----------_____----------L/s

.4 Maximum Airflow (SV1.14)
- .1 Specified Occupied Maximum Airflow ---------250 L/s
- .2 Occupied airflow indicated at EMCS ----------_____----------L/s
- .3 Occupied airflow shown on TAB report --------_____----------L/s
- .4 Specified Occcupied Minimum Airflow --------100 L/s
- .5 Unoccupied airflow shown EMCS ----------_____----------L/s
- .6 Specified Unoccupied Airflow ----------38 L/s
- .7 Unoccupied airflow shown EMCS ----------_____----------L/s

.5 Maximum Airflow (SV1.15)
- .1 Specified Occupied Maximum Airflow ---------250 L/s
- .2 Occupied airflow indicated at EMCS ----------_____----------L/s

.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------100 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s
.6 Specified Unoccupied Airflow ----------38 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

.6 Maximum Airflow (SV1.17)
.1 Specified Occupied Maximum Airflow ---------94 L/s
.2 Occupied airflow indicated at EMCS ----------_____----------L/s
.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------38 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s
.6 Specified Unoccupied Airflow ----------14 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

.7 Maximum Airflow (SV1.19)
.1 Specified Occupied Maximum Airflow ---------94 L/s
.2 Occupied airflow indicated at EMCS ----------_____----------L/s
.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------38 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s
.6 Specified Unoccupied Airflow ----------14 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

.8 Maximum Airflow (SV1.20)
.1 Specified Occupied Maximum Airflow ---------188 L/s
.2 Occupied airflow indicated at EMCS ----------_____----------L/s
.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------75 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s
.6 Specified Unoccupied Airflow ----------28 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

.9 Maximum Airflow (SV1.21)
.1 Specified Occupied Maximum Airflow ---------250 L/s
.2 Occupied airflow indicated at EMCS ----------_____----------L/s
.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------100 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s
.6 Specified Unoccupied Airflow ----------38 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

.10 Maximum Airflow (SV1.22)
.1 Specified Occupied Maximum Airflow ---------141 L/s
.2 Occupied airflow indicated at EMCS ----------_____----------L/s
.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------56 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s

.6 Specified Unoccupied Airflow ----------21 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

.11 Maximum Airflow (SV1.23)
.1 Specified Occupied Maximum Airflow ---------142 L/s
.2 Occupied airflow indicated at EMCS ----------_____----------L/s
.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------57 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s
.6 Specified Unoccupied Airflow ----------21 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

.12 Maximum Airflow (EV1.61)
.1 Specified Occupied Maximum Airflow ---------1600 L/s
.2 Occupied airflow indicated at EMCS ----------_____----------L/s
.3 Occupied airflow shown on TAB report --------_____----------L/s
.4 Specified Occcupied Minimum Airflow --------640 L/s
.5 Unoccupied airflow shown EMCS ----------_____----------L/s
.6 Specified Unoccupied Airflow ----------240 L/s
.7 Unoccupied airflow shown EMCS ----------_____----------L/s

6. Temperature Setpoint

.1 Median Reset Schedule
.1 Upper Limit
.1 Outside Temperature ----------_____---------- ^{o}C
.2 Median Setpoint _____---------- ^{o}C
.2 Lower Limit
.1 Outside Temperature ----------_____---------- ^{o}C
.2 Median Setpoint _____---------- ^{o}C

.2 Slider Range
.1 Range set to ± ----------_____ ^{o}C

.3 Night Setback
.1 Winter Night Setback Temperature ----------_____---------- ^{o}C
.2 Summer Night Setback Temperature----------_____---------- ^{o}C

		C	E
.4	Functional Test - Median Setpoint		
.1	Manually override EMCS outdoor temperature above upper limit:	☐	☐
.2	Median setpoint resets to upper limit for both thermostats:	☐	☐
.3	Manually override EMCS outdoor temperature below lower limit:	☐	☐
.4	Median setpoint resets to lower limit for both thermostats:	☐	☐
.5	Manually override EMCS outdoor temperature between upper and lower limit:	☐	☐
.6	Median setpoint resets to calculated position between upper and lower limit for both thermostats:	☐	☐
.7	Reset EMCS outdoor temperature back to automatic:	☐	☐
.5	Functional Test - Slider Adjustment	C	E
.1	Set sliders to center on all thermostats in space:	☐	☐

.2 Adjust slider up maximum amount for Thermostat 1 (SV1.7): ---------- ☐ ☐
.3 EMCS registers adjustment of slider: ---------- ☐ ☐
.4 All systems move to control to average setpoint between Thermostat 1 and thermostat 2:---------- ☐ ☐
.5 Adjust slider up maximum amount for Thermostat 2 (SV1.9): ---------- ☐ ☐
.6 EMCS registers adjustment of slider: ---------- ☐ ☐
.7 Adjust slider up maximum amount for Thermostat 2 (SV1.12):---------- ☐ ☐
.8 EMCS registers adjustment of slider: ---------- ☐ ☐
.9 Adjust slider up maximum amount for Thermostat 2 (SV1.14):---------- ☐ ☐
.10 EMCS registers adjustment of slider: ---------- ☐ ☐
.11 Adjust slider up maximum amount for Thermostat 2 (SV1.15):---------- ☐ ☐
.12 EMCS registers adjustment of slider: ---------- ☐ ☐
.13 Adjust slider up maximum amount for Thermostat 2 (SV1.17):---------- ☐ ☐
.14 EMCS registers adjustment of slider: ---------- ☐ ☐
.15 Adjust slider up maximum amount for Thermostat 2 (SV1.19):---------- ☐ ☐
.16 EMCS registers adjustment of slider: ---------- ☐ ☐
.17 Adjust slider up maximum amount for Thermostat 2 (SV1.20):---------- ☐ ☐
.18 EMCS registers adjustment of slider: ---------- ☐ ☐
.19 Adjust slider up maximum amount for Thermostat 2 (SV1.22):---------- ☐ ☐
.20 EMCS registers adjustment of slider: ---------- ☐ ☐
.21 Adjust slider up maximum amount for Thermostat 2 (SV1.23):---------- ☐ ☐
.22 EMCS registers adjustment of slider: ---------- ☐ ☐
.23 All systems move to control to average setpoint between Thermostats: ---------- ☐ ☐
.24 Adjust slider down maximum amount for half of the Thermostats:---------- ☐ ☐
.25 EMCS registers adjustment of slider on thermostats: ---------- ☐ ☐
.26 All systems move to control to average setpoint between Thermostats: ---------- ☐ ☐

Functional Test - Slider Adjustment (continued)----------C E
.27 All systems move to control to average setpoint between Thermostats: ---------- ☐ ☐
.28 Reset sliders to center: ---------- ☐ ☐

.6 Functional Test - Night Setback ----------C E
.1 Set system to unoccupied: ---------- ☐ ☐
.2 Verify space control reverts to night setback temperature setpoint:---------- ☐ ☐
.1 Record season---------- _____
.3 Set season flag to opposite of current season: ---------- ☐ ☐
.4 Night setback control revert to correct season setpoint: ---------- ☐ ☐
.5 Reset season flag to automatic---------- ☐ ☐
.6 Reset occupancy to occupied ---------- ☐ ☐

7. Temperature Control - Summer Mode (Set system to summer mode if not already in summer mode)

.1 Turn space temperature setpoint down to 15 deg.C.----------C E
.1 Reheat coil valves are closed:---------- ☐ ☐
.2 Radiant Panel valve is closed: ---------- ☐ ☐
.3 Record S/A discharge temperature:----------

.1 At AHU-1---------- _____ ---------- °C
.2 At VAV Box SV1.7 ---------- ---------- °C
.3 At VAV Box SV1.9 ---------- ---------- °C
.4 At VAV Box SV1.12---------- ---------- °C
.5 At VAV Box SV1.14---------- ---------- °C
.6 At VAV Box SV1.15---------- ---------- °C
.7 At VAV Box SV1.17---------- ---------- °C
.8 At VAV Box SV1.19---------- ---------- °C
.9 At VAV Box SV1.20---------- ---------- °C
.10 At VAV Box SV1.21---------- ---------- °C
.11 At VAV Box SV1.22---------- ---------- °C
.12 At VAV Box SV1.23---------- ---------- °C

.4 Box airflows move to maximum : ---------- ☐ ☐

.2 Turn space temperature setpoint to actual space temperature
.1 Box air flow goes to minimum :---------- ☐ ☐
.2 Reheat coil modulates to maintain discharge air temperature at 2 Deg.C. below room temperature : ---------- ☐ ☐
.3 Radiant Panel valve stays closed: ---------- ☐ ☐

.3 Turn space temperature setpoint up to 25 Deg.C.
.1 Box air flow stays at minimum : ---------- ☐ ☐
.2 Radiant Panel valve stays closed: ---------- ☐ ☐
.3 Reheat coil valves begin to modulate to increase discharge temperature up to 7 Deg.C. above space temperature:---------- ☐ ☐
.4 If space cannot be maintained at minimum airflow, airflow shall increase ---------- ☐ ☐

.4 Reset control to normal operation. ---------- C E
.1 Reset summer / winter flag to automatic ---------- ☐ ☐
.2 Reset space temperature setpoint to default---------- ☐ ☐

8. Temperature Control - Winter Mode (Set system to winter mode if not already in winter mode)

.1 Turn space temperature setpoint down to 15 deg.C.---------- C E
.1 Reheat coil valves are closed:---------- ☐ ☐
.2 Radiant Panel valve is closed: ---------- ☐ ☐
.3 Record S/A discharge temperature:----------
.1 At AHU-1---------- _____ ---------- °C
.2 At VAV Box SV1.7 ---------- ---------- °C
.3 At VAV Box SV1.9 ---------- ---------- °C
.4 At VAV Box SV1.12---------- ---------- °C
.5 At VAV Box SV1.14---------- ---------- °C
.6 At VAV Box SV1.15---------- ---------- °C
.7 At VAV Box SV1.17---------- ---------- °C
.8 At VAV Box SV1.19---------- ---------- °C
.9 At VAV Box SV1.20---------- ---------- °C

.10 At VAV Box SV1.21---------- ---------- ^{O}C
.11 At VAV Box SV1.22---------- ---------- ^{O}C
.12 At VAV Box SV1.23---------- ---------- ^{O}C

.4 Box airflows move to maximum: ---------- ☐ ☐

.2 Turn space temperature setpoint to actual space temperature
.1 Box air flow goes to minimum: ---------- ☐ ☐
.2 Reheat coil modulates to maintain discharge air temperature at 2 Deg.C. below room temperature : ---------- ☐ ☐
.3 Radiant Panel valve modulates to meet space setpoint: ---------- ☐ ☐

.3 Turn space temperature setpoint up to 25 Deg.C.
.1 Box air flow stays at minimum: ---------- ☐ ☐
.2 Reheat coil modulates to maintain discharge air temperature at 2 Deg.C. below room temperature : ---------- ☐ ☐
.3 Radiant Panel valve modulates to meet space setpoint: ---------- ☐ ☐
.4 Once radiant panel valve is 100% open, further call for heat will allow the reheat coil valves to increase discharge temperature up to 7 Deg.C. above space temperature:---------- ☐ ☐
.5 If space setpoint cannot be maintained at minimum airflow, airflow shall increase---------- ☐ ☐

.4 Reset control to normal operation. ----------C E
.1 Reset summer / winter flag to automatic ---------- ☐ ☐
.2 Reset space temperature setpoint to default---------- ☐ ☐

9. Alarms

.1 Discharge Air Temperature----------C E
.1 Raise temperature sensor five degrees above discharge air: ---------- ☐ ☐
.2 System alarms after delay:
.1 Record Delay ---------- _____ mins

Comments

SIGN-OFFS

Contractor: _____ Date:_____

Engineer:_____ Date:_____

CxA:_____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **CABLE TRAY**

EQUIPMENT DATA:

DATE / CHECKED BY: _____

Manufacturer _____

Catalogue Number _____

Cable Tray Type _____

Width _____

Depth _____

Colour _____

_____

Options _____

_____

Match Installed ___ Yes ___ No

_____

_____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **EQUIPMENT RACK**

LOCATION DATA:

Floor _____ Room _____ Panel ID _____

EQUIPMENT RACK:

Manufacturer _____ Match Installed ___ Yes ___ No
Series _____
Model Number _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

19-inch mounting rails	___ Yes	___ No	Fibre Patch Panel - Qty:	_____	
42U Rack Units	___ Yes	___ No	Data Patch Panel - Qty:	_____	
152mm Side Channels	___ Yes	___ No			
2-Ring horizontal managers	___ Yes	___ No			
2 - Shelves	___ Yes	___ No	Min Clearance - Front: 914mm	___ Yes	___ No
6-Outlet Power Bar	___ Yes	___ No	Min Clearance - Back: 1067mm	___ Yes	___ No
12-foot Shielded Cord Set	___ Yes	___ No	Min Clearance - Side: 762mm	___ Yes	___ No
Integral on/off Switch	___ Yes	___ No			
15A Breaker Reset	___ Yes	___ No			
EMI/RFI Filtering	___ Yes	___ No			
Ground Lug Terminated	___ Yes	___ No			

Cabling

Fibre Cable:	Type:	_____	Size:	_____	Colour:	_____
Data Cables:	Category:	_____	Size:	_____	Colour:	_____

Connectors:

Fibre Connectors	Type:	_____	Size:	_____	Colour:	_____
Data Connectors	Category:	_____	Size:	_____	Colour:	_____

OPERATION CHECKS:

Cable installation and testing:

Installed and Certified by:
Company: _____ Name: _____ Date: _____

Labeling info provided by Owner	___ Yes	___ No	Rack layout info provided	___ Yes	___ No
Patch Cords Supplied	___ Yes	___ No	by Owner:		
Cable Test Report Submitted	___ Yes	___ No	All Cables Passed Tests:	___ Yes	___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **DISCONNECT SWITCHES**

LOCATION DATA:

Floor _____ Room _____ Equipment: _____

EQUIPMENT DATA:

Manufacturer _____
Model Number _____
Volt/Phase/Amperage _____
Horsepower _____ Match Installed ___ Yes ___ No

STATIC CHECKS: **DATE / CHECKED BY:** _____

Elevator Main Disconnect Switch

Fusible Switch	___ Yes	___ No
Volt/Phase	_____	
Pole/Wire	_____	
Switch Amperage - 60A	___ Yes	___ No
Fuse Amperage - 35A	___ Yes	___ No

Enclosure Details

Mounting	___ Flush	___ Surface
EEMAC Enclosure Type	_____	
Padlockable	___ Yes	___ No
Label	___ Yes	___ No

Elevator Cab Light Main Disconnect Switch

Breaker Switch	___ Yes	___ No
Volt/Phase	_____	
Pole/Wire	_____	
Switch Amperage - 15A	___ Yes	___ No

Enclosure Details

Mounting	___ Flush	___ Surface
EEMAC Enclosure Type	_____	
Padlockable	___ Yes	___ No
Label	___ Yes	___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item:

EMERGENCY LIGHTING

FIXTURE TYPE: _____ Number Installed: _____

EQUIPMENT DATA:

DATE / CHECKED BY: _____

Manufacturer _____

Catalogue Number _____

Voltage _____

LED / Lamp Type _____

LED / Lamp Wattage _____

Number of Lamps _____

Battery Size _____

Nexus RF Compatible _____

Nexus RF Area Controller _____

Nexus RF Repeater _____

Mounting _____

Options _____

_____

Match Installed ___ Yes ___ No

SIGN-OFFS:

Contractor: _____ Signature: _____ Date:_____

Cx Rep: _____ Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **CABLE TRAY**

EQUIPMENT DATA:

DATE / CHECKED BY: _____

Manufacturer _____

Catalogue Number _____

Cable Tray Type _____

Width _____

Depth _____

Colour _____

_____

Options _____

_____

Match Installed ___ Yes ___ No

_____

_____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **EQUIPMENT RACK**

LOCATION DATA:

Floor _____ Room _____ Panel ID _____

EQUIPMENT RACK:

Manufacturer _____ Match Installed ___ Yes ___ No
Series _____
Model Number _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

19-inch mounting rails	___ Yes	___ No	Fibre Patch Panel - Qty:	_____	
42U Rack Units	___ Yes	___ No	Data Patch Panel - Qty:	_____	
152mm Side Channels	___ Yes	___ No			
2-Ring horizontal managers	___ Yes	___ No			
2 - Shelves	___ Yes	___ No	Min Clearance - Front: 914mm	___ Yes	___ No
6-Outlet Power Bar	___ Yes	___ No	Min Clearance - Back: 1067mm	___ Yes	___ No
12-foot Shielded Cord Set	___ Yes	___ No	Min Clearance - Side: 762mm	___ Yes	___ No
Integral on/off Switch	___ Yes	___ No			
15A Breaker Reset	___ Yes	___ No			
EMI/RFI Filtering	___ Yes	___ No			
Ground Lug Terminated	___ Yes	___ No			

Cabling

Fibre Cable:	Type:	_____	Size:	_____	Colour:	_____
Data Cables:	Category:	_____	Size:	_____	Colour:	_____

Connectors:

Fibre Connectors	Type:	_____	Size:	_____	Colour:	_____
Data Connectors	Category:	_____	Size:	_____	Colour:	_____

OPERATION CHECKS:

Cable installation and testing:

Installed and Certified by:
Company: _____ Name: _____ Date: _____

Labeling info provided by Owner	___ Yes	___ No	Rack layout info provided	___ Yes	___ No
Patch Cords Supplied	___ Yes	___ No	by Owner:		
Cable Test Report Submitted	___ Yes	___ No	All Cables Passed Tests:	___ Yes	___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **DISCONNECT SWITCHES**

LOCATION DATA:

Floor _____ Room _____ Equipment: _____

EQUIPMENT DATA:

Manufacturer _____
Model Number _____
Volt/Phase/Amperage _____
Horsepower _____ Match Installed ___ Yes ___ No

STATIC CHECKS: **DATE / CHECKED BY:** _____

Elevator Main Disconnect Switch

Fusible Switch	___ Yes	___ No
Volt/Phase	_____	
Pole/Wire	_____	
Switch Amperage - 60A	___ Yes	___ No
Fuse Amperage - 35A	___ Yes	___ No

Enclosure Details

Mounting	___ Flush	___ Surface
EEMAC Enclosure Type	_____	
Padlockable	___ Yes	___ No
Label	___ Yes	___ No

Elevator Cab Light Main Disconnect Switch

Breaker Switch	___ Yes	___ No
Volt/Phase	_____	
Pole/Wire	_____	
Switch Amperage - 15A	___ Yes	___ No

Enclosure Details

Mounting	___ Flush	___ Surface
EEMAC Enclosure Type	_____	
Padlockable	___ Yes	___ No
Label	___ Yes	___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item:

EMERGENCY LIGHTING

FIXTURE TYPE: _____ Number Installed: _____

EQUIPMENT DATA:

DATE / CHECKED BY: _____

Manufacturer _____

Catalogue Number _____

Voltage _____

LED / Lamp Type _____

LED / Lamp Wattage _____

Number of Lamps _____

Battery Size _____

Nexus RF Compatible _____

Nexus RF Area Controller _____

Nexus RF Repeater _____

Mounting _____

Options _____

_____

Match Installed ___ Yes ___ No

SIGN-OFFS:

Contractor: _____ Signature: _____ Date:_____

Cx Rep: _____ Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **EXIT SIGN**

FIXTURE TYPE: _____ Number Installed: _____

EQUIPMENT DATA:

DATE / CHECKED BY: _____

Manufacturer _____

Catalogue Number _____

Fixture Type _____

Housing _____

Voltage _____

Lamp Wattage _____

Lamp Type _____

Lettering Type _____

Number of Faces _____

Circuit _____

Mounting

Nexus Compatible _____

Options _____

_____

Match Installed ___ Yes ___ No

_____

_____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
RAL File No:
Owner File No: *Item:* **F/A COMPONENTS**

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

System Devices	**Model Number**	**Match installed**
Manual Pull Stations		___ Yes ___ No
Smoke Detectors		___ Yes ___ No
Monitor Modules		___ Yes ___ No
Control Modules		___ Yes ___ No
Relay Modules		___ Yes ___ No
Fault Isolator Modules		___ Yes ___ No
Power Supply		___ Yes ___ No
Pre-Action Releasing Panel		___ Yes ___ No
Annunciator Panel		___ Yes ___ No
Horn Strobes		___ Yes ___ No
Wall Speakers & Speaker Strobes for Future Code Spear		___ Yes ___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
RAL File No:
Owner File No: *Item:* **GROUNDING**

STATIC CHECKS: **DATE / CHECKED BY:** _____

Grounded Systems

Communications	___ Yes	___ No
Switchboard	___ Yes	___ No
Transformers	___ Yes	___ No
Lay-in Trays	___ Yes	___ No
Feeder Conduits	___ Yes	___ No
Green Insul. on Branch Conduits	___ Yes	___ No

Miscellaneous

Riser _____

Ground Bus _____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **LIGHTING**

FIXTURE TYPE: _____ Number Installed: _____

EQUIPMENT DATA: **DATE / CHECKED BY:** _____

Manufacturer _____

Catalogue Number _____

Voltage _____

LED / Lamp Type _____

LED / Lamp Wattage _____

Number of Lamps _____

Driver / Ballast Type _____

Size _____

Mounting _____

Diffuser _____

Options _____

_____

Match Installed ___ Yes ___ No

SIGN-OFFS:

Contractor: _____ Signature: _____ Date:_____

Cx Rep: _____ Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
Location:
RAL File No:
Owner File No: *Item:* **LV PANELS**

LOCATION DATA:

Floor: _____ Room: _____ ID: _____

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____
Model Number _____ Relay Capacity: _____ Relays: _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

Intelligent Card	___ Yes	___ No	Data-Line	___ Yes	___ No
Photo Control Package	___ Yes	___ No	BMS Interface Module	___ Yes	___ No
Networking Modules	___ Yes	___ No	Photo-control Module	___ Yes	___ No
Power Supply Units	___ Yes	___ No	OCC Sensors	___ Yes	___ No
Digital Switches w/ Pilot Light	___ Yes	___ No	Photo Sensors (Indoor)	___ Yes	___ No
Relays w/ Pilot Light Switch	___ Yes	___ No	Photo Sensors (Outdoor)	___ Yes	___ No
Channel Bushbuttons	___ Yes	___ No			

Panel Installation

Power supply terminated	___ Yes	___ No	Operating manuals provided	___ Yes	___ No
Panel relays terminated	___ Yes	___ No			
Remote relays terminated	___ Yes	___ No			
Class 2 wiring terminated	___ Yes	___ No			
Lamecoid Identification	___ Yes	___ No			

OPERATION CHECKS:

Programming and Start-up

Start-up and programming verified by:
Company: _____ Name: _____ Date: _____

Control Devices:

LV Switching conforms to drawings	___ Yes	___ No
Indoor Photo Sensors Operational	___ Yes	___ No
Outdoor Photo Sensors Operational	___ Yes	___ No
Occupancy Sensors Operational	___ Yes	___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
Location:
RAL File No:
Owner File No: *Item:* **PUBLIC ADDRESS**

LOCATION DATA:

Floor: _____ Room: _____ ID: _____

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____
Model Number _____ _____ _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

Speakers (4 Types)	___ Yes	___ No
Public Address Amplifier	___ Yes	___ No
DSP / Matrix Routing	___ Yes	___ No
Desktop Paging Microphone	___ Yes	___ No
Wall Mounted Audio Rack	___ Yes	___ No
Cable & Connector Panels	___ Yes	___ No
Cable Jack Terminations	___ Yes	___ No
Spare Devices	___ Yes	___ No
Receptacle Provided	___ Yes	___ No
Zones Provided	___ Yes	___ No
Intelligibility Test	___ Yes	___ No

Operating manuals provided ___ Yes ___ No

Owner Training provided ___ Yes ___ No

OPERATION CHECKS:

Programming and Start-up

Start-up and programming verified by:
Company: _____ Name: _____ Date: _____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
Location:
RAL File No:
Owner File No: *Item:* **SOUND MASKING**

LOCATION DATA:

Floor: _____ Room: _____ ID: _____

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____
Model Number _____ _____ _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

Control Module	___ Yes	___ No
Audio Inputs	___ Yes	___ No
Wireless Remote Control	___ Yes	___ No
Transducers/Emitters	___ Yes	___ No
Finish/Colour as Specified	___ Yes	___ No
Cabling	___ Yes	___ No
Cable Jack Terminations	___ Yes	___ No
Spare Devices	___ Yes	___ No
Receptacle Provided	___ Yes	___ No
Zones Provided	___ Yes	___ No
Intelligibility Test	___ Yes	___ No

Operating manuals provided ___ Yes ___ No

Owner Training provided ___ Yes ___ No

OPERATION CHECKS:

Programming and Start-up

Start-up and programming verified by:
Company: _____ Name: _____ Date: _____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **MOTOR STARTER**

LOCATION DATA:

Floor _____ Room _____ ID _____

EQUIPMENT DATA:

Manufacturer	_____	Thermal Protection	___ Yes ___ No
Model Number	_____	Panel/Cct Fed From	_____
Starter Volt/Phase/Wire	_____	Starter Size	_____
Starter Type	_____	Match Installed	___ Yes ___ No

STATIC CHECKS: **DATE / CHECKED BY:** _____

Motor Protection Switch

Type	___ Fuse ___ Breaker	Pilot Lights Checked	___ Yes ___ No
Size	_____		

Overload Elements

Overload Correctly Sized	___ Yes ___ No	Amperage Range	_____ Amps

Motor Data

Service Factor	_____	Full Load Current	_____ Amps
Motor Volt/Phase/Wire	_____	Motor Horsepower	_____ HP
Motor Design Type	_____	Motor Code	_____
Motor Insulation	_____	Motor Locked Rotor Current	_____ Amps
Cable Distance to Drive	_____	Motor RPM	_____ RPM

Enclosure Details

Mounting	___ Flush ___ Surface		
EEMAC Enclosure Type	_____		
Door Type	_____		
Drip Hood	___ Yes ___ No	Door Lock	___ Yes ___ No

Miscellaneous

Exterior Clean	___ Yes ___ No	Top Connectors Water Tight	___ Yes ___ No
Interior Clean	___ Yes ___ No	Conduit Connectors Sealed	___ Yes ___ No
Indicating Lights Operate	___ Yes ___ No	Ground Wire Type & Size	___ Type ___ AWG
Hand/Off/Auto Switch	___ Yes ___ No	Phase Rotation Confirmed	___ Yes ___ No
Air Filters Present	___ Yes ___ No	Operation Manual Included	___ Yes ___ No
Air Filters Changed Pre-Startup	___ Yes ___ No	Record of VFD Settings	___ Yes ___ No

OPERATION CHECKS: **DATE / MEASURED BY:** _____

Starter Operation

Manual Operation Checked	___ Yes ___ No	Auto Operation Checked	___ Yes ___ No
Disconnect Function Checked	___ Yes ___ No	Fire Alarm Shutdown Checked	___ Yes ___ No
VFD Display Calibrated	___ Yes ___ No	Auto Restart Checked	___ Yes ___ No
Motor RPM Verified	___ Yes ___ No	Owner Training Completed	___ Yes ___ No

Measured Values	**Amperage**		**Voltage**		**Voltage**	
	Line A	_____ Amps	AB	_____ Volts	AN	_____ Volts
	Line B	_____ Amps	BC	_____ Volts	BN	_____ Volts
	Line C	_____ Amps	CA	_____ Volts	CN	_____ Volts

Motor Terminal Waveforms Taken	___ Yes ___ No	Skip Frequencies	_____
Acceleration Time	_____	Carries Frequency	_____
Deceleration Time	_____	Maximum Speed	_____
Output Pulse Risetime	_____	Minimum Speed	_____
Speed Control	☐-10VDC ☐4-20mA ☐ +/-10VDC	Speed Display	☐ % ☐ Hz

SIGN-OFFS:

Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
Location:
Owner File No:

Item: **Wiring Devices**

STATIC CHECKS: **DATE / CHECKED BY:** _____

Receptacles location and operation confirmation

Duplex Receptacles (5-15R)	_____ Yes	_____ No
Single Receptacles (5-15R)	_____ Yes	_____ No
T-Slot Receptacles (5-20R)	_____ Yes	_____ No
Twist-Lock Receptacles (L6-30R)	_____ Yes	_____ No
Tamper resistant safety Receptacles (5-15R)	_____ Yes	_____ No
GFCI (Safe-Lock - 5mA Ground Fault)	_____ Yes	_____ No

Switches location and operation confirmation

120V Switches (SPST, 15A)	_____ Yes	_____ No
120V Pilot Light Switches (SPST - 15A)	_____ Yes	_____ No
347V Switches (SPST, 15A)	_____ Yes	_____ No
Fractional HP/KW Manual Starters	_____ Yes	_____ No
Illuminated Switches	_____ Yes	_____ No
Dimmers	_____ Yes	_____ No

Comments:

SIGN-OFFS:

Contractor: Signature:_____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature:_____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **EXIT SIGN**

FIXTURE TYPE: _____ Number Installed: _____

EQUIPMENT DATA:

DATE / CHECKED BY: _____

Manufacturer _____

Catalogue Number _____

Fixture Type _____

Housing _____

Voltage _____

Lamp Wattage _____

Lamp Type _____

Lettering Type _____

Number of Faces _____

Circuit _____

Mounting

Nexus Compatible _____

Options _____

_____

Match Installed ___ Yes ___ No

_____

_____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
RAL File No:
Owner File No: *Item:* **F/A COMPONENTS**

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

System Devices	**Model Number**	**Match installed**
Manual Pull Stations		___ Yes ___ No
Smoke Detectors		___ Yes ___ No
Monitor Modules		___ Yes ___ No
Control Modules		___ Yes ___ No
Relay Modules		___ Yes ___ No
Fault Isolator Modules		___ Yes ___ No
Power Supply		___ Yes ___ No
Pre-Action Releasing Panel		___ Yes ___ No
Annunciator Panel		___ Yes ___ No
Horn Strobes		___ Yes ___ No
Wall Speakers & Speaker Strobes for Future Code Spear		___ Yes ___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
RAL File No:
Owner File No: *Item:* **GROUNDING**

STATIC CHECKS: **DATE / CHECKED BY:** _____

Grounded Systems

Communications	___ Yes	___ No
Switchboard	___ Yes	___ No
Transformers	___ Yes	___ No
Lay-in Trays	___ Yes	___ No
Feeder Conduits	___ Yes	___ No
Green Insul. on Branch Conduits	___ Yes	___ No

Miscellaneous

Riser _____

Ground Bus _____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **LIGHTING**

FIXTURE TYPE: _____ Number Installed: _____

EQUIPMENT DATA: **DATE / CHECKED BY:** _____

Manufacturer _____

Catalogue Number _____

Voltage _____

LED / Lamp Type _____

LED / Lamp Wattage _____

Number of Lamps _____

Driver / Ballast Type _____

Size _____

Mounting _____

Diffuser _____

Options _____

_____

Match Installed ___ Yes ___ No

SIGN-OFFS:

Contractor: _____ Signature: _____ Date:_____

Cx Rep: _____ Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
Location:
RAL File No:
Owner File No: *Item:* **LV PANELS**

LOCATION DATA:

Floor: _____ Room: _____ ID: _____

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____
Model Number _____ Relay Capacity: _____ Relays: _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

Intelligent Card	___ Yes	___ No	Data-Line	___ Yes	___ No
Photo Control Package	___ Yes	___ No	BMS Interface Module	___ Yes	___ No
Networking Modules	___ Yes	___ No	Photo-control Module	___ Yes	___ No
Power Supply Units	___ Yes	___ No	OCC Sensors	___ Yes	___ No
Digital Switches w/ Pilot Light	___ Yes	___ No	Photo Sensors (Indoor)	___ Yes	___ No
Relays w/ Pilot Light Switch	___ Yes	___ No	Photo Sensors (Outdoor)	___ Yes	___ No
Channel Bushbuttons	___ Yes	___ No			

Panel Installation

Power supply terminated	___ Yes	___ No	Operating manuals provided	___ Yes	___ No
Panel relays terminated	___ Yes	___ No			
Remote relays terminated	___ Yes	___ No			
Class 2 wiring terminated	___ Yes	___ No			
Lamecoid Identification	___ Yes	___ No			

OPERATION CHECKS:

Programming and Start-up

Start-up and programming verified by:
Company: _____ Name: _____ Date: _____

Control Devices:

LV Switching conforms to drawings	___ Yes	___ No
Indoor Photo Sensors Operational	___ Yes	___ No
Outdoor Photo Sensors Operational	___ Yes	___ No
Occupancy Sensors Operational	___ Yes	___ No

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
Location:
RAL File No:
Owner File No: *Item:* **PUBLIC ADDRESS**

LOCATION DATA:

Floor: _____ Room: _____ ID: _____

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____
Model Number _____ _____ _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

Speakers (4 Types)	___ Yes	___ No
Public Address Amplifier	___ Yes	___ No
DSP / Matrix Routing	___ Yes	___ No
Desktop Paging Microphone	___ Yes	___ No
Wall Mounted Audio Rack	___ Yes	___ No
Cable & Connector Panels	___ Yes	___ No
Cable Jack Terminations	___ Yes	___ No
Spare Devices	___ Yes	___ No
Receptacle Provided	___ Yes	___ No
Zones Provided	___ Yes	___ No
Intelligibility Test	___ Yes	___ No

Operating manuals provided ___ Yes ___ No

Owner Training provided ___ Yes ___ No

OPERATION CHECKS:

Programming and Start-up

Start-up and programming verified by:
Company: _____ Name: _____ Date: _____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name: *Section:*
Location:
RAL File No:
Owner File No: *Item:* **SOUND MASKING**

LOCATION DATA:

Floor: _____ Room: _____ ID: _____

EQUIPMENT DATA:

Manufacturer _____ Match Installed ___ Yes ___ No
System _____
Model Number _____ _____ _____

STATIC CHECKS: **DATE / CHECKED BY:** _____

Components Installed

Control Module	___ Yes	___ No
Audio Inputs	___ Yes	___ No
Wireless Remote Control	___ Yes	___ No
Transducers/Emitters	___ Yes	___ No
Finish/Colour as Specified	___ Yes	___ No
Cabling	___ Yes	___ No
Cable Jack Terminations	___ Yes	___ No
Spare Devices	___ Yes	___ No
Receptacle Provided	___ Yes	___ No
Zones Provided	___ Yes	___ No
Intelligibility Test	___ Yes	___ No

Operating manuals provided ___ Yes ___ No

Owner Training provided ___ Yes ___ No

OPERATION CHECKS:

Programming and Start-up

Start-up and programming verified by:
Company: _____ Name: _____ Date: _____

SIGN-OFFS:

Contractor: Signature: _____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
RAL File No:
Owner File No:

Item: **MOTOR STARTER**

LOCATION DATA:

Floor _____ Room _____ ID _____

EQUIPMENT DATA:

Manufacturer	_____	Thermal Protection	___ Yes ___ No
Model Number	_____	Panel/Cct Fed From	_____
Starter Volt/Phase/Wire	_____	Starter Size	_____
Starter Type	_____	Match Installed	___ Yes ___ No

STATIC CHECKS: **DATE / CHECKED BY:** _____

Motor Protection Switch

Type	___ Fuse ___ Breaker	Pilot Lights Checked	___ Yes ___ No
Size	_____		

Overload Elements

Overload Correctly Sized	___ Yes ___ No	Amperage Range	_____ Amps

Motor Data

Service Factor	_____	Full Load Current	_____ Amps
Motor Volt/Phase/Wire	_____	Motor Horsepower	_____ HP
Motor Design Type	_____	Motor Code	_____
Motor Insulation	_____	Motor Locked Rotor Current	_____ Amps
Cable Distance to Drive	_____	Motor RPM	_____ RPM

Enclosure Details

Mounting	___ Flush ___ Surface		
EEMAC Enclosure Type	_____		
Door Type	_____		
Drip Hood	___ Yes ___ No	Door Lock	___ Yes ___ No

Miscellaneous

Exterior Clean	___ Yes ___ No	Top Connectors Water Tight	___ Yes ___ No
Interior Clean	___ Yes ___ No	Conduit Connectors Sealed	___ Yes ___ No
Indicating Lights Operate	___ Yes ___ No	Ground Wire Type & Size	___ Type ___ AWG
Hand/Off/Auto Switch	___ Yes ___ No	Phase Rotation Confirmed	___ Yes ___ No
Air Filters Present	___ Yes ___ No	Operation Manual Included	___ Yes ___ No
Air Filters Changed Pre-Startup	___ Yes ___ No	Record of VFD Settings	___ Yes ___ No

OPERATION CHECKS: **DATE / MEASURED BY:** _____

Starter Operation

Manual Operation Checked	___ Yes ___ No	Auto Operation Checked	___ Yes ___ No
Disconnect Function Checked	___ Yes ___ No	Fire Alarm Shutdown Checked	___ Yes ___ No
VFD Display Calibrated	___ Yes ___ No	Auto Restart Checked	___ Yes ___ No
Motor RPM Verified	___ Yes ___ No	Owner Training Completed	___ Yes ___ No

Measured Values	**Amperage**		**Voltage**		**Voltage**	
	Line A	_____ Amps	AB	_____ Volts	AN	_____ Volts
	Line B	_____ Amps	BC	_____ Volts	BN	_____ Volts
	Line C	_____ Amps	CA	_____ Volts	CN	_____ Volts

Motor Terminal Waveforms Taken	___ Yes ___ No	Skip Frequencies	_____
Acceleration Time	_____	Carries Frequency	_____
Deceleration Time	_____	Maximum Speed	_____
Output Pulse Risetime	_____	Minimum Speed	_____
Speed Control	☐-10VDC ☐4-20mA ☐ +/-10VDC	Speed Display	☐ % ☐ Hz

SIGN-OFFS:

Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Owner:
Project Name:
Location:
Owner File No:

Item: **Wiring Devices**

STATIC CHECKS: **DATE / CHECKED BY:** _____

Receptacles location and operation confirmation

Duplex Receptacles (5-15R)	_____ Yes	_____ No
Single Receptacles (5-15R)	_____ Yes	_____ No
T-Slot Receptacles (5-20R)	_____ Yes	_____ No
Twist-Lock Receptacles (L6-30R)	_____ Yes	_____ No
Tamper resistant safety Receptacles (5-15R)	_____ Yes	_____ No
GFCI (Safe-Lock - 5mA Ground Fault)	_____ Yes	_____ No

Switches location and operation confirmation

120V Switches (SPST, 15A)	_____ Yes	_____ No
120V Pilot Light Switches (SPST - 15A)	_____ Yes	_____ No
347V Switches (SPST, 15A)	_____ Yes	_____ No
Fractional HP/KW Manual Starters	_____ Yes	_____ No
Illuminated Switches	_____ Yes	_____ No
Dimmers	_____ Yes	_____ No

Comments:

SIGN-OFFS:

Contractor: Signature:_____ Date:_____

Consultant: Ritenburg & Associates Ltd. Signature:_____ Date:_____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
CABLE TRAY

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Verify that the Site Acceptance Test has been completed.
- ☐ Preventative Maintenance Plan and Quality Assurance Plans have been submitted.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
Data/Voice System

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the specifications and comply with the shop drawings.
- ☐ Perform the installation in accordance with the manufacturer's recommendations and in accordance with the specifications and drawings.
- ☐ Conduct testing of the cabling system in accordance the standards outlined in the specifications.
- ☐ Confirm termination of all vertical and horizontal copper cable.
- ☐ Confirm termination of all fibre cable.
- ☐ All fibre and copper cables are provided with service loops at the equipment racks and BIX blocks.
- ☐ In all wall or pac pole drops, a 300mm cable slack is provided before entering wall or pac pole suspended in the ceiling.
- ☐ Confirm identification of equipment and all tagging is completed in accordance with the specifications and Owner's requirements.
- ☐ Confirm management of all vertical and horizontal cables, including installation of waterfalls at equipment racks.
- ☐ Confirm velcor straps are used. Cable ties are unacceptable.
- ☐ Confirm grounding within the Data/Com Rooms in accordance with the requirements of the Canadian Electrical Code, specifications and drawings, including bonding of the equipment racks, conduit stubs and cable trays.
- ☐ Confirm clearances at the equipment racks.
- ☐ Each equipment racks is supplied with a floor mounting base, fibre and copper patch panels, cable managers, power bar, and shelves.
- ☐ Confirm equipment racks are secured to floor.
- ☐ Confirm power to server equipment is energized and polarity of all wiring devices is checked.
- ☐ Supply and turn-over to Owner the fibre and copper patch cords in the quantities, types and lengths noted in the specifications.
- ☐ Submit cable test reports, include copies or CD disk in the Operating and Maintenance Manual.
- ☐ Conduct Owner training on the layout and installation of this system.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
DISCONNECT SWITCHES F/NF

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, manufacturer's recommendations and Specifications.
- ☐ Confirm that the disconnect switches has been securely fastened.
- ☐ Confirm that all feeder and branch circuit conductors are properly sized, terminated with the proper torque, identified as required by the Specifications.
- ☐ Mark all lugs and terminals that have been torqued with red lacquer or marker.
- ☐ Ensure that the branch circuits and their fuses are correctly matched.
- ☐ Ensure that the disconnect switches lamecoid tags conforms to the drawings & Specification.
- ☐ Ensure that all sections of the Contractor Start-up and Testing Sheet(s) are signed or initialed and dated.
- ☐ Complete record drawings.
- ☐ Conduct Owner training on the operation and maintenance of the panelboards.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
CABLE TRAY

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Verify that the Site Acceptance Test has been completed.
- ☐ Preventative Maintenance Plan and Quality Assurance Plans have been submitted.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
Data/Voice System

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the specifications and comply with the shop drawings.
- ☐ Perform the installation in accordance with the manufacturer's recommendations and in accordance with the specifications and drawings.
- ☐ Conduct testing of the cabling system in accordance the standards outlined in the specifications.
- ☐ Confirm termination of all vertical and horizontal copper cable.
- ☐ Confirm termination of all fibre cable.
- ☐ All fibre and copper cables are provided with service loops at the equipment racks and BIX blocks.
- ☐ In all wall or pac pole drops, a 300mm cable slack is provided before entering wall or pac pole suspended in the ceiling.
- ☐ Confirm identification of equipment and all tagging is completed in accordance with the specifications and Owner's requirements.
- ☐ Confirm management of all vertical and horizontal cables, including installation of waterfalls at equipment racks.
- ☐ Confirm velcor straps are used. Cable ties are unacceptable.
- ☐ Confirm grounding within the Data/Com Rooms in accordance with the requirements of the Canadian Electrical Code, specifications and drawings, including bonding of the equipment racks, conduit stubs and cable trays.
- ☐ Confirm clearances at the equipment racks.
- ☐ Each equipment racks is supplied with a floor mounting base, fibre and copper patch panels, cable managers, power bar, and shelves.
- ☐ Confirm equipment racks are secured to floor.
- ☐ Confirm power to server equipment is energized and polarity of all wiring devices is checked.
- ☐ Supply and turn-over to Owner the fibre and copper patch cords in the quantities, types and lengths noted in the specifications.
- ☐ Submit cable test reports, include copies or CD disk in the Operating and Maintenance Manual.
- ☐ Conduct Owner training on the layout and installation of this system.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
DISCONNECT SWITCHES F/NF

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, manufacturer's recommendations and Specifications.
- ☐ Confirm that the disconnect switches has been securely fastened.
- ☐ Confirm that all feeder and branch circuit conductors are properly sized, terminated with the proper torque, identified as required by the Specifications.
- ☐ Mark all lugs and terminals that have been torqued with red lacquer or marker.
- ☐ Ensure that the branch circuits and their fuses are correctly matched.
- ☐ Ensure that the disconnect switches lamecoid tags conforms to the drawings & Specification.
- ☐ Ensure that all sections of the Contractor Start-up and Testing Sheet(s) are signed or initialed and dated.
- ☐ Complete record drawings.
- ☐ Conduct Owner training on the operation and maintenance of the panelboards.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
EXIT AND EMERGENCY LIGHTING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings (if provided).
- ☐ The installation is completed in accordance with the Canadian Electrical Code, specifications and manufacturer's recommendations.
- ☐ Confirm that all conductors for supply and control are properly sized, terminated with proper torque.
- ☐ Confirm exit lighting clearly indicate the means of egress and are visible in all public areas.
- ☐ Confirm exit light fixtures are connected to a dedicated emergency circuit as indicated on the floor plans.
- ☐ Ensure that exit light circuit breaker is locked in on position.
- ☐ Confirm complete illumination of the emergency battery units and exit signs.
- ☐ Confirm complete emergency battery units and exit signs are connected to the Nexus RF system.
- ☐ Perform functional & other tests (as applicable) required by the Specifications, the Manufacturer or the Design Consultant.
- ☐ Conduct Owner training in regards to the operation and maintenance of the emergency battery lighting and exit lighting.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
FIRE ALARM

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Complete installation and wiring of all components of the fire alarm system in accordance with the manufacturer's recommendations, specifications, and in accordance with the National Standard of Canada/Underwriters' Laboratory of Canada Standards CAN/ULC-S524-M06 "Standard for the Installation of Fire Alarm Systems".
- ☐ Complete the inspection and testing of the fire alarm system in accordance with the National Standard of Canada/Underwriters' Laboratory of Canada Standards CAN/ULC-S536-04 "Standard for the Inspection and Testing of Fire Alarm Systems".
- ☐ Complete the verification of the fire alarm system in accordance with the National Standard of Canada/Underwriters' Laboratory of Canada Standards CAN/ULC-S537-04 "Standard for the Verification of Fire Alarm System Installations".
- ☐ Confirm fire alarm system connected to a dedicated circuit with breaker lock-on device on branch breaker.
- ☐ Confirm fire alarm system is connected to new sprinkler pre-action system as per drawings, specifications and system supplier..
- ☐ Initiate alarm from each breakglass station.
- ☐ Initiate an alarm from each smoke detector and heat detector by initiating an alarm using a magnet, artificial smoke, or by jumping out device in case of fixed temperature heat detectors. The method to activate a detector shall be confirmed by the manufacturer's verification agent.
- ☐ Initiate an alarm from the sprinkler system by testing flow within a floor control zone valve.
- ☐ Conduct an open circuit tests at various points on the Class B tolerant loops. Initiate an alarm from various points on the open circuit.
- ☐ Initiate an alarm to check supervisory and control functions at the fire alarm control and annunciator panel.
- ☐ Check correctness of identification of annunciator zones and device mapping at the annunciator.
- ☐ Initiate one test alarm to central supervisory station after notice of test is given.
- ☐ Check operation of all auxiliary contacts and devices, and verify that auxiliary control door holders, fan shut-down, elevator homing, etc, is fully operational.
- ☐ Perform functional and other tests (as applicable) as required by the Specifications, the Manufacturer or the Consultant.
- ☐ Check operation of fire alarm audible and visual signal appliances in public areas.
- ☐ Record sound levels for fire alarm signal devices within public areas.
- ☐ Confirm signal to the municipal fire department in accordance with the requirements of the 2010 National Building Code.
- ☐ Submit manufacturer's fire alarm certificate of verification and fire alarm test report.
- ☐ Confirm spared devices are provided to the owner as required by the Specifications.
- ☐ Complete record drawings.

- ☐ Conduct Owner training on the operation and maintenance of the fire alarm system.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into notes areas of any unfinished areas or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
GROUNDING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings (if provided).
- ☐ Perform tests that are required by the Canadian Electrical Code, ANSI/NETA standard's, manufacturer's recommendations and Specifications.
- ☐ All electrical equipment and wiring grounded in accordance with the Canadian Electrical Code, and local inspection authority's rules and regulations.
- ☐ The ground bus in each switchboard, transformer, motor control centre, etc., connected to the grounding network by two AWG #3/0 bare copper conductors.
- ☐ All motors with flexible connections have separate insulated ground wire run bridging the flexible connections with the ground wire run back to the nearest junction box or motor control centre.
- ☐ Exposed copper cleaned to a bright surface, and finished with two coats of clean, insulating varnish.
- ☐ Where bonds are covered with soil, the conductors are to be coated with anti-corrosion compound "Kopr-Shield" (Thomas & Betts Co.) before compression connector is applied. All bonding done with 'C' tap and lug compression connectors.
- ☐ All grounding connectors, conductor and terminations checked and approved by the Consultant prior to concealment by fill or architectural finishes.
- ☐ The main grounding electrode or system shall have a fall-of-potential test. Refer to IEEE Standard 81. Five ohms is the maximum allowable resistance between the main grounding electrode and ground.
- ☐ Determine resistance between main grounding system and all major electrical equipment frames, system neutral and any floating neutrals. Any resistance values greater than 0.5 ohm shall be examined.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
LIGHTING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, specifications, and manufacturer's recommendations.
- ☐ Confirm that all circuit conductors for supply and control are properly sized, terminated with proper torque, identified as required by the Specifications.
- ☐ Confirm proper ballast and voltage ratings are installed within the fixtures.
- ☐ Confirm correct lamps are provided for the fixture in accordance with the specifications and manufacturer's requirements. Ensure lamp colour temperatures and colour rendering index (CRI) are in accordance with the requirements of the specifications.
- ☐ Confirm fixtures are clean, proper fit of lenses and fixture trims.
- ☐ Confirm installation of switches, occupancy sensors and photocells.
- ☐ Adjust coverage and time delay-off to all wall and ceiling occupancy sensors.
- ☐ Complete record drawings for layout of lighting, circuit identification and control.
- ☐ Conduct Owner training in regards to the operating and maintenance of lighting fixtures, including the type of LEDS or lamps installed, lamp, driver, and ballast replacement, ballast and driver warranties, and general maintenance of the fixtures.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
LOW VOLTAGE LIGHTING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Confirm that all line voltage and class II wiring for supply and control are properly sized, terminated, identified as required by the specifications.
- ☐ Day-light sensors installed for interior perimeter lighting.
- ☐ Exterior photo-sensors installed for exterior lighting.
- ☐ Low voltage power packs are installed and locations marked on as-built drawings.
- ☐ Verify and adjust photo control sensitivity for interior and exterior lighting.
- ☐ Occupancy sensors interconnected to switches as shown on drawings.
- ☐ Provide record of occupancy sensor and photocell programming.
- ☐ Aim and adjust photo controls to optimize function.
- ☐ Conduct Owner training in regards to the operation, programming and maintenance of the lighting control system.
- ☐ Complete record drawings.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
OVERCURRENT PROTECTIVE DEVICES

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Confirm that the overcurrent protection device is correctly sized and has been securely fastened.
- ☐ Confirm that all supply and load feeders are properly sized, terminated with the proper torque, identified as required by the Specification. Ensure that the supply and load feeders have been Megger tested.
- ☐ Mark all lugs and terminals that have been torqued with red lacquer or marker.
- ☐ Ensure that all sections of the Contractor Start-up and Testing Sheet(s) are signed or initialed and dated.
- ☐ Complete record drawings
- ☐ Conduct Owner training on the operation and maintenance of the overcurrent protective equipment.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
PUBLIC ADDRSS SYSTEM

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Conduct Owner training in regards to the operation, programming and maintenance of the system.
- ☐ Verify that the Site Acceptance Test has been completed.
- ☐ Preventative Maintenance Plan and Quality Assurance Plans have been submitted.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
SOUND MASKING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Conduct Owner training in regards to the operation, programming and maintenance of the system.
- ☐ Verify that the Site Acceptance Test has been completed.
- ☐ Preventative Maintenance Plan and Quality Assurance Plans have been submitted.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
WIRING DEVICES

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, manufacturer's recommendations and Specifications.
- ☐ Test receptacles for polarity.
- ☐ Test GFCI Receptacles with an appropriate ground fault tester.
- ☐ Verify panel directories and circuit identification indicated on the record drawings are consistent and correct.
- ☐ Record drawings are completed, indicating actual location of devices and circuit identification.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
EXIT AND EMERGENCY LIGHTING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings (if provided).
- ☐ The installation is completed in accordance with the Canadian Electrical Code, specifications and manufacturer's recommendations.
- ☐ Confirm that all conductors for supply and control are properly sized, terminated with proper torque.
- ☐ Confirm exit lighting clearly indicate the means of egress and are visible in all public areas.
- ☐ Confirm exit light fixtures are connected to a dedicated emergency circuit as indicated on the floor plans.
- ☐ Ensure that exit light circuit breaker is locked in on position.
- ☐ Confirm complete illumination of the emergency battery units and exit signs.
- ☐ Confirm complete emergency battery units and exit signs are connected to the Nexus RF system.
- ☐ Perform functional & other tests (as applicable) required by the Specifications, the Manufacturer or the Design Consultant.
- ☐ Conduct Owner training in regards to the operation and maintenance of the emergency battery lighting and exit lighting.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

Notes: _____

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
FIRE ALARM

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Complete installation and wiring of all components of the fire alarm system in accordance with the manufacturer's recommendations, specifications, and in accordance with the National Standard of Canada/Underwriters' Laboratory of Canada Standards CAN/ULC-S524-M06 "Standard for the Installation of Fire Alarm Systems".
- ☐ Complete the inspection and testing of the fire alarm system in accordance with the National Standard of Canada/Underwriters' Laboratory of Canada Standards CAN/ULC-S536-04 "Standard for the Inspection and Testing of Fire Alarm Systems".
- ☐ Complete the verification of the fire alarm system in accordance with the National Standard of Canada/Underwriters' Laboratory of Canada Standards CAN/ULC-S537-04 "Standard for the Verification of Fire Alarm System Installations".
- ☐ Confirm fire alarm system connected to a dedicated circuit with breaker lock-on device on branch breaker.
- ☐ Confirm fire alarm system is connected to new sprinkler pre-action system as per drawings, specifications and system supplier..
- ☐ Initiate alarm from each breakglass station.
- ☐ Initiate an alarm from each smoke detector and heat detector by initiating an alarm using a magnet, artificial smoke, or by jumping out device in case of fixed temperature heat detectors. The method to activate a detector shall be confirmed by the manufacturer's verification agent.
- ☐ Initiate an alarm from the sprinkler system by testing flow within a floor control zone valve.
- ☐ Conduct an open circuit tests at various points on the Class B tolerant loops. Initiate an alarm from various points on the open circuit.
- ☐ Initiate an alarm to check supervisory and control functions at the fire alarm control and annunciator panel.
- ☐ Check correctness of identification of annunciator zones and device mapping at the annunciator.
- ☐ Initiate one test alarm to central supervisory station after notice of test is given.
- ☐ Check operation of all auxiliary contacts and devices, and verify that auxiliary control door holders, fan shut-down, elevator homing, etc, is fully operational.
- ☐ Perform functional and other tests (as applicable) as required by the Specifications, the Manufacturer or the Consultant.
- ☐ Check operation of fire alarm audible and visual signal appliances in public areas.
- ☐ Record sound levels for fire alarm signal devices within public areas.
- ☐ Confirm signal to the municipal fire department in accordance with the requirements of the 2010 National Building Code.
- ☐ Submit manufacturer's fire alarm certificate of verification and fire alarm test report.
- ☐ Confirm spared devices are provided to the owner as required by the Specifications.
- ☐ Complete record drawings.

- ☐ Conduct Owner training on the operation and maintenance of the fire alarm system.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into notes areas of any unfinished areas or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
GROUNDING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings (if provided).
- ☐ Perform tests that are required by the Canadian Electrical Code, ANSI/NETA standard's, manufacturer's recommendations and Specifications.
- ☐ All electrical equipment and wiring grounded in accordance with the Canadian Electrical Code, and local inspection authority's rules and regulations.
- ☐ The ground bus in each switchboard, transformer, motor control centre, etc., connected to the grounding network by two AWG #3/0 bare copper conductors.
- ☐ All motors with flexible connections have separate insulated ground wire run bridging the flexible connections with the ground wire run back to the nearest junction box or motor control centre.
- ☐ Exposed copper cleaned to a bright surface, and finished with two coats of clean, insulating varnish.
- ☐ Where bonds are covered with soil, the conductors are to be coated with anti-corrosion compound "Kopr-Shield" (Thomas & Betts Co.) before compression connector is applied. All bonding done with 'C' tap and lug compression connectors.
- ☐ All grounding connectors, conductor and terminations checked and approved by the Consultant prior to concealment by fill or architectural finishes.
- ☐ The main grounding electrode or system shall have a fall-of-potential test. Refer to IEEE Standard 81. Five ohms is the maximum allowable resistance between the main grounding electrode and ground.
- ☐ Determine resistance between main grounding system and all major electrical equipment frames, system neutral and any floating neutrals. Any resistance values greater than 0.5 ohm shall be examined.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
LIGHTING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, specifications, and manufacturer's recommendations.
- ☐ Confirm that all circuit conductors for supply and control are properly sized, terminated with proper torque, identified as required by the Specifications.
- ☐ Confirm proper ballast and voltage ratings are installed within the fixtures.
- ☐ Confirm correct lamps are provided for the fixture in accordance with the specifications and manufacturer's requirements. Ensure lamp colour temperatures and colour rendering index (CRI) are in accordance with the requirements of the specifications.
- ☐ Confirm fixtures are clean, proper fit of lenses and fixture trims.
- ☐ Confirm installation of switches, occupancy sensors and photocells.
- ☐ Adjust coverage and time delay-off to all wall and ceiling occupancy sensors.
- ☐ Complete record drawings for layout of lighting, circuit identification and control.
- ☐ Conduct Owner training in regards to the operating and maintenance of lighting fixtures, including the type of LEDS or lamps installed, lamp, driver, and ballast replacement, ballast and driver warranties, and general maintenance of the fixtures.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
LOW VOLTAGE LIGHTING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Confirm that all line voltage and class II wiring for supply and control are properly sized, terminated, identified as required by the specifications.
- ☐ Day-light sensors installed for interior perimeter lighting.
- ☐ Exterior photo-sensors installed for exterior lighting.
- ☐ Low voltage power packs are installed and locations marked on as-built drawings.
- ☐ Verify and adjust photo control sensitivity for interior and exterior lighting.
- ☐ Occupancy sensors interconnected to switches as shown on drawings.
- ☐ Provide record of occupancy sensor and photocell programming.
- ☐ Aim and adjust photo controls to optimize function.
- ☐ Conduct Owner training in regards to the operation, programming and maintenance of the lighting control system.
- ☐ Complete record drawings.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
OVERCURRENT PROTECTIVE DEVICES

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Confirm that the overcurrent protection device is correctly sized and has been securely fastened.
- ☐ Confirm that all supply and load feeders are properly sized, terminated with the proper torque, identified as required by the Specification. Ensure that the supply and load feeders have been Megger tested.
- ☐ Mark all lugs and terminals that have been torqued with red lacquer or marker.
- ☐ Ensure that all sections of the Contractor Start-up and Testing Sheet(s) are signed or initialed and dated.
- ☐ Complete record drawings
- ☐ Conduct Owner training on the operation and maintenance of the overcurrent protective equipment.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
PUBLIC ADDRSS SYSTEM

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Conduct Owner training in regards to the operation, programming and maintenance of the system.
- ☐ Verify that the Site Acceptance Test has been completed.
- ☐ Preventative Maintenance Plan and Quality Assurance Plans have been submitted.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
SOUND MASKING

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical Specification and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, ANSI/NETA standards, manufacturer's recommendations and Specification.
- ☐ Conduct Owner training in regards to the operation, programming and maintenance of the system.
- ☐ Verify that the Site Acceptance Test has been completed.
- ☐ Preventative Maintenance Plan and Quality Assurance Plans have been submitted.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Ritenburg & Associates Ltd.
Consulting Electrical Engineers

Performance Checks
WIRING DEVICES

Owner:
Project Name:
RAL File No:
Owner File No:

Activities, Checks and Tests by the Electrical Contractor

- ☐ Verify the products used meet the requirements of the electrical specifications and complies with the shop drawings.
- ☐ Perform the installation and performance tests according to the Canadian Electrical Code, manufacturer's recommendations and Specifications.
- ☐ Test receptacles for polarity.
- ☐ Test GFCI Receptacles with an appropriate ground fault tester.
- ☐ Verify panel directories and circuit identification indicated on the record drawings are consistent and correct.
- ☐ Record drawings are completed, indicating actual location of devices and circuit identification.
- ☐ Ensure that all parts of this commissioning form and performance checks have been completed. Enter into the notes areas of any unfinished work or problems encountered during installation or commissioning.

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Contractor: Signature: _____ Date: _____

Consultant: Ritenburg & Associates Ltd. Signature: _____ Date: _____

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 This Section specifies roles and responsibilities of Training.

1.2 TRAINEES

.1 Trainees: personnel selected for operating and maintaining this facility. Includes Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.

.2 Trainees will be available for training for purposes of familiarization with systems.

1.3 INSTRUCTORS

.1 Consultant will provide:

.1 Descriptions of systems.

.2 Instruction on design philosophy, design criteria, and design intent.

.2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:

.1 Start-Up, operation, shut-down of equipment, components and systems.

.2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.

.3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

.3 Contractor and equipment manufacturer to provide instruction on:

.1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.4 TRAINING OBJECTIVES

.1 Training to be detailed and duration to ensure:

.1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.

.2 Effective on-going inspection, measurements of system performance.

.3 Proper preventive maintenance, diagnosis and trouble-shooting.

.4 Ability to update documentation.

.5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.5 TRAINING MATERIALS

.1 Instructors to be responsible for content and quality.

.2 Training materials to include:

.1 "As-Built" Contract Documents.

.2 Operating & Maintenance Manual.

.3 TAB and PV Reports.

.3 Departmental Representative will review training manuals.

.4 Training materials to be in a format that permits future training procedures to same degree of detail.

.5 Supplement training materials:

.1 Transparencies for overhead projectors.

.2 Multimedia presentations.

.3 Manufacturer's training videos.

.4 Equipment models.

1.6 SCHEDULING

.1 Include in Commissioning Schedule time for training.

.2 Deliver training during regular working hours, training sessions to be for duration specified in relevant Specification Sections.

.3 Training to be completed prior to acceptance of facility.

1.7 RESPONSIBILITIES

.1 Be responsible for:

.1 Implementation of training activities,

.2 Coordination among instructors,

.3 Quality of training, training materials,

.2 Departmental Representative will evaluate training and materials.

.3 Upon completion of training, provide written report, signed by Instructors, with complete list of attendees, and witnessed by Consultant and Cx Authority.

.4 Coordination with Departmental Representative.

1.8 TRAINING CONTENT

.1 Training to include demonstrations by Instructors using the installed equipment and systems.

.2 Provide specialized training as specified in relevant Sections of the Specifications.

.3 Content to include the following plus any items required by the relevant Sections of the Specifications:

.1 Review of facility and occupancy profile.

.2 Functional requirements.

.3 System philosophy, limitations of systems and emergency procedures.

.4 Review of system layout, equipment, components and controls.

.5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.

.6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.

.7 Maintenance and servicing.

.8 Trouble-shooting diagnosis.

.9 Interaction among systems during integrated operation.

.10 Review of O&M documentation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.2 SUBMITTALS

.1 Submit shop drawings in accordance with Sections 01 33 00 - Submittal Procedures.

.2 Before proceeding with demolition of load bearing walls or other walls and where required by authority having jurisdiction submit for review by Departmental Representative shoring and underpinning drawings prepared by qualified professional engineer registered or licensed in the Province of Saskatchewan, showing proposed method.

.3 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Sections 01 74 21 - Construction/Demolition Waste Management and Disposal and indicate:

.1 Descriptions of and anticipated quantities of materials to be salvaged, reused, recycled and landfilled.

.2 Schedule of selective demolition.

.3 Number and location of dumpsters.

.4 Anticipated frequency of tippage.

.5 Name and address of haulers, waste facilities, and waste receiving organizations.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.4 SITE CONDITIONS

.1 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

Part 2 Execution

2.1 PREPARATION

.1 Inspect building and site with Departmental Representative 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.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

2.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements.

2.3 SALVAGE

.1 Refer to drawings and specifications for items to be salvaged for reuse.

.2 Remove items to be reused, store as directed by Departmental Representative, and re-install under appropriate section of specification.

2.4 DEMOLITION

.1 Remove parts of existing building to permit new construction. Sort materials into appropriate piles for reuse and recycling.

.2 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

2.5 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities or reuse facilities except where specified otherwise, in accordance with authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Environmental Protection Act,1999 (CEPA 1999).

.1 Export and Import of Hazardous Waste Regulations (SOR/2002-300).

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 National Fire Code of Canada [2005].

.4 Transportation of Dangerous Goods Act (TDG Act) [1999], (c. 34).

.5 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).

1.2 DEFINITIONS

.1 Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.4 Workplace Hazardous Materials Information System (WHMIS): Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

1.3 SUBMITTALS

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

.2 Product Data:

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

.1 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.

.2 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.

.4 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.
- .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Do not transfer of flammable and combustible liquids in vicinity of open flames or heat-producing devices.

.7 Do not use flammable liquids having flash point below 38 degrees C, such as naptha or gasoline as solvents or cleaning agents.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

.10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg 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 not mixed.
- .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 Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.5 TRANSPORTATION

.1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.

.3 If hazardous waste is generated on site:

- .1 Co-ordinate transportation and disposal with Departmental Representative.
- .2 Ensure compliance with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
- .3 Use licensed carrier authorized by provincial authorities to accept subject material.
- .4 Prior to shipping material obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
- .5 Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.
- .6 Ensure that trained personnel handle, offer for transport, or transport dangerous goods.
- .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
- .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 Products

2.1 MATERIALS

.1 Only bring on site quantity of hazardous materials 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.

Part 3 Execution

3.1 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 Hazardous waste burned for energy recovery.
- .3 Lead-acid battery recycling.
- .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 NOT USED

.1 Not Used.

Part 2 Products

2.1 MATERIALS

.1 Portland cement to conform to CSA-A5 Type 50 - Sulphate Resistant

.2 Supplementary Cementing Material: All concrete to contain 15% fly ash. Fly ash to be Type F or C.

.3 Fine and Coarse Aggregates: conforming to CSA A23.1-04 – "Concrete Materials and Methods of Concrete Construction". The fine and coarse aggregate for concrete slab, toppings and sidewalks shall contain a maximum of 0.4% low density particles as determined by CSA Test A23.2-4A "Low Density material in Aggregate".

.4 Water: clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material. Water to CSA A23.1-04.

.5 Admixtures:

.1 Air-entraining admixtures are to conform to the requirements of ASTM C260. The admixture is to be of uniform consistency and quality within each container and from shipment to shipment.

.2 Water-reducing admixtures are to conform to the requirements of ASTM C494, Type A or D. The admixture is to be of uniform consistency and quality within each container and from shipment to shipment.

.3 Superplasticizers, if approved by the Departmental Representative, (high range water reducers) are to conform to the requirements of ASTM C494, Type F or G.

.6 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.

.7 Welded steel wire fabric: to CAN/CSA-30.5 10 gauge.

.8 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.

.9 Other concrete materials: to CAN/CSA-A23.1.

2.2 MIXES

.1 Proportion concrete in accordance with CAN/CSA-A23.1.

.2 Class of exposure: to CAN/CSA-A23.1, Table 1.

.1 C-2: sidewalks, curb and gutters, pads.

.2 C-4: concrete thrust blocks and/or support blocks.

.3 Minimum compressive strength at 28 days to CAN/CSA-A23.1-04 Table 2 as per class of exposure.

.1 C-2: 32 MPa

.2 C-4: 25 MPa

.4 Nominal size of aggregate (Group 1 20-5): to CAN/CSA-A23.1.

.5 Slump: to CAN/CSA-A23.1-04.

.6 Air content: concrete to contain purposely entrained air in accordance with CAN/CSA-A23.1, Table 4.

.1 C-2: 5-8%

.2 C-4: 4-7%

Part 3 Execution

1. CONSTRUCTION

.1 Do forming and placing of cast-in-place concrete work in accordance with CAN/CSA-A23.1-04.

3.2 INSERTS

.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in. Sleeves and openings greater than 100 mm x 100 mm not indicated, must be approved by Departmental Representative.

3.3 FINISHES

.1 Formed surfaces exposed to view: trowelled finish in accordance with CAN/CSA-A23.1.

.2 Pavements, walks, curbs:

.1 Refer to Section 32 16 15.

3.4 CURING

.1 Cure and protect concrete in accordance with CAN/CSA-A23.1-04.

.1 Do not use curing compounds where bond is required by subsequent topping or coating.

3.5 SITE TOLERANCES

.1 Concrete finishing tolerance in accordance with CAN/CSA-A23.1-04.

3.6 FIELD QUALITY CONTROL

.1 Concrete testing: to CAN/CSA-A23.2.

.2 Make at least one Compressive Strength Test from each 25 cubic metres of concrete poured with a minimum of one test per day or per each pour. One strength test shall consist of three 152 x 305 mm cylinders. One tested at seven days and two tested at 28 days.

.3 Slump and air content test shall accompany each compressive strength test.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.

1.2 SUBMITTALS

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

.2 Product Data: Submit manufacturer's technical literature for each product indicated, specified, or required. Include manufacturer's technical data, application instructions, and recommendations.

.3 Maintenance Manuals:

.1 Conform to Section 01 78 00 - Closeout Submittals.

.2 Include instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.

.3 Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.4 QUALITY ASSURANCE

.1 Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.

.2 Supervision: Maintain competent supervisor who is at Project during times specified work is in progress.

.3 Manufacturer Qualification: Approved by manufacturer to apply liquid applied products.

.4 Pre-Installation of Concrete Conference: Prior to placing concrete for areas scheduled for polishing, conduct meeting. Meeting attendees to include Architect, Contractor, Concrete supplier, concrete finisher, concrete polisher and technical representative of liquid applied products.

.5 Coefficient of Friction: Achieve following coefficient of friction by field quality control testing in accordance to the following standards:

.1 ASTM D-2047 – Static coefficient of friction after application of all finishes. Average (wet) >0.60 when tested in 4 pull directions.

.2 ANSI B101.3 Dynamic Coefficient of Friction – Wet DCOF > 0.42 for level floor surfaces after application of all finishes.

.6 Field Mock-up: Before performing work of this Section, provide following field mock-up to verify selections made under submittals and to demonstrate aesthetic effects of polishing. Approval does not constitute approval of deviations from Contract Documents, unless Departmental Representative specifically approves deviations in writing.

.1 Provide 3 x 3 meter mock-up. Locate as shown on drawings.

.2 Mock-up shall be representative of work to be expected.

.3 Perform grinding, honing, and polishing work as scheduled for Project using same personnel as will perform work for Project.

.4 Approval is for following aesthetic qualities:

.1 Compliance with approved submittals.

.5 Compliance with specified aggregate exposure.

.6 Compliance with specified coefficient of friction.

.7 Compliance with specified finished gloss level.

.8 Compliance with Specified colour.

.9 Approved field mock-ups mock-up may remain as part of finished work as a standard for judging completed work.

1.5 SITE CONDITIONS

.1 Damage and Stain Prevention: Prevent damage and staining of concrete surfaces to be polished.

.2 Prohibit use of markers, spray paint, and soapstone.

.3 Prohibit improper application of liquid membrane film forming curing compounds.

.4 Prohibit pipe-cutting operations over concrete surfaces.

.5 Prohibit storage of any items over concrete surfaces for not less than 28 days after concrete placement.

.6 Prohibit ferrous metals storage over concrete surfaces.

.7 Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces.

.8 Protect from acids and acidic detergents contacting concrete surfaces.

.9 Protect from painting activities over concrete surfaces.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 PRODUCTS

2.1 LIQUID APPLIED PRODUCTS

.1 Liquid Densifier: An Aqueous solution of Silicon Dioxide dissolved in one of the following Hydroxides that penetrates into the concrete surface and reacts with the Calcium Hydroxide to provide a permanent chemical reaction that hardens and densifies the wear surface of the cementitious portion of the concrete. All of the following have the same chemistry varying only by the alkali used for solubility of the Silicon Dioxide.

.1 Sodium Silicate

.2 Potassium Silicate

.3 Lithium Silicate

.4 Alkalis solution of Colloidal Silicates or Silica

2.2 DYE

.1 Non-film forming soluble colorant dissolved in a carrier designed to penetrate and alter coloration and appearance of a concrete floor surface without a chemical reaction.

.2 Colours to be selected by Departmental Representative from standard range.

2.3 SEALER

.1 Impregnating Stain Protection: Non film forming stain and food resistant penetrating sealer designed to be applied to densified and polished concrete which meets the requirements of OSHA for slip resistance as tested by ASTM D 2047 and stain resistance of ASTM D 1308.

2.4 ACCESSORIES

.1 Repair Material: The material must have sufficient bonding capabilities to adhere after the polishing to the concrete surface and provide abrasion resistance equal to or greater than the surrounding concrete substrate.

.2 Grout Material: A thin mortar used for filling spaces. Acceptable products shall be:

.1 Epoxy, urethane, poluyrea, or polyaspartic resins.

.2 Latex or acrylic binders mixed with cement dust from previous grinding steps.

.3 Silicate binders mixed with cement dust from previous grinding steps.

.3 Protective Cover: Non-woven, puncture and tear resistant, polypropylene fibers laminated with a multi-ply, textured membrane, not less than 18 mils in thickness.

2.5 POLISHING EQUIPMENT

.1 Multiple head, counter rotating, walk behind or ride on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete.

.2 If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.

.3 If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.

.4 Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces same results, without noticeable differences, as field grinding and polishing equipment.

.5 Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.

.6 Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resinous, ceramic, etc) that are attached to rotating heads to refine the concrete substrate. Select tool and abrasives are required to achieve specified appearance and gloss level and as recommend by manufacturer.

.1 Bonded Abrasive: Abrasive medium held within a bonding that erodes away to expose new abrasive medium as it is used.

.2 Metal Bond Tooling: Diamond tooling containing industrial grade diamonds with a metallic bonded matrix attached to rotating heads to refine the concrete substrate.

.3 Resin Bond Tooling: Diamond tooling containing industrial grade diamonds within a resinous bonded matrix (poly-phenolic, ester-phenolic, thermoplastic-phenolic) attached to rotating heads to refine the concrete substrate.

.4 Hybrid Tooling: Diamond tooling combines metal bond and resin bond having the characteristics of both types of tooling. These types of tools are used as either transitional tooling from metal bond tools to resin bond tools or as a first cut tool on smooth concrete surfaces.

.5 Transitional Tooling: Diamond tooling is used to refine the scratch pattern of metal bond tooling prior to the application of resin bond tooling in an effort to extend the life of resin bond tooling and to create a better foundation for the polishing process.

.6 Abrasive Pad: An abrasive pad, resembling a typical floor maintenance burnishing pad, has the capability of refining the concrete surface on a microscopic level that may or may not contain industrial grade diamonds. These pads are typically used for the maintenance and/or restoration of previously installed polished concrete flooring.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrates to be polished for compliance with requirements and other conditions affecting performance.

.2 Concrete curing methods according to applicable Division 03 Section on cast-in-place concrete.

.3 Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.

.4 Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 PREPARATION

.1 Prepare and clean concrete surfaces.

.2 Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, paint splatter, and other contaminants incompatible with liquid applied products and polishing.

3.3 TESTING

.1 Alkalinity:

.1 Test Method: Measure pH according to method indicated in ASTM F 710.

.2 Acceptable Results: pH between 8 and 10.

.2 Moisture Vapor Transmission Rate:

.1 Test Method: Perform anhydrous calcium chloride test according to ASTM F 1869.

.2 Acceptable Results: Not more than 5 pounds per 1000 square feet in 24 hours.

.3 Relative Humidity:

.1 Test Method: Perform relative humidity test using in situ probes according to ASTM F 2170.

.2 Acceptable Results: Not more than 75 percent

3.4 COLOURING CONCRETE FLOORS

.1 Apply solution by methods and techniques required by manufacturer to produce finish matching approved field mock-ups.

.2 Maintain wet edge, working newly applied solution into edges of adjacent wet edges of previously treated surfaces.

.3 Maintain consistent saturation throughout application.

.4 Avoid splashing, dripping, or puddling of solution on adjacent substrates.

.5 When color matches approved mock-ups, neutralize as required by manufacturer.

3.5 GRINDING AND POLISHING

.1 Perform all polishing procedures to ensure a consistent appearance from wall to wall.

.2 Initial Grinding:

.1 Use grinding equipment with metal or semi-metal bonded tooling.

.2 Begin grinding in one direction using sufficient size equipment and diamond tooling to meet specified aggregate exposure class.

.3 Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to 100 grit metal bonded tooling.

.4 Achieve maximum refinement with each pass before proceeding to finer grit tools.

.5 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.6 Continue grinding until aggregate exposure matches approved field mock-ups

.3 Treating Surface Imperfections:

.1 Mix patching compound or grout material with dust created by grinding operations, manufacturer's tint, or sand to match color of adjacent concrete surfaces.

.2 Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.

.3 Work compound and treatment until color differences between concrete surface and filled surface imperfections are not reasonably noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.

.4 Liquid Densifier Application

.1 Apply undiluted to point of rejection, remove excess liquid, and allow curing according to manufacturer's instructions.

.5 Grout Grinding:

.1 Use grinding equipment and appropriate grit and bond diamond tooling.

.2 Apply grout, forced into the pore structure of the concrete substrate, to fill surface imperfections.

.3 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.6 Honing:

.1 Use grinding equipment with hybrid or resin bonded tooling.

.2 Hone concrete in one direction starting with a 100 grit tooling and make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit tooling reaching maximum refinement with each pass before proceeding to finer grit tooling.

.3 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.7 Polishing:

.1 Use polishing equipment with resin-bonded tooling.

.2 Begin polishing in one direction

.3 Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level.

.4 Make sequential passes with each pass perpendicular to previous pass using finer grit tooling with each pass until the specified level of gloss has been achieved.

.5 Achieve maximum refinement with each pass before proceeding to finer grit pads.

.6 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.7 Stain Protection: Uniformly apply and remove excessive liquid according to manufacturer’s instructions. Final film thickness should be less than .05 mils after cure.

.8 Final Polish: Using burnishing equipment and finest grit abrasive pads, burnish to uniform reflective sheen matching approved field mock-up.

.8 Final Polished Concrete Floor Finish

.1 Aggregate Exposure Class C – Medium Aggregate Finish: Remove not more than 1/8 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying medium aggregate with no, or small amount of, large aggregate at random locations.

.9 Finished Gloss Level

.1 Finished Gloss Level - Medium Gloss Appearance (MG-2):

.1 Procedure: Not less than 4 steps with full refinement of each diamond tool with one application of densifier.

.2 Reflective Sheen Reading: Sheen Level A: Sheen (glossy) as determined by a gloss reading of 45 – 60.

3.1 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 Protect finished floor surface.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA A165 SERIES-04(R2009), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2, A165.3).

.2 CAN/CSA A179-04(R2009), Mortar and Grout for Unit Masonry.

.3 CAN/CSA-A370-04(R2009), Connectors for Masonry.

.4 CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.

.5 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.6 CSA-S304.1-04(R2010), Design of Masonry Buildings.

1.2 SUBMITTALS

.1 Submit samples in accordance with Sections 01 33 00 - Submittal Procedures.

.1 Submit duplicate full size samples of each type masonry units.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Sections 01 33 00 - Submittal Procedures.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.

.1 Indicate VOC's for epoxy coatings and galvanized protective coatings and touch-up products.

.2 Indicate VOC's for mortar, grout, parging, colour additives and admixtures.

.3 Shop Drawings:

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

.2 Shop drawings consist of bar bending details, lists and placing drawings.

.3 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.

.4 Samples:

.1 Provide sample of new grout colour to match existing grout.

1.3 QUALITY ASSURANCE

.1 Mock-ups:

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

.2 Construct mock-up of exterior window construction showing masonry colours and textures, use of reinforcement, jointing, pointing, coursing, mortar and quality of work.

.3 Mock-up used:

.1 To judge quality of work, substrate preparation, operation of equipment and material application.

.4 Construct mock-up where directed by Departmental Representative.

.5 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with work.

.6 When accepted by Departmental Representative mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.4 STORAGE AND HANDLING

.1 Protect on site stored or installed material from moisture damage in accordance with manufacturer's printed instructions.

Part 2 Products

2.1 MASONRY UNITS

.1 Fired clay brick: to CAN/CSA-A82.

.1 New brick as follows:

.1 Type: FBX.

.2 Grade: ASTM C216 grade SW. CAN/CSA A82-06 grade EG

.3 Size: 90 x 57 x 190 mm. Confirm dimensions match existing bricks.

.4 Colour to match existing or “Burlington Matt” as manufactured by Hanson

.5 Special profile brick sill to match existing sloped top and colour. (Alternatively, provide integrally coloured precast concrete profiled sill to match new brick. Provide range of samples for selection.)

2.2 REINFORCEMENT AND CONNECTORS

.1 Bar reinforcement: to CSA-A371 and CAN/CSA G30.18, Grade 400.

.2 Wire reinforcement: to CSA-A371, truss type.

.3 Connectors shall be corrosion resistant: to CSA-A370 and CSA-S304.

2.3 MORTAR AND GROUT

.1 Brick

.1 Mortar to CSA A179

.2 Mortor Type: N based on property specifications.

.3 Colour: to match existing coloured mortar.

2.4 STEEL ANGLE LINTELS

.1 Refer to Section 05 50 00 Metal Fabrications.

.2 Install lintel with minimum 200mm bearing on both sides.

2.5 ACCESSORIES

.1 Control joint filler: purpose-made elastomer durometer hardness to ASTM D2240 of size and shape indicated.

.2 Masonry Flashing Membrane: Self-Adhesive SBS rubberized asphalt laminated to high-density polyethylene film, minimum nominal total thickness of 1.0 mm.

.3 Lap adhesive: recommended by masonry flashing manufacturer.

.4 Weep hole vents: purpose-made PVC, colour black

.5 Cavity Drainage Protection

.1 Polyester/polyethylene mesh trapezoidal shape to maintain cavity airflow and drainage while suspending mortar droppings at unequal heights.

.1 Manufacturer: “Mortar Net” or equivalent.

.6 Nailing Inserts: 0.5 mm minimum thickness, galvanized.

.7 Bolts: 12 mm diameter x 150 mm long with ends bent 50 mm at 90 degrees.

2.6 EXISTING FACE BRICK

.1 Use hard, sound, and clean salvaged bricks only to replace bricks damaged during removal or to provide end units of existing panels to remain. Use only bricks without evidence of soluble salts, compatible in appearance and performance with existing.

.2 Contractor will be responsible for carefully removing existing bricks in area of walls to be rebuilt.

.3 Contractor will be responsible for carefully cleaning mortar off salvaged bricks and to palletize bricks in a protected area.

.4 Protect palletised bricks from weather. Turn over palletized bricks to Departmental Representative. Deliver to location on site as directed.

Part 3 Execution

3.1 INSTALLATION

.1 Do masonry work in accordance with CSA-A371 except where specified otherwise.

.1 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

.2 Brick:

.1 Bond: running stretcher bond with vertical joints in perpendicular alignment and centred on adjacent stretchers above and below.

.2 Coursing height: to match existing (confirm 200mm for three courses).

.3 Jointing: Jointing to match existing.

3.2 CONSTRUCTION

.1 Exposed masonry:

.1 Remove chipped, cracked, and otherwise damaged units, in exposed masonry and replace with undamaged units.

.2 Make cuts straight, clean, and free from uneven edges.

.2 Building-In:

.1 Install masonry connectors and reinforcement where indicated on drawings.

.2 Build in items required to be built into masonry.

.3 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

.4 Install loose steel lintels over openings where indicated.

.3 Support of loads:

.1 Use grout to CSA A179 where grout is used in lieu of solid units.

.4 Provision for movement:

.1 Leave 3 mm space below shelf angles.

.2 Built masonry to tie in with stabilizers, with provision for vertical movement.

.5 Interface with other work:

.1 Cut openings in existing work as indicated.

.2 Openings in walls: approved by Departmental Representative.

.3 Make good existing work. Use materials to match existing.

3.3 REINFORCING AND CONNECTING

.1 Install masonry connectors and reinforcement in accordance with CSA-A370, CSA-A371 and CSA-S304.1 unless indicated otherwise.

.2 Prior to placing concrete, mortar, and grout, obtain Engineer's approval of placement of reinforcement and connectors.

3.4 BONDING AND TYING

.1 Tie masonry veneer to backing in accordance with NBC, CSA-S304.1, CSA-A371 and as indicated.

3.5 STEEL LINTELS

.1 Reinforce masonry lintels and bond beams as indicated.

.2 Place and grout reinforcement in accordance with CSA-S304.1, CSA-A371, and CSA-A179.

3.6 GROUTING

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

3.7 ANCHORS

.1 Supply and install metal anchors as indicated.

3.8 SITE TOLERANCES

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

3.9 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

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

3.10 PROTECTION

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.
- .2 ASTM A276-13a, Standard Specification for Stainless Steel Bars and Shapes.
- .3 ASTM A307-12, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
- .2 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA International)

- .1 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel.
- .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
- .4 CSA W48-06(R2011), Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

1.2 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:
  - .1 For finishes, coatings, primers and paints.

.2 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 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 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Storage and Protection:

.1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

.2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W or 350W.

.2 Steel pipe: to ASTM A53/A53M extra strong, galvanized finish where indicated.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 Stainless steel: to ASTM A276, Type 302 commercial grade.

.7 Expanded Mesh: To EMMA 557-99. Style 19mm-9F. 19mm #9/10 roll-flattened steel mesh. Nominal strand thickness of 3mm. Diamond opening of 14mm x 43mm.

.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 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Shop coat primer: to CAN/CGSB-1.40.

.2 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m^2 to CAN/CSA-G164.

.3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

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 Refer to Section 09 91 13 Exterior Painting and 09 91 23 Interior Painting. Coordinate prime painting with specified paint systems.

.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 STEEL ANGLE LINTELS

.1 Size: L100x90x10 for window openings not exceeding 1200mm.

.2 Steel angles: galvanized and prime painted.

2.7 SIGN POST AND SLEEVE

.1 Post – galvanized steel pipe.

.1 Diameter: 50mm.

.2 Length: approximately 3000mm.

.2 Sleeve – galvanized steel pipe

.1 Diameter: to suit insertion of 50mm diameter sign post.

.2 Length: 900mm

.3 Breakaway fitting-by Section 10 14 00.

2.8 SECURITY BARS

.1 Security bars: 10M steel bars. Hot dipped galvanized.

.2 Cut length to suit installation.

2.9 STEEL MESH

.1 Rolled flattened steel mesh, galvanized.

2.10 MILLWORK SUPPORT BRACKETS

.1 As noted in drawings.

.2 Prime painted.

2.11 LOCKER ROOM BENCH

.1 As noted in drawings.

.2 Prime for epoxy paint.

Part 3 Execution

3.1 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Provide components for building by other sections in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CAN/CSA-S16.1, or weld.

.7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.9 Touch-up galvanized surfaces with zinc rich primer and zinc finish coating where burned by field welding.

3.2 STEEL ANGLE LINTELS

.1 Turn over steel angle lintels to Section 04 04 99 Masonry For Minor Works.

3.3 SIGN POST AND SLEEVE

.1 Refer to drawings.

.2 Turn over steel sleeve and sign post to General Contractor.

3.4 SECURITY BARS

.1 Install security bars into steel angle frames as shown on drawings.

.2 Weld security bars to steel angle frames.

.3 Coordinate with mechanical for duct penetrations. Seal all duct penetrations.

.4 Install welded angle frame using 6mm hex steel through bolt. Weld bolt head in 3 spots on attack side.

.5 Touch up all welded areas using zinc-rich coating.

3.5 STEEL MESH

.1 Refer to Wall Types in drawings.

.2 Refer to drawings and Section 09 22 16 Non-Structural Metal Framing for installation details.

3.6 MILLWORK SUPPORT BRACKETS

.1 Refer to drawings for fabrication and installation details.

.2 Grind all welds smooth.

.3 Coordinate painting with section 09 91 23 Interior Painting.

3.7 LOCKER ROOM BENCH

.1 Refer to drawings for fabrication and installation details.

.2 Coordinate painting with section 09 91 23 Interior Painting.

3.8 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C36/C36M-03e1, Standard Specification for Gypsum Wallboard.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.3 Canadian Standards Association (CSA International)

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA O112 Series-M1977(R2006), CSA Standards for Wood Adhesives.

.4 CSA O141-05(R2009), Softwood Lumber.

.5 CSA O151-09, Canadian Softwood Plywood.

.6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.

.4 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2010.

1.2 SUBMITTALS

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

1.3 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 FRAMING AND STRUCTURAL MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:

- .1 CSA O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Structural Composite Lumber (SCL) in accordance with ASTM D5456.

.3 Framing and board lumber: in accordance with NBC.

.4 Furring, blocking, nailing strips, grounds, rough bucks:

- .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.

.5 Use pressure (preservative) treated lumber material for wood nailers at roof.

2.2 PANEL MATERIALS

.1 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.0.

.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.3 Gypsum sheathing: to ASTM C36/C36M.

2.3 ACCESSORIES

.1 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick.

.2 Air seal: closed cell polyurethane or polyethylene.

.3 Sealants: in accordance with Section 07 92 10 - Joint Sealing.

- .1 Maximum allowable VOC limit 250 g/L.

.4 Subflooring adhesive: to CGSB-71.26, cartridge loaded.

- .1 Maximum allowable VOC limit 30 g/L.

.5 General purpose adhesive: to CSA O112 Series.

- .1 Maximum allowable VOC limit 140 g/L.

.6 Nails, spikes and staples: to CSA B111.

.7 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.8 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

2.4 FASTENER FINISHES

.1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work, interior highly humid areas, pressure-preservative, fire-retardant, and treated lumber.

Part 3 Execution

3.1 PREPARATION

.1 Store wood products in a dry location off the ground.

3.2 INSTALLATION

.1 Comply with requirements of NBC 2005 Part 9 supplemented by following paragraphs.

.2 Install members true to line, levels and elevations, square and plumb.

.3 Construct continuous members from pieces of longest practical length.

.4 Install spanning members with "crown-edge" up.

.5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.6 Install wall sheathing in accordance with manufacturer's printed instructions.

.7 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, electrical equipment mounting boards, and other work as required.

.8 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.9 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

3.3 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Countersink bolts where necessary to provide clearance for other work.

.3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.4 SCHEDULES

.1 Refer to drawings for various items requiring furring, blocking, nailing strips, grounds and rough bucks.

.2 Provide backing in walls for all millwork, shelving and wall mounted items requiring solid blocking. Blocking to be 400mm high in walls where required.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI/HPVA HP-1-2009, Standard for Hardwood and Decorative Plywood.

.2 ANSI/NPA A208.1-2009, Particleboard.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

.1 Architectural Woodwork Quality Standards Illustrated, Edition 2, 2014.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.4 Canadian Standards Association (CSA International)

.1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.

.2 CSA O112.4 Series-M1977(R2006), Standards for Wood Adhesives.

.3 CSA O121-08(R2013), Douglas Fir Plywood.

.4 CSA O141-05(R2009), Softwood Lumber.

.5 National Electrical Manufacturers Association (NEMA)

.1 ANSI/NEMA LD-3-2005, High-Pressure Decorative Laminates (HPDL).

.6 National Hardwood Lumber Association (NHLA)

.1 Rules for the Measurement and Inspection of Hardwood and Cypress 2011.

.7 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2010.

1.2 PERFORMANCE REQUIREMENTS

.1 Perform architectural casework work in accordance with the recommendations of the "Architectural Woodwork Quality Standards Illustrated" of the Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada (AWMAC), 2014 Edition, together with authorized additions and amendments, Custom Grade.

.2 Where modifications to the AWMAC Quality Standards are included in this project specification, then such modifications shall govern in case of conflict.

.3 Materials and installation shall be in metric measurement as specified.

1.3 SUBMITTALS

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

.2 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.1 Indicate details of construction, profiles, jointing, fastening and other related details.

.1 Scales: profiles full size, details half full size.

.2 Indicate materials, thicknesses, finishes and hardware.

.3 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.

.3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide duplicate samples: sample size 300 x 300 mm or 600 mm long unless specified otherwise.

.2 Provide two (2) samples of each wood species for review complete with final coatings.

.3 Provide duplicate colour samples of laminated plastic for colour selection.

.4 Provide duplicate colour samples of quartz counter top for colour selection.

.5 Provide duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.

.4 Quality assurance submittals:

.1 Manufacturer's Instructions: manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood and wood based composite panels in accordance with CSA and ANSI standards.

.3 Delivery, Storage, and Handling:

.1 Deliver, handle, store and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.

.1 Protect millwork against dampness and damage during and after delivery.

.2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:

.1 CSA O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 AWMAC custom grade, moisture content as specified.

.2 Hardwood lumber: moisture content 6% or less in accordance with following standards:

.1 National Hardwood Lumber Association (NHLA).

.2 AWMAC custom grade, moisture content as specified.

.3 Douglas fir plywood (DFP): to CSA O121, standard construction.

.1 Urea-formaldehyde free.

.4 Hardwood plywood: to ANSI/HPVA HP-1.

.1 Urea-formaldehyde free.

.5 Birch plywood: to AWMAC Select A and AA White. Flat-sliced, slip match.

.1 Urea-formaldehyde free.

.6 Hardwood: Solid hard maple, to AWMAC Select A for clear finish.

.7 Engineered Combination core – 5 ply veneer: to ANSI A208-1

.1 Urea-formaldehyde free.

.8 Laminated plastic for flatwork: to NEMA LD3, Grade VGL, Type HD, 1.6 mm thick; based on solid, woodgrain, printed pattern, and metallic, colour range with satin, matt, textured, and embossed finish.

.9 Laminated plastic backing sheet: Grade BK, Type HD not less than 0.5 mm thick or same thickness and colour as face laminate.

.1 Plastic laminate colours:

.1 PLAM-1: Counter Tops, Backsplash, Adjustable Shelves and as noted on drawings.

.1 Formica: “Storm”, Matte Finish 912-58 or similar.

.2 PLAM-2: Upper Casework Base Cabinets, Gabel Support Ends and as noted in drawings

.1 Laminate colour to be continuous through backing sheet.

.2 Formica: ColorCore White CC0949 Matte58 or similar.

.10 Thermofused Melamine: to NEMA LD3 Grade VGL.

.1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).

.1 Interior cabinet- colour white unless otherwise noted.

.11 Quartz counter top:

.1 Composition: Maximum 93 percent quartz aggregate combined with polyester resin binders and proprietary pigments.

.2 Thickness: 20mm unless otherwise noted.

.3 Quartz Finish: Polished finish with Glossometer reading greater than 45.

.4 Colour: dark grey coloured field with fine black speckled pattern.

.1 Similar in colour to Cambria “Fieldstone”.

.5 Joint Adhesive: Methacrylate-based adhesive for chemically bonding quartz surfacing seams. Color complementary to quartz surfacing sheet material.

.12 Nails and staples: to CSA B111.

.13 Wood screws: plain, type and size to suit application.

.14 Splines: wood and metal.

.15 Sealant: in accordance with Section 07 92 00 - Joint Sealants.

.16 Laminated plastic adhesive:

.1 Adhesive: contact adhesive to CAN/CGSB-71.20.

.1 Maximum VOC limit 250 g/l.

.2 Adhesives urea-formaldehyde free.

2.2 MANUFACTURED UNITS

.1 Casework:

.1 Fabricate caseworks to AWMAC custom quality grade.

.2 Furring, blocking, nailing strips, grounds and rough bucks

.1 S2S is acceptable for concealed products.

.2 Board sizes: "standard" or better grade.

.3 Dimension sizes: "standard" light framing or better grade.

.4 Urea-formaldehyde free.

.3 Case bodies (ends, divisions and bottoms).

.1 Particleboard core, grade, square edge, 19mm thick. Laminated with high pressure laminate on exposed ends and thermofused melamine on concealed interios.

.4 Backs:

.1 Particleboard core, square edge, 12.7mm thick, laminated with thermofused melamine.

.5 Shelving:

.1 Particleboard core, laminated with thermofused melamine, 19 mm and 25mm thick as noted.

.2 Edge banding: plastic laminate to match.

.2 Drawers:

.1 Fabricate drawers to AWMAC custom grade supplemented as follows:

.2 Sides and Backs.

.1 Thermofused melamine: 15 mm thick.

.3 Bottoms:

.1 Thermofused melamine: 15 mm thick.

.4 Fronts:

.1 Engineered composite core, 19 mm thick, laminated with high-pressure plastic laminate.

.1 Exposed finish: high-pressure plastic laminate

.2 Semi-exposed surface: plastic laminate.

.3 Edges: banded with 3 mm PVC edge, colour to match exposed faces.

.3 Casework Doors:

.1 Fabricate doors to AWMAC custom grade supplemented as follows:

.2 Engineered composite core, 19 mm thick, laminated with high-pressure plastic laminate. Doors over 1525mm high 25 mm thick unless noted otherwise.

.1 Exposed finish: high-pressure plastic laminate

.2 Semi-exposed surface: plastic laminate.

.3 Edges: plastic laminate to match.

.4 Countertops

.1 High-pressure plastic laminate: edged with matching plastic laminate edge unless indicated otherwise on details. Backsplash to match countertop unless indicated otherwise on drawings.

.2 Quartz Countertop: 20mm thick countertop material by maximum practical length. Backsplash and sidesplash to match countertop unless indicated otherwise on drawings. Carry 20mm quartz onto front apron of vanity. Slightly bullnose edges.

.3 Core: Engineered composite core, 19 mm thick as noted.

2.3 LOCKER ROOM BENCHES

.1 Solid maple lumber, stain and varnish.

.2 As noted in drawings

2.4 VANITIES

.1 Quartz counter tops.

.2 As noted in drawings.

2.5 MAILROOM SHELF UNITS

.1 Birch plywood with solid wood edging.

.2 Stained and varnished.

.3 As noted in drawings.

2.6 FABRICATION

.1 Assemble cabinets in flush overlay style.

.2 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.

.3 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

.4 Shelving to cabinetwork to be adjustable unless otherwise noted.

.5 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.6 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

.7 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.8 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.9 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.

.10 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.11 Apply laminate backing sheet to reverse side of core of plastic laminate work.

2.7 HARDWARE

.1 Hinges: European concealed hinges, 110 degree opening. Only screw fastened hardware will be accepted, no friction fit hardware will be accepted. Use plastic insertion dowels to receive screws of hinge baseplates.

.1 Acceptable manufacturers: Hettich, Blum, Hafele or Richelieu.

.2 Drawer slides: full extension, bearing type, secured to sides of drawers and to gable, 45kg static load capacity, integral stop, self-closing

.1 Acceptable product: Accuride 3832, or Knape & Vogt 8400.

.3 Shelf standards: Safety shelf support pin for 5mm diameter holes, steel pin with mounded on clear plastic.

.4 Pulls: Contemporary bar style, stainless steel with brushed nickel finish, 160mm centre to centre unless otherwise noted on drawings.

.1 Acceptable product: Richelieu BP527160195, or equivalent.

.5 Cabinet locks: Cam type cylinder lock. Satin stainless steel finish. Install where shown on details. Key locks that are in the same room alike.

.6 Clear plastic silencers to be installed on all cabinet doors.

Part 3 Execution

3.1 INSTALLATION

.1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.

.3 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets.

.4 Use draw bolts in countertop joints.

.5 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.

.6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.

.7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.

.8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

.9 Site apply laminated plastic to units as indicated. Adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where indicated or approved. Slightly bevel arises.

.10 For site application, offset joints in plastic laminate facing from joints in core.

.11 Coordinate installation of continuous wood blocking behind adjustable shelving units. Attach standards to studs at a maximum spacing of 400mm on centre. Adjustable shelf shall extend a maximum of 100mm beyond the final standard, install standard as required.

3.2 CLEANING

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

.2 Clean millwork and cabinet work, inside cupboards and drawers and outside surfaces.

.3 Remove excess glue from surfaces.

3.3 PROTECTION

.1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Underwriters Laboratories of Canada (ULC)

.1 ASTM C612-[04], Standard Specification for Mineral Fibre Block and Board Thermal Insulation.

.2 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.

.3 CAN/ULC-S702- 97, Thermal Insulation, Mineral Fibre, for Buildings.

.4 CAN/ULC-S704-03, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.2 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 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

.1 Mineral fibre insulation must be formaldehyde free.

Part 2 Products

2.1 BOARD INSULATION

.1 Rigid Mineral Wool Insulation Board

.1 Non-Combustible, mineral wood fiber insulations made from basalt rock and slag.

.2 Shape: flat and sloped as required.

.3 RSI (R-value): RSI 0.62 (R3.8) per 25mm.

.4 Thickness: as indicated on drawings.

.1 Acceptable products:

.1 Roxul: TopRock DD Plus

.2 Approved alternate.

2.2 ADHESIVE

.1 Adhesive (for polystyrene): to CGSB 71-GP-24.

.2 Compatible with roofing membrane and polystyrene insulation

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.

.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 and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and 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 inspected and approved by Consultant.

3.3 EXAMINATION

.1 Examine 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 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C553-11, Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.

.2 ASTM C1320-10, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S702-09, Standard for Thermal Insulation, Mineral Fibre for Buildings.

.2 CAN/ULC-S102.2, Standard Method of Test for Surface Burning Characteristics of Building Materials and assemblies.

1.2 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 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 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 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and 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.

Part 2 Products

2.1 INSULATION

.1 Batt and blanket mineral fibre: CAN/ULC S702, Type 1

.1 Non-combustible: to CAN/ULC S114.
  .1 Flame spread: 0 to 10
  .2 Smoke developed: 0 to 10
.2 Thickness: as indicated on drawings and to suit partition framing (fill cavity).
.3 Zero formaldehyde content.
.4 Acoustical performance:
  .1 Airborne sound transmission loss: To ASTM E90
  .2 Rating sound insulation: To ASTM E413
  .3 Sound absorption co-efficients: To ASTM E423 (NRC 1.10 for 102mm thickness)
.5 Density: To ASTM C612, 45 kg/m^3

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 INSULATION INSTALLATION

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.

.2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.3 Do not compress insulation to fit into spaces.

.4 Fill cavity to full depth for partitions and floor assemblies.

.5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CSA-B149.1 and CSA-B149.2 Type B and L vents.

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheets.

1.3 QUALITY ASSURANCE

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Mock-Ups:

.1 Convene pre-installation meeting prior to construction of mock-up, include major sub-trades..

.2 Install mock-up using approved air barrier assemblies including fasteners, flashing, tape and related accessories per manufacturer’s current printed instructions and recommendations.

.1 Mock-up size: approximately 2 meters by 2 meters including window opening. Location to be selected by Departmental Representative.

.3 Mock-up will be used to judge workmanship, substrate preparation, and material application.

.3 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

.4 Allow 48 h for inspection of mock-up by Consultant before proceeding with air/vapour barrier Work.

1.4 SEQUENCING

.1 Sequence work to permit installation of materials in conjunction with related materials and seals.

Part 2 Products

2.1 SHEET VAPOUR BARRIER

.1 Polyethylene film: to CAN/CGSB-51.34, 0.15mm thick.

2.2 AIR VAPOUR BARRIER MEMBRANE

.1 Self-adhesive membrane composed of SBS modified bitumen and a laminated woven polyethylene facer. Underface is covered with a silicone release paper or film.

.2 Woven polyethylene is compatible for the use of sprayed polyurethane foam insulation.

.3 Components:

.1 Reinforcement: woven polyethylene.

.2 Elastomeric bitumen: Mix of selected bitumen and SBS polymer.

.4 Properties:

.1	Thickness:	minimum1.0 mm
.2	Flexibility at cold temperature (°C):	-35
.3	Water vapour permeability (ng/m2sPa.):	less than 0.50
.4	Static puncture (N):	greater than 350
.5	Lap adhesion (N/m):	2 000

2.3 VAPOUR PERMEABLE MEMBRANE

.1 Self-adhesive waterproofing membrane composed of SBS modified bitumen and woven polyethylene. Bituminous formulation designed to withstand service temperatures up to 115C (239F) degrees.

.2 Top surface: laminated polypropylene.

.3 Underface: self-adhesive, protected with a silicone release film.

.4 Water vapour permeance:

.1 ASTM E96-A: greater than 600 ng/Pa•s•m².

.2 ASTM E96-B: greater than 900 ng/Pa•s•m².

.5 Plywood adhesion:

.1 ASTM D3330: minimum 300N/m.

.6 Hydrostatic pressure for 5 hours:

.1 AATCC 127-08: Pass

2.4 ACCESSORIES- VAPOUR BARRIERS

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide.

.2 Sealant: compatible with air barrier materials, recommended by air barrier manufacturer. Refer to Section 07 92 00 - Joint Sealing.

.3 Primer: as recommended by membrane manufacturer for specific application.

Part 3 Execution

3.1 EXAMINATION

.1 Verify substrate and surface conditions are in accordance with manufacturer recommended tolerances prior to installation of barrier and accessories.

3.2 SHEET VAPOUR BARRIER (POLYETHYLENE)

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Install sheet vapour retarder on warm side of exterior assemblies prior to installation of gypsum board to form continuous retarder.

.3 Use sheets of largest practical size to minimize joints.

.4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

.5 PERIMETER SEALS

.1 Apply continuous bead of sealant to substrate along 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.

.4 Seal self-adhesive membrane to sheet vapour barrier where these two membrane meet. Roll self-adhesive membrane to sheet vapour barrier to ensure an air-tight seal.

.6 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.2 Attach first sheet to substrate.

.3 Apply continuous bead of sealant over solid backing at joint.

.4 Lap adjoining sheet minimum 150 mm and press into sealant bead.

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

.7 ELECTRICAL BOXES AND PENETRATIONS

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.3 AIR VAPOUR AND VAPOUR PERMEABLE MEMBRANES

.1 Preparation

.1 Remove loose or foreign matter which might impair adhesion of materials.

.2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.

.3 Ensure all substrates are free of surface moisture prior to application of self-adhesive membrane and primer.

.4 Ensure metal closures are free of sharp edges and burrs.

.5 Prime substrate surfaces to receive adhesive in accordance with manufacturer's instructions.

.2 Installation

.1 Install materials in accordance with manufacturer's instructions to create a continuous seal between all material junctions within the building envelope.

.2 Apply sealants and primers within recommended application temperature ranges. Consult manufacturer when products cannot be applied within these temperature ranges.

.3 Install membrane using a consecutive overlap method. Provide minimum 50mm side laps and 80mm end laps.

.4 Position membrane for alignment, remove protective film and firmly apply pressure to ensure adhesion. Eliminate all gaps and wrinkles.

.5 Roll entire membrane surface, including seams, to ensure full contact and adhesion.

.6 Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with manufacturer recommended sealant.

3.4 INSTALLATION AT OPENINGS

.1 Carefully install around wall openings (windows, doors, etc.) to prevent any air or vapour leak at these locations

.2 Install air/vapour barrier membrane to create continuous seal at construction elements such as foundations, roofs and walls, and at junctures of different materials or construction types.

3.5 INSTALLATION – MASONRY CAVITY FLASHING

.1 Ensure compatibility between masonry cavity flashing and air vapour barrier.

.2 Coordinate installation of masonry cavity membrane flashing with application of vapour permeable membrane.

3.6 CLEANING

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

.2 Progress Cleaning: Leave Work area clean at end of each day.

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment. Clean new surfaces and existing surfaces affected by Work.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM International)

.1 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 1997.

.3 Canadian Standards Association (CSA International)

.1 CSA B111-1974 (R1998), Wire, Nails, Spikes and Staples

1.2 SAMPLES

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

.2 Submit duplicate 100 x 100 mm samples of each type of sheet metal material, colour and finish.

1.3 WARRANTY

.1 Contractor shall warrant that sheet metal flashings will stay in place and remain leakproof in accordance with General Conditions (GC) - CCDC GC 12.3 , but for two years.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Zinc coated steel sheet: 0.8 mm (22 gauge) thickness, commercial quality to ASTM A653/A653M, with Z275 (G80) designation coating.

2.2 PREFINSIHED STEEL SHEET

.1 Prefinished steel with factory applied silicone modified polyester finish.

.2 Thickness: 0.8mm (22 gauge).

.1 Stelco / Dafasco 8000 Series

.2 Colour selected by Consultant from manufacturer’s standard range of colours.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.3 Sealants: two component polyurethane, colour to match adjacent materials.

.4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.5 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

.6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.7 Solder: to ASTM B32, alloy composition.

.8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated of 0.8mm thick prefinished steel

Part 3 Execution

3.1 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

3.2 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details, FL Aluminum Sheet Metal Work in Building Construction and as detailed.

.2 Use concealed fastenings except where approved before installation.

.3 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.

.4 “S-Lock” end joints and caulk with sealant.

.5 Install metal flashing under cap flashing to form weather tight junction.

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.

3.4 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 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-05, Fire Tests of Fire stop Systems.

1.2 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" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.3 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 Shop Drawings:

.1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.

.2 Construction details should accurately reflect actual job conditions.

.4 Samples:

.1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.

.5 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 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company specializing in fire stopping installations with 5 years' experience.

.2 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 Upon completion of Work, after cleaning is carried out.

1.5 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, and 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.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and 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

.2 Fire stop system rating: as indicated on drawings.

.2 Re-penetrable fire stop system for power and communication cables and cable trays.

.1 Square profile, heavy gauge galvanized steel with intumescent material for rapid expansion.

.2 Wall and floor applications.

.3 Accessories including manufactured multi-gang plates, brackets, extensions and multi-slot frames.

.3 Service penetration assemblies: systems tested to CAN-ULC-S115.

.4 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.8 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.10 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.11 Sealants for vertical joints: non-sagging.

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 SPECIAL REQUIREMENTS

.1 Location of special requirements for fire stopping and smoke seal materials at openings and penetrations in fire resistant rated assemblies are as follows:

.1 Designed for re-entry, removable at: cable trays, electrical and communication rooms.

3.5 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Departmental Representative.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: certified fire stop system component.

.1 Ensure pipe insulation installation precedes fire stopping.

3.6 FIELD QUALITY CONTROL

.1 Inspections: notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

3.7 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.

3.8 SCHEDULE

.1 Fire stop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Top 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 cm^2 : 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.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM C919-12, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 ASTM E814-13, Standard Test Method for Fire Tests of Penetration Firestop Systems.
- .3 ASTM E1966-07(2011), Standard Test Method for Fire-Resistive Joint Systems.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .2 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .3 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 Department of Justice Canada (Jus)

- .1 Canadian Environmental Protection Act, 1999 (CEPA).

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.2 SUBMITTALS

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

.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 manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.

- .1 Instructions to include installation instructions for each product used.

1.3 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where directed.

.5 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with sealant work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and 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 Place materials defined as hazardous or toxic in designated containers.

.4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.5 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.6 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Departmental Representative.

.7 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of by use of approved portable supply and exhaust fans approved by Departmental Representative.

Part 2 Products

2.1 SEALANT 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.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Type 1 - Urethanes Two Part.

.1 Non-Sag to CAN/CGSB-19.24, Type 2, Class B, colour as selected by Departmental Representative from manufacturer’s standard range.

.2 Type 2 - Urethanes One Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25 or MCG-2-40, colour as selected by Departmental Representative from manufacturer’s standard range.

.3 Type 3 - Silicones One Part.

.1 To CAN/CGSB-19.13.

.2 Mildew resistant: for use in interior areas where water may contact sealant.

.4 Type 4 - Acrylic Latex One Part.

.1 To CAN/CGSB-19.17.

.5 Type 5 - Acoustical Sealant.

.1 To ASTM C919.

.6 Type 6 – Acoustical Sealant and Firestopping.

.1 To ASTM E-814 and ASTM E-1966.

.2 Acceptable material: Metacaulk MC-150+.

2.3 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/m^3 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 Perimeters of exterior openings where frames meet exterior facade of building (i.e. brick, block, precast masonry): Sealant type: 1 or 2.

.2 Control and expansion joints in exterior surfaces of unit masonry and stone veneer walls: Sealant type: 1 or 2.

.3 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: 4.

.4 Control and expansion joints on the interior of exterior surfaces of unit masonry walls: Sealant type: 1 or 2.

.5 Perimeters of interior frames, as detailed and itemized: Sealant type: 4.

.6 Exposed interior control joints in drywall: Sealant type: 4

.7 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, water closets, basins, vanities): Sealant type: 3.

.8 Perimeter of countertop edges: Sealant type: 3 (translucent)

.9 Acoustic seal for sound rated walls: Sealant type: 5

.10 Acoustic seal and firestopping: Sealant type: 6

.11 In additional locations as noted on the drawings: confirm with Departmental Representative.

2.5 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

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

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

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

3.6 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM A653/A653M-11, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.

.3 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).

.4 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, 2009.

.5 National Fire Protection Association (NFPA)

.1 NFPA 80-2013, Standard for Fire Doors and Fire Windows.

.2 NFPA 252-2013, Standard Methods of Fire Tests of Door Assemblies.

.6 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC S104-10, Standard Method for Fire Tests of Door Assemblies.

1.2 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 degrees C to 35 degrees C.

.2 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN/ULC S104 for ratings specified or indicated.

.3 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN/ULC S104, ASTM E152 or NFPA 252 and listed by nationally recognized agency having factory inspection services.

1.3 SUBMITTALS

.1 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvered, arrangement of hardware and fire rating and finishes.

.2 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing, fire rating, and finishes.

.3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition 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 Honeycomb construction:

.1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m^3 minimum sanded to required thickness.

.2 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door. Core to be tested as part of a complete door assembly, in accordance with CAN/ULC S104, ASTM E152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

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 50 g/L.

2.4 PRIMER

.1 Touch-up prime CAN/CGSB-1.181.

.1 Maximum VOC limit 50 g/L.

2.5 PAINT

.1 Field paint steel doors and frames in accordance with Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.

2.6 ACCESSORIES

.1 Door silencers: single stud rubber/neoprene type.

.2 Exterior and interior top and bottom caps: steel.

.3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.4 Metal outlet box, conduit and conduit connectors: refer to access control detail drawings.

.5 Metallic paste filler: to manufacturer's standard.

.6 Fire labels: metal riveted.

.7 Sealant: in accordance with Section 07 92 00 – Joint Sealants.

.1 Maximum VOC limit 250 g/L.

.8 Glazing: in accordance with Section 08 80 50 - Glazing.

.9 Make provisions for glazing as indicated and provide necessary glazing stops.

.1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screw.

.2 Design exterior glazing stops to be tamperproof.

2.7 FRAMES FABRICATION GENERAL

.1 Fabricate frames in accordance with CSDMA specifications.

.2 Fabricate frames to profiles and maximum face sizes as indicated.

.3 Door frames are wrapped style unless noted otherwise. Refer to drawings and schedules for specific door frame details where flush door/frame detail is required.

.4 Exterior frames: 1.6 mm welded, thermally broken type construction using rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.5 Interior frames: 1.6 mm welded type construction.

.6 Blank, reinforce, drill and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.

.7 Protect mortised cut-outs with steel guard boxes.

.8 Prepare frame for door silencers, 3 for single door, 2 at head for double door.

.9 Manufacturer's nameplates on frames and screens are not permitted.

.10 Conceal fastenings except where exposed fastenings are indicated.

.11 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.12 Insulate exterior frame components with polyurethane insulation.

.13 Prepare frames to receive electronic monitoring and security devices. Refer to Section 08 71 10 - Door Hardware and Section 08 90 10 - Door, Frame and Hardware Schedule. Coordinate frame preparation with Electrical Divisions 26 and 28.

.14 Outlet box to be spot welded to frame by door frame fabricator.

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 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

.4 Locate anchors for frames in existing 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 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.10 DOOR FABRICATION GENERAL

.1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.

.2 Refer to Drawings for specific door details where flush door/frame detail is required.

.3 Fabricate doors with longitudinal edges welded. 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 and 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 Conduit connector for frame mounted outlet box to be mounted and fastened to outlet box by door fabricator.

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in conformance with CAN/ULC S104, ASTM E152, or 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.

.10 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 honeycomb 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.

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 welded 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 Install knock-down frames in accordance with manufacturers written instructions. Mechanically fasten knock-down frames to existing concrete block wall.

.6 Caulk perimeter of frames between frame and adjacent material.

.7 Maintain continuity of air barrier and vapour retarder.

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 Latchside and head: 1.5 mm.

.3 Finished floor, top of carpet, 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 and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).

.1 Quality Standards for Architectural Woodwork 2009.

.2 Canadian Standards Association (CSA International).

.1 CAN/CSA-O132.5-M1992(R1998), Stile and Rail Wood Doors.

.3 National Fire Protection Association (NFPA).

.1 NFPA 80-09, Standard for Fire Doors and Fire Windows.

.2 NFPA 252-07, Standard Method of Fire Tests of Door Assemblies.

.4 Underwriters' Laboratories of Canada (ULC).

.1 CAN4-S104M-80(R1985), Fire Tests of Door Assemblies.

.2 CAN4-S105M-09, Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.2 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:

.1 For caulking materials during application and curing.

.2 For door materials and adhesives.

.2 Shop Drawings:

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

.2 Indicate door types and cutouts for lights and louvres, sizes, core construction, transom panel construction and cutouts.

1.3 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Wood fire rated doors: labelled and listed by an organization accredited by Standards Council of Canada.

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

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

1.4 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.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

.3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

.4 Divert unused adhesive material from landfill to official hazardous material collections site approved by Departmental Representative.

.5 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 FIRE RATED WOOD DOORS

.1 Wood doors: tested in accordance with CAN4-S104 or NFPA 252 to achieve rating as scheduled.

2.2 WOOD FLUSH DOORS

.1 Solid core: to CAN/CSA-O132.2.1.

.1 Construction:

.1 Solid particleboard core: grade LD-1 or LD-2, stile and rail frame bonded to particleboard core with wood lock blocks and top blocks, 5-ply construction, 45 mm thickness. Door core and all materials shall contain no urea formaldehyde.

.2 Face Panels:

.1 Hardwood; veneer grades: Grade I (paint grade), birch species.

.3 Adhesive: Type II (water resistant) for interior doors.

2.3 FABRICATION

.1 Vertical edge strips solid hardwood compatible with face veneer. AWMAC edge type 2.

.2 Prepare doors for glazing. Provide hardwood species to match face veneer and glazing stops with mitred corners.

.3 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 CAN/CSA-O132.2 Series, Appendix A.

.2 Install labelled fire rated doors to NFPA 80.

.3 Install doors and hardware in accordance with manufacturer's printed instructions and CAN/CSA-O132.2 Series, Appendix A.

.4 Adjust hardware for correct function.

.5 Install stops. Stops shall be wood species to match door.

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.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

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

.2 Submit catalogue details for each type of door illustrating profiles, dimensions and methods of assembly.

1.2 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of stainless steel finishes for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with the Waste Reduction Workplan.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

Part 2 Products

2.1 ACCESS DOORS

.1 Sizes: Except as indicated otherwise, to be minimum sizes as follows:

.1 For body entry: 600 x 600 mm where not noted otherwise.

.2 For hand entry: 300 x 300 mm where not noted otherwise.

.2 Construction (except as noted below): Rounded safety corners, concealed hinges, screwdriver latch, anchor straps, able to open 180°.

.3 Construction (for gypsum board walls and ceilings in finished areas): concealed aluminum frame and recessed door to fit either 12.7 mm or 16 mm gypsum board for flush installation into ceiling or wall. Latch mechanism is to be concealed. Latch released by sliding knife edge into slot at latch mechanism. Do not use push-door type release latch.

.4 Access door will have a uniform slot/gap around perimeter.

.5 Door will open 120 degrees minimum and be removable. Latch released by mechanism concealed in slot (Not cam latch).

.6 Materials

.1 Tiled surfaces and other special areas as noted: Stainless steel with brushed satin finish.

.2 Other areas: Prime painted steel.

.7 Materials

.1 For finished gypsum board wall and ceiling locations:

.1 Frame: 2mm (.080) aluminum extrusion. For 16mm or 12.7mm depth.

.2 Door panel: 2 mm ((.080) aluminum door for 16mm gypsum board.

.3 Mill finish.

.2 For unfinished or concealed locations:

.1 Frame: 0.55mm (26ga) galvanized steel.

.2 Door panel: 1.01mm (20ga) galvanized steel, flanged on four sides.

.3 Baked enamel, mill finish.

Part 3 Execution

3.1 INSTALLATION

.1 Installation:

.1 Flush installation for drywall surfaces.

3.2 LOCATION

.1 Locations: As required for Mechanical and Electrical equipment access.

.2 Refer to drawings for other specific locations.

.3 Ensure that equipment is within view and is accessible for operating, inspecting, adjusting and servicing without using special tools.

3.3 ADJUSTMENT

.1 Re-adjust doors just prior to completion of building to function freely and properly.

3.4 CLEANING

.1 Remove traces of primer, caulking; clean doors and frames.

.2 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

- .1 ASTM A653/A653M-11, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM E90-09 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- .3 ASTM E413-11 – Classification for Rating Sound Insulation

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.

.3 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).

.4 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, 2009.

.5 National Fire Protection Association (NFPA)

- .1 NFPA 80-2013, Standard for Fire Doors and Fire Windows.
- .2 NFPA 252-2013, Standard Methods of Fire Tests of Door Assemblies.

.6 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC S104-10, Standard Method for Fire Tests of Door Assemblies.

1.2 SYSTEM DESCRIPTION

.1 Design Requirements:

- .1 Acoustic Performance: Minimum Sound Transmission Class **(STC) 50** tested to ASTM E90. Label indicating sound transmission class shall be applied to the door and door frame.
- .2 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN/ULC S104 for ratings specified or indicated.
- .3 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN/ULC S104, ASTM E152 or NFPA 252 and listed by nationally recognized agency having factory inspection services.

1.3 SUBMITTALS

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

.2 Provide product data: in accordance with Section 01 33 00 - Submittal Procedures.

.3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvered, arrangement of hardware and fire rating and finishes.

.2 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing, fire rating, and finishes.

.3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

.4 Test Data:

.1 Submit test data indicating compliance with the Sound Transmission Class (STC) requirements. Include laboratory name, test report number, and date of test.

.2 Submit certification from test laboratory qualified under the National Voluntary Accreditation Program (NVLAP) of the U.S. Bureau of Standards.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 WARRANTY

.1 Manufacturer's Limited Warranty: Five (5) years from date of supply, covering material and workmanship.

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 ACCESSORIES

.1 Hinges: Heavy weight butt type as recommended by the manufacturer.

.2 Primer: Rust inhibitive zinc chromate.

.3 Threshold: Smooth and flush, to provide a seal for door on closed position.

.4 Perimeter acoustic seals: Primary and secondary perimeter acoustic seals to provide a seal for door in closed position to meet specified STC rating.

.5 Head seal: Acoustic neoprene at header.

.6 Bottom acoustic seals: Acoustic mortised drop door bottom to provide a seal for door in closed position to meet specified STC rating.

2.3 STEEL DOORS

.1 Sheet steel faces, thickness, design, and core suitable to achieve specified STC performance.

.2 Acoustic core construction, longitudinal edges, mechanically interlocked with visible edge seams.

.3 Reinforce doors where hardware is required.

.4 Drill and tap for mortised, templated hardware.

.5 Top and Bottom Channels: Inverted, recessed, welded steel channels.

2.4 STEEL FRAMES

.1 Sheet steel, metal thickness and appropriate to maintain door STC ratings, mitred corners, fully welded seams.

.2 Factory assemble and weld frames.

.3 Affix permanent metal nameplates to frame indicating manufacture’s name, door tag, and STC rating where it shall be clearly visible.

2.5 PRIMER

.1 Touch-up prime CAN/CGSB-1.181.

.1 Maximum VOC limit 50 g/L.

2.6 PAINT

.1 Field paint steel doors and frames in accordance with Sections 09 91 13 - Interior Painting. Protect sound seals from paint. Provide final finish free of scratches or other blemishes.

2.7 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 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

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 doors and frames to CSDMA Installation Guide.

.2 Install components to manufacturer’s written instructions.

.3 Utilize welders certified by Canadian Welding Bureau (CWB).

3.3 FRAME INSTALLATION

.1 Set frames plumb, square, level and at correct elevation.

.2 Coordinate with masonry and gypsum board wall construction for anchor placement.

.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 barrier and vapour retarder.

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 to allow easy operation and proper function of seals.

.3 Adjust operable parts for correct function.

3.5 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.6 FIELD QUALITY CONTROL

.1 Provide qualified manufacturer's representative to instruct installers on the proper installation and adjustment of door assemblies.

.2 Provide manufacturer's representative to inspect door installation, and test minimum ten (10) cycles of operation. Correct any deficient doors.

END OF SECTION

PART 1 General

1.1 REFERENCES

.1 Aluminum Association (AA)

.1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA).

.1 AAMA CW-10, Care and Handling of Architectural Aluminum from Shop to Site.

.2 AAMA 611, Voluntary Specifications for Anodized finishes Architectural Aluminum

.3 AAMA 609/610-09, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

.3 American Society for Testing and Materials International, (ASTM).

.1 ASTM B221-02, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.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 E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.

.4 ASTM E331-00(2016), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.

.4 Canadian General Standards Board (CGSB).

.1 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint.

.5 Canadian Standards Association (CSA International).

.1 CAN3-S157-M83(R2002), Strength Design in Aluminum.

.2 CSA W59.2-M1991 (R2003), Welded Aluminum Construction.

.3 AAMA/WDMA/CSA 101/I.S.2/A440-[11], NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.

.4 CSA A440S1-09, Canadian Supplement to AAMA/WDMA/CSA 101/1.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.

.5 CAN/CSA-A440.4-07(R2012), Window, Door, and Skylight Installation

1.2 PERFORMANCE REQUIREMENTS

.1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with NBC to a design pressure windload per 30 year occurrence.

.2 Limit mullion deflection to L/240; with full recovery of glazing materials.

.3 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

.4 Glass units installed and replaced from the interior.

.5 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

.6 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

.7 Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

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 windows and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.

.2 Indicate materials and profiles and provide scaled details of components for each type of window and frame.

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 windows for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect windows from nicks, scratches, and blemishes.

.3 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.

.4 Leave protective covering in place until final cleaning of building.

.5 Replace defective or damaged materials with new.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Do not install sealants when ambient temperature is less than 5 degrees C.

.2 Maintain this minimum temperature during and after installation of sealants..

PART 2 Products

2.1 MATERIALS

.1 Extruded aluminum: ASTM B221. Aluminum Association alloy AA6063-T5 anodizing quality

.2 Sheet aluminum: ASTM B209.

.3 Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.

.4 Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

.5 Bituminous paint: CAN/CGSB 1.108.

.6 Sealant: Refer to Section 07 92 00 - Joint Sealants.

2.2 GLAZING

.1 Refer to Section 08 80 50 – Glazing.

.2 Triple sealed glazed units in exterior windows

.3 Laminated and tempered glazing in Anti-Vault Window

2.3 EXTERIOR WINDOW

.1 Refer to Section 08 80 50 Glazing.

.1 Performance: Total system U-factor centre-of-glazing for windows: Maximum 1.08 W/m²K (0.19 Btu/hour ft²F)

.2 Exterior – frame profile to appear similar to existing frames to remain.

.1 Type: Fixed, triple-glazing, frame depth approximately 127 mm, thermally broken.

.2 Glazing from interior.

.3 Sizes as noted in drawings.

.4 Acceptable manufacturer:

.1 Kawneer "5500 Isoweb"

.2 Alumicor – "1900 Series"

.3 Approved substitution.

2.4 ANTI-VAULT WINDOW

.1 Aluminum window frame

.1 Interior aluminum frames:

.1 Extruded aluminum frames nominal size 114 x 45 mm – closed back system.

.2 Thickness: 3 mm (minimum)

.3 Centre glazed system.

.2 Interior sliding panel:

.1 Top channel for concealed heavy duty roller brackets to suit sliding panel thickness and allow ease of operation.

.2 Extruded bottom channel to suit sliding panel thickness and allow ease of operation. To run continuous along opening.

.3 Extruded jamb channel at receiving jamb to suit sliding panel thickness.

.4 Sliding panel 45 mm thickness, 45 mm stiles, 45 mm top rail, 150 mm bottom rail.

.5 To accept 12 mm (nominal) thickness laminated glazing.

.2 Anti-vault aluminum frame hardware.

.1 All components to be heavy duty.

.2 Horizontal Sliding Panel: Suspended by two heavy duty roller brackets, each having self-lubricating nylon wheel and ball bearing assembly; running in an extruded aluminum track assembly. Provide continuous extruded aluminum door glides and retainer clips along bottom for positive guide no-sway operation.

.3 Recessed pull handle (installed on office side).

.4 Cylinder thumb turn (non-key design) locking device with one hand operation. Interior side Locking device to be self-activating upon closing, slam latch operation.

.1 Device: Spring loaded Transcom latch Model #865 manufactured by Sobinco (as supplied by Anotec MFG Inc.)

.2 Locate lock so it cannot be reached through the adjacent opening. Confirm location with Departmental Representative.

.5 Rubber faced door stop to restrict window movement at maximum window opening.

2.5 HARDWARE

.1 Hardware to match colour of aluminum frames.

2.6 FABRICATION

.1 Fabricate in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:

.2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.

.3 Face dimensions detailed are maximum permissible sizes.

.4 Brace frames to maintain squareness and rigidity during shipment and installation.

.5 Finish steel clips and reinforcement with zinc coating to CAN/CSA-G164.

2.7 ALUMINUM FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes, Architectural Class I (.7 mils minimum).

.1 Clear anodic finish: designation AA-M10C21A41.

.2 Touch-up primer for galvanized steel surfaces: SSPC 20 Paint zinc rich.

.3 Concealed steel items: galvanized in accordance with CAN/CSA-G164M.

.4 Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

2.8 ISOLATION COATING

.1 Isolate aluminum from following components, by means of isolation coating:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

2.9 AIR BARRIER AND VAPOUR RETARDER

.1 Equip window frames with factory installed air barrier and vapour retarder material for sealing to building air barrier and vapour retarder as follows:

.1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.

.2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.

.3 Ensure continuity of air barrier and vapour barrier with adjacent construction.

2.10 LOW EXPANSION FOAM

.1 Low pressure polyurethane expanding foam, closed cell structure.

.2 Foam remains flexible after curing.

.3 Insulation value: R-5 per 25mm (1 inch) of cured foam.

2.11 SOURCE QUALITY CONTROL

.1 Installer qualifications: company specializing in performing the work of this Section with minimum five years experience and approved 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 product installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative 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 Departmental Representative.

3.2 INSTALLATION

.1 Exterior window installation:

.1 Install in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 and manufacturer’s instructions.

.2 Attach to structure to permit sufficient adjustment to accommodate existing building conditions and other irregularities.

.3 Install products specified square, plumb and level. Center window unit in opening and secure window unit as indicated in manufacturer’s written instructions. Provide alignment attachments and shims to permanently fasten system to building structure.

.4 Arrange components to prevent abrupt variation in colour.

.5 Allow for deflection of structure at head of window so structure will not impact window.

.6 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances.

.7 Provide thermal isolation where components penetrate or disrupt building insulation.

.8 Install low/no expanding foam insulation in void between frame and building opening.

.9 Install window system and components to drain condensation, water penetrating joints, and moisture migrating within system to the exterior.

.10 Install sill flashings as indicated.

.11 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.

.12 Install glass in accordance with Section 08 80 50 - Glazing, to glazing method required to achieve performance criteria using foam type gasket on interior and rigid neoprene gasket on exterior.

.13 Install perimeter sealant in accordance with manufacturer's written instructions and Section 07 92 00 - Joint Sealing.

.14 Avoid direct contact between pressure treated wood products and aluminum frames, provide isolation.

.2 Interior Anti-Vault Window Installation:

.1 Install windows in accordance with manufacturer's instructions. Set frames plumb, square, level at correct elevation in alignment with adjacent work.

.2 Anchor securely.

.3 Adjust operable parts for correct function and smooth friction free operation. Run through minimum ten (10) operating cycles to confirm optimal operation.

.4 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

.5 Seal joints between window frame and other building components with clear silicone caulking.

3.3 GLAZING

.1 Glaze aluminum doors and frames in accordance with Section 08 80 50 – Glazing.

3.4 SITE TOLERANCES

.1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm /30 m, whichever is less.

.2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.

.3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

3.5 CAULKING/SEALING

.1 Apply sealant in accordance with Section 07 92 00 - Joint Sealing. Conceal sealant within the aluminum work except where exposed use is permitted by Departmental Representative.

3.6 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 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.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by window installation.

END OF SECTION

Part 1 General

1.1 SALVAGE ITEMS

.1 Work of this Section includes removal of existing hardware for salvage; items include locksets, closers, card readers, and electric strikes. Turn over to Owner for first right of refusal.

1.2 REFERENCES

.1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).

.1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-69.18-M90/ANSI/BHMA A156.1-1981, Butts and Hinges.

.2 CAN/CGSB-69.19-93/ANSI/BHMA A156.3-1989, Exit Devices.

.3 CAN/CGSB-69.20-M90/ANSI/BHMA A156.4-1986, Door Controls (Closers).

.4 CAN/CGSB-69.21-M90/ANSI/BHMA A156.5-1984, Auxiliary Locks and Associated Products.

.5 CAN/CGSB-69.22-M90/ANSI/BHMA A156.6-1986, Architectural Door Trim.

.6 CAN/CGSB-69.24-M90/ANSI/BHMA A156.8-1982, Door Controls - Overhead Holders.

.7 CAN/CGSB-69.26-96/ANSI/BHMA A156.10-1991, Power-operated Pedestrian Doors.

.8 CAN/CGSB-69.28-M90/ANSI/BHMA A156.12-1986, Interconnected Locks and Latches.

.9 CAN/CGSB-69.29-93/ANSI/BHMA A156.13-1987, Mortise Locks and Latches.

.10 CAN/CGSB-69.32-M90/ANSI/BHMA A156.16-1981, Auxiliary Hardware.

.11 CAN/CGSB-69.35-M89/ANSI/BHMA A156.19-1984, Power Assist and Low Energy Power Operated Doors.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Hardware List:

.1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.4 Closeout Submittals

.1 Provide operation and maintenance data for door closers, locksets, door holders electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

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

.3 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 Packing, Shipping, Handling and Unloading:

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.2 Storage and Protection:

.1 Store finishing hardware in locked, clean and dry area.

1.6 WASTE DISPOSAL AND MANAGEMENT

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Dispose of corrugated cardboard, polystyrene, plastic, and packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

1.7 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Supply two sets of wrenches for door closers, locksets, and fire exit hardware.

Part 2 Products

2.1 HARDWARE ITEMS

.1 For new hardware use one manufacturer's products only for similar items.

.2 Existing locksets and specialty items as noted on demolition plans and as listed below shall be removed and salvaged for re-use on this project by the Hardware Contractor. Salvage items noted below:

.1 Mortised locksets:

.1 Sargent, confirm functions available.

.2 Yale, new Sargent cylinders to be provided by Contractor.

.2 Closers: site verify quantities.

.3 Turn over all locksets and hardware to the Owner for first right of refusal.

2.2 DOOR HARDWARE

.1 Locks and latches:

.1 Interconnected locks and latches: to CAN/CGSB-69.28, series 5000 interconnected lock, grade 1, designed for function and keyed as stated in Hardware Schedule.

.2 Mortise locks and latches: to CAN/CGSB-69.29, series 1000 mortise lock, grade 1, designed for function as stated in Hardware Schedule.

.3 Lever handles: Sargent ‘J’ design

.4 Escutcheons : Sargent ‘LE1.’

.5 Normal strikes: box type, lip projection not beyond jamb.

.6 Cylinders: Sargent 6 pin, LA keyway, 0 bitted; keying by Owner.

.7 Finish: 26D.

.8 Acceptable manufacturer: Sargent.

.9 List of locksets, listed in Hardware Schedule:

a) ANSI F01; Sargent Model 8215-LE1J-26D (Passage)

b) ANSI F05; Sargent Model 8237-LE1J-26D (Classroom)

c) ANSI F07; Sargent Model 8204-LE1J-26D (Storeroom)

d) ANSI F13; Sargent Model 8225-LE1J-26D (Exit)

e) ANSI F15; Sargent Model 8251 (Hotel/Motel)

f) ANSI F22; Sargent Model 8265-LE1J-26D (Privacy)

g) Sargent Model 8252-LE1J-26D (Fixed)

.2 Butts and hinges:

.1 Butts and hinges: to CAN/CGSB-69.18, listed in Hardware Schedule.

.2 List of hinges:

a) FBB 168 114 x 114.

b) FBB 168 114 x 144 NRP (non removable pins).

.3 Acceptable manufacturers: Stanley, Hager, Monthard, McKimmey or approved alternate.

.3 Exit devices: to CAN/CGSB-69.19, type and function as noted, grade 1, finished to 630.

.1 Exit devices in fire-rated doors shall be ULC listed.

.2 List of exit devices:

a) Rim type: ETL exterior trim, cylinder lock, non-doggable.

.1 Acceptable manufacturer: Sargent 12-8888-ETL 704-26D.

b) Deadbolt-style latch, with positive deadlocking by auxiliary bolt, exterior cylinder lock, FLL exterior trim.

.4 Door Closers and Accessories:

.1 Door controls (closers): to CAN/CGSB-69.20, size in accordance with CAN/CGSB-69.20, table A1, finished to 630.

.1 Grade 1, heavy duty, adjustable hydraulic back check, separate regulation of closing speed and latching speed, rack and pinion action.

.2 List of closers:

.1 LCN 4040 with delayed action function.

.3 Acceptable manufacturers: LCN, Sargent, Norton, Rixson or approved alternate.

.2 Door controls (overhead hold open/door stop): to ANSI A156.8, as listed in Hardware Schedule, finished to 652.

.1 Heavy duty hold open-stop, grade 1, heavy duty shock spring, surface mounted, 110° opening, arm, shoe and slider cam assembly.

.2 Acceptable manufacturers: Rixson 9-336 or approved alternate.

.5 Architectural door trim: to CAN/CGSB-69.22, as listed in Hardware Schedule, finish as noted

.1 Door protection plates: kick plate type, 1.27 mm thick stainless steel, bevelled edges, 300 mm high by 25 mm less than door width, 32D finish.

.2 Push plates: 1.27 mm thick stainless steel, bevelled edges, 125 mm wide by 400 mm high, finished to 32D.

.3 Pulls: 19 mm diameter “D” style, projecting 35 mm from door, height 300 mm, without rose.

.6 Auxiliary hardware: to CAN/CGSB-69.32, as listed in Hardware Schedule and as listed below.

.1 Wall stop: concave wall stop with concealed mounting, 62 mm diameter, 30 mm projection, cast brass with rubber bumper, 26D finish.

.1 Acceptable products: Hager 234 or Richelieu 2205.

.2 Floor stop: to ANSI A156.16, low dome stop, 45 mm diameter, 3.2 mm thick base, cast brass, 26D finish.

.1 Acceptable products: Hager 241, or Richelieu 218.

.7 Thresholds:

a) 127 mm wide x full width of door opening, 12.7mm height, 3.8 mm wall. stainless steel mill finish, plain surface.

.8 Weatherstripping:

.1 Head and jamb seal:

.1 Extruded aluminum frame and solid closed cell neoprene insert, clear anodized finish. Match Pemko 332R profile

.2 Door bottom seal:

.1 Heavy duty, extruded aluminum frame and closed cell neoprene weather seal, surface mounted, closed ends, adjustable, clear anodized finish.

.9 Sound Seals

.1 Head and jamb seal:

.1 Self-adhesive silicone perimeter gasketing.

.2 Acceptable Manufacturer: Pemko S773; DraftSeal DS340CS or approved alternate.

.2 Door bottom drop seal:

.1 Auto door bottom drop seal: heavy duty, door seal of extruded aluminum frame and solid closed cell neoprene seal, surface mounted, closed ends, automatic retract mechanism when door is open, clear anodized finish.

.2 Acceptable manufacturer: Pemko 4131CPKL or approved alternate.

.10 Electric strike: To ANSI/BHMA A156.5, Grade 1. To accept lockset or exit device scheduled. Heavy duty, stainless steel construction, dual voltage, fail secure operation unless noted otherwise, 630 finish. ULC listed for fire rated doors.

a) Acceptable product: HES 9500-12/24-630 fail secure.

b) Acceptable product: SDC Uni-flex 55-DU-630, complete with dead bolt keeper, installed.

.11 Card reader: provided by Owner.

.12 Door Viewer

.1 Mount 1.57m above floor level.

.2 Finish: anodized aluminum. Colour ‘Black’

.3 60mm (2 3/8”) viewing diameter; glass optical lenses

.4 Acceptable manufacturer:

.1 ASD Door Scope Model DS238

.13 Transfer Cable: Frame to Door

.1 Acceptable product: ASSA Abloy A281

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 All locks to be ordered with zero bitted Sargent LA cylinders. Cylinders to be installed by the Contractor and locks tested for proper operation.

.2 All final keying by Departmental Representative.

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.

.2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

.1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

.2 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.3 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

3.3 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 provide tight fit at contact points with frames.

3.4 TESTING

.1 All locks must be tested by the Contractor with the installed construction cores for proper installation. All doors and locks not installed and operating correctly will be rejected.

3.5 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

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

3.6 DEMONSTRATION

.1 Maintenance Staff Briefing:

.1 Brief maintenance staff regarding:

.1 Proper care, cleaning, and general maintenance of projects complete hardware.

.2 Use, application and storage of wrenches for door closers, locksets, and fire exit hardware.

.2 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.7 HARDWARE SCHEDULE

FIRST FLOOR	
Door 101A	**Door 101B**
1 12-8888-ETL 704-26D 3 butts NRP 1 closer 1 full door length astragal 1 electric strike – HES 9500-2-3/4 12/24D-630 1 weather stripping 1 threshold 1 door sweep	1 lockset: ANSI F13
Door 102	**Door 103**
Existing hardware to remain	1 lockset: ANSI F07 3 butts 1 door closer 1 kick plate 1 wall stop

Door 104	**Door 105**
1 lockset: ANSI F07 3 butts 1 threshold 1 drop seal 1 weather stripping 1 closer EAC 1 electric strike - SDC Uni-flex 55-DU	Existing hardware to remain 1 full door length astragal
Door 106A	**Door 106B**
1 lockset: ANSI F15 3 butts 1 door closer EAC 1 electric strike - SDC Uni-flex 55-DU	1 lockset: ANSI F15 3 butts 1 door closer EAC 1 electric strike - SDC Uni-flex 55-DU 1 wall stop
Door 109	**Door 111**
1 lockset: ANSI F13 3 butts 1 kick plate	Existing to remain
Door 112	**Door 126A**
Existing hardware to remain	1 12-8888-ETL 704-26D 3 butts NRP 1 full door length astragal 1 door closer 1 weather stripping 1 threshold 1 door sweep 1 ASD DS238 Panoramic Viewer EAC 1 electric strike – HES 9500-2-3/4 12/24D-630
Door 126B	**Door 127A**
Existing hardware to remain	8252-LE1J-26D Lever set to be frozen on both sides EAC on both sides 1 electric strike - SDC Uni-flex 55-DU
Door 127B	**Door 127C**
1 lockset: ANSI F15 3 butts NRP 1 closer 1 weather stripping 1 threshold 1 door sweep	Existing hardware to remain

Door 127D	**Door 127E**
Existing hardware to remain	Existing hardware to remain
Door 127F	**Door 127G**
Existing hardware to remain	1 lockset: ANSI F15 3 butts
Door 127H	**Door 127I**
1 lockset: ANSI F15 3 butts	1 lockset: ANSI F15 3 butts
Door 127J	**Door 128**
1 lockset: ANSI F15 3 butts	1 lockset: ANSI F15 3 butts 1 closer 1 threshold 1 drop seal EAC 1 electric strike - SDC Uni-flex 55-DU
Door 129	**Door 130**
1 lockset: ANSI F15 3 butts 1 closer 1 threshold 1 drop seal EAC 1 electric strike - SDC Uni-flex 55-DU	Existing hardware to remain
Door 131A	**Door 131B**
Existing double doors to remain 1 12-8888-ETL 704-26D 1 full door length astragal EAC 1 transfer EA281 1 electric strike – HES 9500-2-3/4 12/24D-630 1 HES 783-SMB (Surface Mount Box)	Existing double door hardware to remain
Door 132A	**Door 132B**
Existing hardware to remain 1 full door length astragal	1 lockset: ANSI F15 3 butts EAC 1 electric strike - SDC Uni-flex 55-DU

Door 133	**Door 133A**
1 lockset: ANSI F15 3 butts 1 closer EAC 1 electric strike - SDC Uni-flex 55-DU 1 kick plate	1 lockset: ANSI F07 3 butts 1 closer
Door 133B	**Door 134**
1 lockset: ANSI F07 3 butts 1 closer	1 lockset: ANSI F07 3 butts 1 closer 1 kick plate 1 wall stop
Door 135	**Door 136**
1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop	Existing hardware to remain
Door 137	**Door 138A**
Existing hardware to remain	1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC
Door 138B	**Door 141**
1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC	1 lockset: ANSI F04 3 butts 1 closer 1 drop seal 1 perimeter sound seal
Door 142	**Door 143A**
1 lockset: ANSI F15 3 butts 1 closer 1 threshold 1 drop seal 1 perimeter sound seal 1 electric strike - SDC Uni-flex 55-DU EAC	1 lockset: ANSI F07 (frozen lever on inside of room) 3 butts 1 closer 1 threshold 1 drop seal 1 perimeter sound seal 1 electric strike - SDC Uni-flex 55-DU EAC

Door 143B	**Door 144**
1 lockset: ANSI F15 (frozen lever on inside of room) 3 butts 1 closer 1 threshold 1 drop seal 1 perimeter sound seal 1 electric strike - SDC Uni-flex 55-DU EAC	1 lockset: ANSI F15 3 butts 1 closer 1 threshold 1 drop seal 1 perimeter sound seal 1 electric strike - SDC Uni-flex 55-DU EAC
Door S1A	**Door S3A**
1 full door length astragal	1 full door length astragal
Door S5	
1 lockset: ANSI F15 3 butts NRP 1 partial astragal (covers locking mechanism) 1 electric strike - SDC Uni-flex 55-DU EAC	
SECOND FLOOR	
Door 202	**Door 203**
1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop	1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC
Door 204	**Door 205**
1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop	1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop
Door 206	**Door 207**
1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC	1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC

Door 208	**Door 209**
1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC	1 lockset: ANSI F01 3 butts
Door 210	**Door 211**
1 lockset: ANSI F01 3 butts	1 lockset: ANSI F15 3 butts 1 closer 1 electric strike - SDC Uni-flex 55-DU EAC
Door 212	**Door 213**
1 lockset: ANSI F15 3 butts 1 closer 1 wall stop	Existing to remain
Door 214A	**Door 214B**
1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC	1 lockset: ANSI F15 3 butts 1 closer 1 wall stop 1 electric strike - SDC Uni-flex 55-DU EAC
Door 215	**Door 216**
1 lockset: ANSI F04 3 butts	(Acoustic Door and Frame) 1 lockset: ANSI F15 3 butts 1 closer
Door 217	**Door 226**
1 lockset: ANSI F01 3 butts 1 drop seal 1 weather stripping	Existing hardware to remain
Door 227	**Door 229**
Existing hardware to remain	1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop
Door 230	**Door 231**

1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop	1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop
Door 232	**Door 233**
1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal	1 lockset: ANSI F01 3 butts 1 drop seal 1 perimeter sound seal 1 wall stop
Door S3C	**Door S3D**
Existing hardware to remain	Existing hardware to remain
Door S1C	**Door S1D**
Existing hardware to remain	Existing hardware to remain

Note 1: Prepare frames for installation of electric strikes. Ensure deadbolt keepers are installed and aligned in door frame where there are locksets with deadbolts.

Note 2: EAC – Electronic Access Control – See also Electrical

Note 3: Perimeter sound seal and bottom drop seal on doors designated as Acoustic Steel Door (ASD) are specified for performance under Section 08 34 74.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI/ASTM E330-02(2010), Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM C542-05(2011), Standard Specification for Lock-Strip Gaskets.

.2 ASTM D790-10, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.3 ASTM D1003-13, Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.

.4 ASTM D1929-13a, Standard Test Method for Determining Ignition Temperature of Plastics.

.5 ASTM D2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness.

.6 ASTM E84-13a, Standard Test Method for Surface Burning Characteristics of Building Materials.

.7 ASTM F1233-08(2013), Standard Test Method for Security Glazing Materials and Systems.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.

.3 CAN/CGSB-12.5-M86, Mirrors, Silvered.

.4 CAN/CGSB-12.11-M90, Wired Safety Glass.

.4 Flat Glass Manufacturers Association (FGMA).

.1 FGMA Glazing Manual.

.5 Laminators Safety Glass Association (LSGA).

.1 LSGA Laminated Glass Design Guide.

1.2 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 test data substantiating triple glazed sealed units meets specified maximum centre-of-glazing U-factor.

.3 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:

.1 For glazing materials during application and curing.

.2 Shop Drawings:

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

.3 Sample:

.1 Provide minimum 200x200mm sample of sealed unit. Sample will be used to verify matching of bronze coloured exterior glass.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 QUALITY ASSURANCE

.1 Mock-ups:

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

.2 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.3 Locate where directed.

.4 Allow 48 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. 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 off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect glazing and frames from nicks, scratches, and blemishes.

.3 Protect prefinished aluminum surfaces with strippable coating.

.4 Replace defective or damaged materials with new.

1.6 SITE CONDITIONS

.1 Environmental Requirements:

.1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert uninstalled materials for reuse at nearest used building materials facility or similar type facility.

.3 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.

.4 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

.5 Remove form site and dispose of packaging materials at appropriate recycling facilities.

.6 Dispose of corrugated cardboard, polystyrene, plastic, and packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

1.8 WARRANTY

.1 Contractor's Warranty –Contractor shall warrant the work in accordance with the General Conditions.

.2 Product Warranty – Provide a TEN (10) year manufacturer's warranty for sealed glazing units. Include coverage for sealed glass units from seal failure, interpane dusting or misting and replacement of same.

Part 2 Products

2.1 MATERIALS: FLAT GLASS

.1 Design Criteria:

.1 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Float glass: to CAN/CGSB-12.3.

.3 Safety glass: to CAN/CGSB-12.1, transparent, 6 mm (typical) and 10 mm thick as indicated on schedules and drawings.

.1 Type 2-tempered.

.2 Class B-float.

.3 Category 1.

.4 Silvered mirror glass: thickness to suit mirror dimensions.

.1 Type 3A-tempered.

.1 Alternate: heat strengthened glass with safety film applied to the backside.

.2 All edges to be rounded and polished smooth.

2.2 EXTERIOR SEALED INSULATING TRIPLE UNITS

.1 Refer to Section 08 51 13 – Aluminum Windows.

.2 Insulating glass units: to CAN/CGSB 12.8, triple glazed unit; 44 mm overall thickness. Designed to be installed and replaced from the interior. Provide 300 mm x 300 mm sample of insulated glass unit. Match tint of existing windows on site as closely as possible.

.1 Glass: to CAN/CGSB 12.1 and 12.3.

.2 Glass thickness: sized to in CAN/CGSB-12.20 and National Building Code to 1 in 50 hourly wind pressure level of 0.75 kPa – Open Terrain.

.1 Minimum lite thickness 6mm

.3 Exterior lite:

.1 Heat strengthened.

.2 Colour: Bronze.

.4 Inter cavity space thickness: 12.5 mm

.5 Interior Lites:

.1 Heat strengthened.

.2 Low-E Glass coating: to achieve specified performance values.

.3 Colour: clear.

.4 Coating surface #2 and surface #5.

.6 Inert gas fill: argon.

.7 Spacer: warm edge spacer, all non-metallic materials.

.8 Performance values:

.1 U-value of sealed unit: Maximum 0.12 (winter) and 0.12 (summer).

.2 Solar Heat Gain Coefficient: Maximum 0.25.

.3 Visible Transmittance: Minimum 30%

2.3 LAMINATED GLASS UNIT – ANTI-VAULT WINDOW RM 144

.1 Refer to Section 08 51 13 – Aluminum Windows, anti-vault window.

.2 Laminated glass: to ASTM C-1172

.1 Type: Full surface layer of 0.762 mm polyvinyl butyral (PVB) interlayer compressed between two panes of 6 mm tempered glass unless noted otherwise (total 12 mm thickness)

2.4 INTERIOR BUTT-GLAZED OPENINGS – RM 106 AND RM 234/201

.1 Safety glass: to CAN/CGSB-12.1, transparent.

.2 Butt glazing

.1 Type 2-tempered.
.2 Class B-float.
.3 Category 1 and 2 as applicable.
.4 Square edge.
.5 Size: Maximize size of glass to minimize butt joints. Multiple panes to be of equal widths or as indicated in drawings.
.6 Thickness: minimum 10mm or as required.

.3 Hardware

.1 Seamless recessed "U' channel complete with top lip.
.2 Size: approximately 14mm deep by 21 mm wide to accept 10 mm thick glazing.
.3 Finish: brite anodized.
.4 Similar to C. R. Lawrence catalog number SDCF38BN

.4 Sealant:

.1 Clear silicone sealant; for interior application.

2.5 GLAZED PRIVACY SCREEN – ROOM 144

.1 Glazed privacy panel

.1 Type 2-tempered.
.2 Class B-float.
.3 Category 1 and 2 as applicable.
.4 Polished edges.
.5 Size: As indicated in drawings.
.6 Thickness: 10mm.

.2 Hardware

.1 Slot mount standoff for vertical glazing installation.
.2 Nylon tip set screws firmly restraint glazing in standoff.
.3 Size: diameter 32mm.
.4 Slot: suitable for 10mm thick glazing complete with clear gasket.
.5 Finish: brushed stainless.
.6 Similar to C. R. Lawrence catalog number SM38BS.

2.6 WALL MIRROR – RMS 103, 226 AND 227

.1 Silvered, minimum 6mm thickness, polished edges.

.2 Fasteners: vandal resistant concealed clips, size and number to suit mirror dimensions.

.3 Refer to schedule.

2.7 ACCESSORIES

.1 Sealant – refer to Section 07 92 00 – Joint Sealing

.2 Setting blocks: Neoprene, 80-90 Shore A durometer hardness to ASTM D2240, to suit glazing method, glass light weight and area.

.3 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self-adhesive on one face.

.4 Glazing tape:

.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; black colour.

.5 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.

.6 Glazing clips: manufacturer's standard type.

.7 Lock-strip gaskets: to ASTM C542.

.8 Films: Refer to Section 08 87 33 Decorative Films.

2.8 SPEAKER PORT

.1 Through glass mounted type, consisting of two circular 152 mm outside diameter perforated 14 gauge stainless steel discs, through bolted.

.2 Perforations: 3 mm dia. holes spaced 10 mm apart each way. Holes in back plate offset 4.8 mm from front plate.

.3 Fasteners: No 8 tamper resistant Torx flat head screws on secure side of room.

.4 Finish: exposed surfaces to ANSI No. 4, satin finish.

.5 Acceptable Product:

.1 Model 45-115-01-SD1 available from Securingcosmos.com.

.2 Metal Fab Services Ltd #820-SD.

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 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.

3.3 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION: EXTERIOR SEALED UNITS

.1 Install to aluminum window manufacturer's instructions.

3.5 INSTALLATION: LAMINATED/TEMPERED GLAZED UNITS

.1 Refer to drawings for glazing configuration and installation.

.2 Install laminated glazing on exterior lite of sealed units.

.3 Perform work in accordance with FGMA Glazing Manual for glazing installation methods.

3.6 INSTALLATION: SAFETY (TEMPERED) GLASS:

.1 Refer to Section 08 06 01 - Door Frame and Hardware Schedule and as noted in drawings.

.2 Perform work in accordance with FGMA Glazing Manual for glazing installation methods.

3.7 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)

.1 Perform work in accordance with FGMA Glazing Manual, IGMAC, and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.5 Place glazing tape on free perimeter of glazing in same manner described.

.6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.7 Knife trim protruding tape.

3.8 INSTALLATION: PLASTIC FILM

.1 Provide decorative films as referenced in Section 08 87 33 – Decorative Films.

3.9 INSTALLATION: INTERIOR BUTT JOINT GLAZING

.1 Perform work in accordance with FGMA Glazing Manual, IGMAC, and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Install glass panels plumb and square.

.3 Recess “U” channels in head and sill locations of glass panel and aluminum frame system as indicated on drawings.

.4 Install glazing in aluminum head and sill recess ‘U’ channels and frame sections in accordance with manufacturer’s instructions.

.5 Install butt joints using silicone sealant. Install to full depth of glass. Tool smooth.

3.10 INSTALLATION: MIRRORS

.1 Set mirrors with concealed clips. Anchor rigidly to wall construction.

.2 Place plumb and level.

3.11 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking.

.3 Remove glazing materials from finish surfaces.

.4 Remove labels after work is complete.

.5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacturer's instructions.

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

3.12 PROTECTION OF FINISHED WORK

.1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

3.13 SCHEDULE

.1 Refer to drawings for sizes, quantities, and locations.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI Z97.1-2009, Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test.

.2 International Window Film Association (IWFA)

.1 IWFA Visual Quality Standard for Applied Window Film 1999.

.3 Government of Canada

.1 Canada Labour Code, WHMIS datasheets.

1.2 SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS - Material Data Sheets.

.3 Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.

.4 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.

.1 Submit up to 3 500 x 500mm sample of film installed on 5 mm thick clear polycarbonate.

.5 Provide mock-up in accordance with Section 01 33 00 – Submittal Procedures.

.1 Install decorative film on max 3 window locations as selected by Departmental Representative. Decorative film for mock-up will be selected by Departmental Representative. Up to 3 different types of film material may be used in mock-up. Mock-up will determine the selection of the material to be ordered.

.2 Approved mock-up may remain in place.

.6 Submit Closeout Submittals in accordance with Section 01 78 00 - Closeout Submittals.

.1 Provide operation and maintenance data for window film for incorporation into manual.

.2 Follow manufacturers written instructions for care and maintenance of security and safety film.

.3 Use only cleaning solution recommended by manufacturer for regularly scheduled cleaning of security film.

1.3 QUALITY ASSURANCE

.1 Health and Safety:

.1 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Canada Labour Code.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Remove from storage, in quantities required for same day use.

.3 Store materials in accordance with manufacturers written instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 WARRANTY

.1 Contractor hereby warrants that Security and Safety Film will stay in place without delaminating, peeling or blistering for 10 years.

.2 Ensure warranty includes items as follows:

.1 Maintaining adhesion properties without blistering, bubbling or delaminating from glass surface.

.2 Maintaining appearance without discolouration.

.3 Removing, replace and reapply defective materials.

.4 In event of product failure under warranty terms, remove and re-apply film without glass replacement at no cost to Owner.

Part 2 Products

2.1 MATERIALS

.1 Polyester

.2 Abrasion resistant coating.

.3 Release liner.

.4 Acrylic pressure sensitive adhesive

.5 Film thickness: minimum 2.76 mil

.6 Pattern: to be selected from manufacturers full range of patterns and gradients.

2.2 TYPE 1 – GRADIENT

.1 Gradient height: minimum 1525mm high.

.2 Gradient: varies from 100% vision obscuring at the bottom to 0% vision obscuring at the top.

.3 Colour: white.

.4 Pattern: selected by Departmental Representative from full range of manufacturers patterns.

2.3 TYPE 2 – FROSTED

.1 Obscurity: vision obscuring approximately 70%.

.2 Colour: white.

.3 Pattern: selected by Departmental Representative from manufacturer's full range of film.

2.4 TYPE 3 – COLOURED

.1 Obscurity: vision obscuring approximately 30%.

.2 Colour: selected by Departmental Representative from full range of manufacturers colours.

.3 Pattern: selected by Departmental Representative from full range of manufacturers patterns.

Part 3 Execution

3.1 PREPARATION

.1 See drawings and specifications for locations of privacy film.

.2 Clean surface of glazing before beginning installation using neutral cleaning solution. Ensure no deleterious material adheres to glass.

.3 Ensure dust, grease, and chemical residue are removed from surface of glazing before installation of film. Examine under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate or cause vision transparency or distortion problems. Report findings to Departmental Representative. Correct deficiencies as required to acceptance of Departmental Representative.

.4 Before beginning Work, place absorbent material on windowsill or at sash frame to absorb moisture accumulation generated by film application.

3.2 INSTALLATION

.1 Do not proceed with installation until mock-ups are approved.

.2 Field Installation of Film to glazing:

.1 Remove window stops prior to installation of film.

.2 Install film to glazing ensuring no blisters, bubbles, scratches or distortions.

.3 Cut film edges straight and square within 3mm of edge of glazing sheet.

.4 Ensure film is installed behind window stops.

.5 Cut edges in accordance with manufacturer's written instructions.

.6 Apply and attach film to glazing in accordance with manufacturer's written instructions.

.7 Apply decorative film on top of security film as noted in drawings. Ensure films and adhesives are compatible with each other.

.8 Remove left over material form work area and return work area to original condition.

3.3 INSTALLER'S INSPECTION

.1 Visual Inspection: in accordance with IWFA - Visual Quality Standard for Applied Window Film.

.2 Remove and replace without glazing replacement, film that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 1.0 m minimum after 30 day period.

3.4 FINAL CLEANING

.1 Wash interior and exterior of each glazing panel and film using cleaning solution recommended by film manufacturer.

3.5 SCHEDULE

.1 Refer to Section 08 90 10 Door, Frame and Hardware Schedule.

.2 Refer to drawings for locations and sizes.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI Z97.1-1984(R1994), Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test.

.2 International Window Film Association (IWFA)

.1 IWFA Visual Quality Standard for Applied Window Film 1999.

.3 Consumer Product Safety Commission Publications (CPSC)/Code of Federal Regulations (CFR)

.1 CPSC, 16 CFR 1201 CAT I.

.2 CPSC, 16 CFR 1201 CAT II.

.4 General Services Administration (GSA)

.1 GSA-TS01-2003, Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.

.5 Government of Canada

.1 Canada Labour Code, WHMIS datasheets.

.6 Underwriters laboratories of Canada (ULC)

.1 ULC-S332-93, Standard for Burglary Resisting Material.

.2 UL-972-02, Burglary resisting Glazing Material.

1.2 DEFINITIONS

.1 Safety: reduction of risk of injury, loss or death of persons due to accidental, natural or unintentional causes.

.2 Security: reduction of risk of injury, loss or death of persons due to intentional actions of others.

.3 Security and Safety Film Types:

.1 Type 1 Safety: areas of concern related to common residential or light commercial accidents.

.2 Type 2 Safety / Security / Seismic: areas of concern related to seismographic upgrade, low end smash and grab break and entry and over pressure due to violent weather.

.3 Type 3 Security / Blast: areas of concern related to bomb blasts.

1.3 SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS - Material Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit one 600 x 600 mm sample of film installed on 6 mm thick clear plate glass.

.5 Submit test reports in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit test reports from approved independent testing laboratory, certifying film's compliance with specified requirements.

.6 Submit Closeout Submittals in accordance with Section 01 78 00 - Closeout Submittals.

.1 Provide operation and maintenance data for window film for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Follow manufacturers written instructions for care and maintenance of security and safety film.

.3 Use only cleaning solution recommended by manufacturer for regularly scheduled cleaning of security film.

1.4 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Canada Labour Code.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with section 01 61 00 - Common Product Requirements.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of film flat on cross supports. Do not stand rolls of film on end.

.4 Remove from storage, in quantities required for same day use.

.5 Store materials in accordance with manufacturers written instructions.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 WARRANTY

.1 Work of this Section 08 87 53 - Security Films 12 months warranty period is extended to 10 years.

.2 Ensure warranty includes items as follows:

.1 Maintaining adhesion properties without blistering, bubbling or delaminating from glass surface.

.2 Maintaining appearance without discolouration.

.3 Removing, replace and reapply defective materials.

.4 In event of product failure under warranty terms, remove and re-apply film without glass replacement at no cost to Departmental Representative.

1.8 MAINTENANCE DATA

.1 Provide operation and maintenance data for window film for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

Part 2 Products

2.1 MATERIALS

.1 Security Film - General: optically clear, multi-layered polyester film, abrasion resistant coating and release liner.

.1 Type 2 Safety / Security / Seismic Film (including sun control):

.1 Testing in accordance with ANSI Z97.1, CPSC 16 CFR 1201 CAT II , and ULC - S332.

.2 Thickness: 0.36mm (14 mils)

.3 Tensile strength: 172Mpa

.4 Surface burn: Class A

.5 Visible light transmittance: >80%

.6 Solar Heat Gain coefficient: 0.80

.2 Acceptable manufacturers:

.1 3M SH114CLARL

.2 Approved alternate.

2.2 FABRICATION

.1 Shop installation of security film to glass panels:

.1 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.

.2 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems.

.1 Install security film to glass panels ensuring no blisters, bubbles, scratches, edge defects or distortions.

.2 Cut film edges straight and square to within 3 mm of edge of panel.

.3 Deliver glass panels complete with security film installed and labels intact and legible to site in accordance with section 01 61 00 - Common Product Requirements.

Part 3 Execution

3.1 INSTALLATION

.1 Install film behind window stops.

3.2 INSTALLER'S INSPECTION

.1 Visual Inspection: in accordance with IWFA - Visual Quality Standard for Applied Window Film.

.2 Remove and replace glass panel that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 2.0 m minimum after 30 day period.

3.3 FINAL CLEANING

.1 Wash interior and exterior of each window, glass panel and film using cleaning solution recommended by film manufacturer.

END OF SECTION

General notes:

.1 This schedule is to be read in conjunction with the Drawings and applicable Specification Sections.
.2 Refer to Section 08 71 10, Door Hardware for hardware groups.
.3 Refer to Drawing A0.0 for door and frame types
.4 Refer to Electrical for Card reader rough-ins, door contacts, power operators and associated power. Hardware manufacturer/installer shall be responsible for making all low voltage connections to hardware devices.
.5 Refer to Drawings for "Secure Door" details.
.6 Verify all door and frame sizes prior to ordering.

Door No.	Door				Frame			Fire Rating	Glass	Additional Requirements
	Size	Type	Mat'l	Fin.	Type	Mat'l	Fin.			
Main Floor – Refer to Drawings A2.9, A2.10 and A2.13										
101A	Match exist'g	A	IMD	PT	-	AL	-	-	-	EXISTING ALUMINUM FRAMING SYSTEM
101B	EXIST.	-	AL	-	-	-	-	-	-	
102	EXIST.	-	AL	-	-	-	-	-	-	
103	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
104	900 x 2150	A	ASD	PT	F2	PS	PT	-	-	STC 50 (SECTION 08 34 74)
105	EXIST.	-	AL	-	-	-	-	-	-	SECURITY FILM (SECTION 08 87 53) DECORATIVE FILM TYPE 2 (SECTION 08 87 33)
106A	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
106B	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
107	EXIST.	-	-	PT	-	-	PT	-	-	BI-FOLD CLOSET DOOR
108	EXIST.	-	-	PT	-	-	PT	1-HR	-	
109	EXIST.	-	-	PT	-	-	PT	-	-	
111	EXIST.	-	-	PT	-	-	PT	-		
112	EXIST.	-	-	PT	-	-	PT	-	-	
126A	EXIST.	-	HM	PT	-	-	PT	-	-	
126B	EXIST.	-	AL	-	-	AL		-	-	
127A	900 x 2150	A	HM	PT	F1	PS	PT	90 MIN	-	NEW FRAME – REFER TO TEMPOARARY ENTRANCE A0.2
127B	EXIST.	A	HM	PT	-	-	PT	90 MIN	-	EXISTING DOOR (REMOVE/REINSTAL) NEW HARDWARE
127C	EXIST.	-	-	-	-	-	-	-	-	OVERHEAD DOOR
127D	EXIST.	-	-	-	-	-	-	-	-	OVERHEAD DOOR
127E	EXIST.	-	-	-	-	-	-	-	-	OVERHEAD DOOR
127F	EXIST.	-	-	-	-	-	-	-	-	OVERHEAD DOOR
127J	900 x 2150	A	HM	PT-	F1	PS	PT	-	-	REFER TO DWG A4.4

Door No.	Door				Frame			Fire Rating	Glass	Additional Requirements
	Size	Type	Mat'l	Fin.	Type	Mat'l	Fin.			
127I	900 x 2150	A	HM	PT	F1	PS	PT	-	-	REFER TO DWG A4.4
127H	900 x 2105	A	HM	PT	F1	PS	PT	-	-	REFER TO DWG A4.4
127G	900 x 2150	A	HM	PT	F1	PS	PT	-	-	REFER TO DWG A4.4
128	900 x 2150	A	HM	PT	F1	PS	PT	-	-	SECURE FRAME REFER TO DWG A4.1
129	900 x 2150	A	HM	PT	F1	PS	PT	-	-	SECURE FRAME REFER TO DWG A4.1
131A	EXIST. PAIR	-	-	PT	-	-	PT	-	-	
131B	EXIST. PAIR	-	-	PT	-	-	PT	-	-	
132A	EXIST	-	-	PT	-	-	PT	-	-	
132B	1100 x 2150	A	HM	PT	F1	PS	PT	1-HR	-	SURFACE MOUNT WITHIN EXISTING OPENING OF CONCRETE BLOCK WALL – APPROXIMATELY 150mm DEEP. CONFIRM DIMENSIONS OF EXISTING OPENING.
133	800 x 2150	A	HM	PT	F1	PS	PT	0-HR	-	SURFACE MOUNT WITHIN EXISTING OPENING OF CONCRETE BLOCK WALL – APPROXIMATELY 150mm DEEP. CONFIRM DIMENSIONS OF EXISTING OPENING.
133A	900 x 2150	A	HM	PT	F1	PS	PT	-	-	
133B	900 x 2150	A	HM	PT	F1	PS	PT	-	-	
134	900 x 2150	A	HM	PT	F1	PS	PT	0-HR	-	
135	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
136	EXIST	-	-	PT	-	-	PT	-	-	
137	EXIST	-	-	PT	-	-	PT	-	-	
138A	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
138B	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
141	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
142	900 x 2150	A	ASD	PT	F2	PS	PT	-	-	STC 50 (SECTION 08 34 74)
143A	900 x 2150	A	ASD	PT	F2	PS	PT	-	-	STC 50 (SECTION 08 34 74)
143B	900 x 2150	A	ASD	PT	F2	PS	PT	-	-	STC 50 (SECTION 08 34 74)
144	900 x 2150	A	HM	PT	F1	PS	PT	-	-	
S1A	EXIST.	-	-	PT	-	-	PT	-	-	SECURITY FILM (SECTION 08 87 53) DECORATIVE FILM TYPE 2 (SECTION 08 87 33)
S3A	EXIST.	-	-	PT	-	-	PT	-	-	SECURITY FILM (SECTION 08 87 53)
S5	900 x 2150	A	IMD	PT	F1	PS	PT	-	-	CONFIRM SIZE OF EXISTING OPENING AND FRAME ARRANGEMENT ON SITE
S6	EXIST.	-	-	PT	-	-	PT	1-HR	-	

Door No.	Door				Frame			Fire Rating	Glass	Additional Requirements
	Size	Type	Mat'l	Fin.	Type	Mat'l	Fin.			
Second Floor – Refer to Drawing A2.11, A2.12 and A2.13										
202	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
203	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
204	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
205	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
206	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
207	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
208	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
209	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
210	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
211	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
212	900 x 2150	A	HM	PT	F1	PS	PT	-	-	SECURE FRAME, Refer to drawing detail A4.1.
213	EXIST.	-	-	PT	-	-	PT		-	
214A	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
214B	900 x 2150	A	HM	PT	F1	PS	PT	-	-	IDS
215	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
216	900 x 2150	A	ASD	PT	F2	PS	PT	-	-	STC 50 (SECTION 08 34 74). SECURE FRAME, refer to drawing detail A4.1. IDS 2
217	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
226	EXIST.	-	-	PT	-	-	PT	-	-	
227	EXIST.	-	-	PT	-	-	PT	-	-	
229	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
230	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
231	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
232	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
233	900 x 2150	A	SCW	PT	F1	PS	PT	-	-	
234	EXIST.	-	-	PT	-	-	PT	-	-	
S1C	EXIST.	-	-	PT	-	-	PT	1-HR	-	
S1D	EXIST.	-	-	PT	-	-	PT	-	-	
S3C	EXIST.	-	-	PT	-	-	PT	1-HR	-	

Door No.	Door				Frame			Fire Rating	Glass	Additional Requirements
	Size	Type	Mat'l	Fin.	Type	Mat'l	Fin.			
S3D	EXIST.	-	-	PT	-	-	PT	-	-	

Abbreviations:
HM – Hollow Metal Door
AN – Anodized Aluminum
ASD – Acoustic Steel Door (08 34 74)
IMD – Insulated Metal Door
PT# – Paint (# Denotes Colour)
PS – Pressed Steel Frame (welded) (08 11 00 & 08 34 74)
SCW – Solid Core Wood
TG – Tempered Glass

IDS – Intrusion Detection System (keypad, motion, door contact) – Refer to Details on Electrical Drawings
IDS 2 – Intrusion Detection System (keypad, motion, door contact, zoned separately) – Refer to Details on Electrical Drawings

Note 1: This schedule is to be read in conjunction with the Drawings and Specification Sections.
Note 2: Refer to Section 09 91 23 Interior Painting for painting of all elements in exposed and semi-exposed areas of the ceiling on both Main and Second floors.

Room No.	Floor	Base	Walls				Ceiling	Notes/Special:
			N	S	E	W		
Main Floor								
101	EXIST.	EXIST.	-	-	-	-	EXIST.	
102	CONC P	RB	PT-1 / EXIST.	PT-1	PT-1	PT-1 / EXIST	LMC	
103	CONC P	MTL	CT-3	CT-3	CT-3	CT-3	ATC	
104	CPT	CPT	PT-1	PT-1	PT-1	PT-1	ATC	ACOUSTIC WALL PANELS
105	EXIST.	EXIST.	EXIST / DF-1	-	EXIST / DF-1 / PT-1	PT-1	EXP	REPAIR CARPET TILE AND BASE WHERE AFFECTED BY RENOVATIONS.
106	CPT	CPT	PT-1	PT-1 / PT-2	PT-1 / PT-2	PT-1 / PT-2	ATC / DCP-1 / DCP-2 / GB	
107	CPT	CPT	PT-1	PT-1	PT-1	PT-1	EXIST.	
108	-	-	-	-	-	-	-	
109	CONC P	RB	PT-3	PT-1	PT-1	PT-1	ATC	
110	EXIST.	EXIST.	PT-1	PT-1	-	PT-1	LMC	REPAIR CARPET TILE AND BASE WHERE AFFECTED BY RENOVATIONS.
111	EXIST.	EXIST.	-	-	-	-	EXIST.	
112	EXIST.	EXIST.	-	-	-	-	EXIST.	
113-125 PHASE 1	-	-	-	-	-	-	-	
126	EXIST.	EXIST.	PT-1	PT-1	PT-1	PT-1	EXIST.	
127	EXIST.	EXIST.	-	-	-	-	EXP	
128	CONC P	RB	PT-1	PT-1	PT-1	PT-1	ATC	
129	CONC P	RB	PT-1	PT-1	PT-1	PT-1	ATC	
130	CONC P	RB	PT-1	PT-1	PT-1	-	LMC	
131	CONC P	RB	PT-1	PT-1	PT-1	PT-1	EXIST.	
132	EXIST.	EXIST.	PT-1	PT-1	PT-1	PT-1	EXIST.	
133	CONC P	RB	PT-1	PT-1	PT-1	PT-1	ATC	
134	CONC P	RB	PT-1	PT-1	PT-1	PT-1	EXP	
135	CPT / CPT-1	CPT	PT-1	PT-1	PT-1	PT-1	GB / DCP-3	ACOUSTIC WALL PANELS
136	EXIST / CT-5	EXIST.	EXIST / CT-2	-	EXIST / CT-2	EXIST / CT-2	GB	NEW WALL AND FLOOR TILES IN SHOWERS

Room No.	Floor	Base	Walls				Ceiling	Notes/Special:
			N	S	E	W		
137	EXIST / CT-5	EXIST.	-	EXIST / CT-2	EXIST / CT-2	EXIST / CT-2	GB	NEW WALL AND FLOOR TILES IN SHOWERS
138	CPT	CPT	PT-1 / PT-2	PT-1 / PT-2	PT-1 / PT-2	PT-1/ PT-2	ATC / DCP-1 / DCP-2 / DCP-3 / GB	
139-140 NOT USED	-	-	-	-	-	-	-	
141	CPT	CPT	PT-1	PT-1	PT-3	PT-1	ATC	
142	CPT	CPT	PT-1	PT-1	PT-1	PT-1	ATC	
143	CPT	CPT	PT-1	PT-1	PT-1	PT-1	ATC	ACOUSTIC WALL PANELS
144	CPT	CPT	PT-1	PT-1	PT-1	PT-1	ATC	
Second Floor								
201	EXIST. / CPT	EXIST. / CPT	PT-1	PT-1	PT-1	PT-1	EXP	REPAIR CARPET TILE AND BASE WHERE AFFECTED BY RENOVATIONS.
202	CPT / CPT-1	CPT	PT-1	PT-1	PT-1	PT-1	DCP-3	
203	CPT	CPT	PT-1 / PT-2	PT-1	PT-1 / PT-2	PT-1	ATC / DCP-1 / DCP-2 / GB	
204	CPT / CPT-1	CPT	PT-1	PT-1	PT-1	PT-1	DCP-3	ACOUSTIC WALL PANELS
205	CPT / CPT-1	CPT	PT-1	PT-1	PT-1	PT-1	DCP-3	
206	CPT	CPT	PT-1 / PT-2	PT-1	PT-1 / PT-2	PT-1	ATC / DCP-1 / DCP-3 / GB	
207	CPT	CPT	PT-1	PT-1	PT-1	PT-1	ATC / DCP-1 / DCP-3	
208	CPT	CPT	PT-1	PT-1 / PT-2	PT-1 / PT-2	PT-1	ATC / DCP-1 / GB	
209	CPT	CPT	PT-1 / PT-3	PT-1	PT-1	PT-1	ATC / GB	
210	CPT	CPT	PT-1	PT-1 / PT-3	PT-1	PT-1	ATC / GB	
211	SDT	CPT	PT-3	PT-1	PT-1	PT-1	DCP-1	
212	SDT	RB	PT-1	PT-1	PT-1	PT-1	ATC	
213	EXIST.	EXIST.	-	-	-	-	EXIST / EXP	
214	CPT	CPT	PT-1 / PT-2	PT-1 / PT-2	PT-1 / PT-2	PT-1 / PT-2	ATC / DCP-1 / DCP-2 / DCP-3 / GB	
215	CPT	CPT	PT-1	PT-1	PT-3	PT-1	ATC	
216	CPT	CPT	PT-1	PT-1	PT-1	PT-1	ATC	
217	CPT	CPT	PT-1	PT-1	PT-3	PT-1	ATC	

Room No.	Floor	Base	Walls				Ceiling	Notes/Special:
			N	S	E	W		
218-225 PHASE 1	-	-	-	-	-	-	-	
226	CONC P	MTL	CT-1 / CT-4	PT-1 / CT-1 / CT-4	CT-1 / CT-4	PT-1	EXIST / GB	
227	CONC P	MTL	PT-1 / CT-1 / CT-4	CT-1 / CT-4	CT-1 / CT-4	PT-1	EXIST / GB	
228	CPT	CPT	PT-1	PT-1	PT-1	PT-1		
229	CPT	CPT	PT-2	PT-1	PT-1	PT-1	DCP-3	
230	CPT	CPT	PT-1	PT-2	PT-1	PT-1	DCP-3	
231	CPT/ CPT-1	CPT	PT-1	PT-1	PT-1	PT-1	DCP-3	
232	CPT/ CPT-1	CPT	PT-1	PT-1	PT-1	PT-1	DCP-3	ACOUSTIC WALL PANELS
233	CPT/ CPT-1	CPT	PT-1	PT-1	PT-1	PT-1	DCP-3	
234	CONC P	RB	EXIST / PT-1	PT-1	EXIST / PT-1	PT-1	EXP	
235 - PATIO	EXIST.	-	-	-	-	-	-	

List of Abbreviations:

FLOORING		
CONC	CONCRETE	
CONC P	POLISHED CONCRETE	03 35 43
CPT	CARPET TILE	09 68 00
CPT-1	CARPET TILE ACCENT	09 68 00
RB	RUBBER BASE	09 65 16
CB	CARPET BASE	09 68 00
MTL	METAL BASE	09 30 13
SDT	STATIC DISSIPATIVE VINYL TILE	09 65 16
CT-5	CERAMIC TILE 5 – MOSAIC	09 30 13

CEILING		
DCP- 1	DECORATIVE PANEL TYPE 1 – CAPZ	09 51 13
DCP- 2	DECORATIVE PANEL TYPE 2 - WOOD	09 51 13
DCP- 3	DECORATIVE PANEL TYPE 3 – OPEN CELL WOOD	09 51 13
ATC	ACOUSTIC TILE CEILING	09 51 13
EXP	EXPOSED	-
LMC	LINEAR METAL CEILING	09 54 23
GB	GYPSUM BOARD (PAINTED)	09 21 16
WALL		
PT- 1	COLOR 1	09 91 23
PT- 2	COLOR 2	09 91 23
PT- 3	COLOR 3	09 91 23
AWP	ACOUSTIC WALL PANEL	09 84 00
DP	DECORATIVE PANEL	08 80 50
CT-1	CERAMIC TILE 1 – SOLID 250 x 760	09 30 13
CT-2	CERAMIC TILE 2 – PATTERNED	09 30 13
CT-3	CERAMIC TILE 3 – SOLID 200 x 600	09 30 13
CT-4	CERAMIC TILE 4 – MOSIAC BACKSPLASH	09 30 13
DF-1	DECORATIVE FILM 1 – GRADIENT	08 87 33
EXIST.	EXISTING MATERIAL TO REMAIN	-

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM C36/C36M-03e1, Specification for Gypsum Wallboard.
- .2 ASTM C475-12, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C840-11, Specification for Application and Finishing of Gypsum Board.
- .4 ASTM C841-03(2008), Standard Specification for Installation of Interior Lathing and Furring.
- .5 ASTM C1002-07, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .6 ASTM C1047-10a, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .7 ASTM C1178/C1178M-11, Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .8 ASTM C1396/C1396M-11, Standard Specification for Gypsum Board.
- .9 ASTM C1629/C1629M-06(2011), Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels

.2 Association of the Wall and Ceilings Industries International (AWEI)

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.4 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S102-2007, Surface Burning Characteristics of Building Materials and Assemblies.

1.2 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.3 SITE ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert unused metal materials from landfill to metal recycling facility.

.3 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

.1 Standard board: to ASTM C36/C36M, Type X, 16 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.

.2 Glass mat water-resistant gypsum backing board: to ASTM C1178/C1178M, 16 mm thick, 1200 mm wide x maximum practical length.

.3 Abuse-resistant gypsum board: to ASTM C1396 and ASTM C1629, 12.7 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.

.4 Metal furring runners, hangers, tie wires, inserts, and anchors required for installation to ASTM C841.

.5 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.6 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.7 Metal channel stiffener: 19 x 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.

.8 Steel drill screws: to ASTM C1002.

.9 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, metal, zinc-coated by electrolytic process, 0.5 mm base thickness, perforated flanges, one piece length per location.

.10 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

.11 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.

.12 Polyethylene: to CAN/CGSB-51.34, Type 2.

.13 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self-sticking permanent adhesive on one face, lengths as required.

.14 Joint compound: to ASTM C475, asbestos-free.

Part 3 Execution

3.1 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.

.3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.4 Install work level to tolerance of 1:1200.

.5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, and grilles.

.6 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.7 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.8 Install wall furring for gypsum board wall finishes in accordance with ASTM C840, except where specified otherwise.

.9 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.10 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

.11 Erect drywall resilient furring transversely across studs, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.

3.2 APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.

.2 Apply single and double layer gypsum board (as indicated on drawings) to metal furring or framing using screw. Maximum spacing of screws, 300 mm on centre.

.1 Single-Layer Application:

.1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

.2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.

.2 Double-Layer Application:

.1 Install gypsum board for base layer and exposed gypsum board for face layer.

.2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.

.3 Apply base layers at right angles to supports unless otherwise indicated.

.4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.

.3 Apply water-resistant gypsum board where wall tiles to be applied. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.4 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.5 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.

.6 Install gypsum board with face side out.

.7 Do not install damaged or damp boards.

.8 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.3 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.4 Install closed cell foam neoprene gasket where partitions abut window mullions, to provide sound seal gasket.

.5 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.

.6 Provide continuous polyethylene dust barrier behind and across control joints.

.7 Apply 12 mm diameter bead of acoustic sealant continuously around perimeter of first layer of multiple layers of gypsum board to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, and penetrations, in partitions where perimeter sealed with acoustic sealant.

.8 Install access doors to electrical and mechanical fixtures specified in respective sections.

.1 Rigidly secure frames to furring or framing systems.

.9 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.10 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:

.1 Levels of finish:

.1 Level 0: No tapping, finishing or accessories required.

.2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.

.3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.

.4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.5 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.

.11 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.12 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.13 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.14 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.15 Mix joint compound slightly thinner than for joint taping.

.16 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.17 Allow skim coat to dry completely.

.18 Remove ridges by light sanding or wiping with damp cloth.

.19 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

3.4 CONTROL JOINTS

.1 Provide control joints at not greater than 9 m spacing on continuous gypsum board walls in a single plane and at not greater than 9 m spacing on ceilings and bulkheads except where indicated otherwise in the drawings.

.1 Confirm location of control joints with the Consultant prior to installation of gypsum board

.2 Provide control joints of preformed units set in gypsum board facing and supported independently on both sides of joint. Interrupt top and bottom tracks at location of control joint.

.3 Install control joints straight and true. Finish control joints as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

3.5 SCHEDULES

.1 Levels of finish: Interior partitions;

.1 Level 1:

.1 Plenums above suspended ceilings, inside of duct shafts and other gypsum board wall areas not exposed to view.

.2 Level 5:

.1 Vertical surfaces exposed to view.

.2 Ceilings and underside of bulkheads exposed to view.

.2 Types of gypsum board:

.1 As noted in drawing partition types.

.2 Water-resistant gypsum board as substrate to tile application in washrooms #226 and #227 and shower stalls #136 and #137.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM A627-03: Standard Test Methods for Tool-Resisting Steel Bars, Flats, and Shapes for Detention and Correctional facilities.

.2 ASTM C645-11a, Specification for Nonstructural Steel Framing Members.

.3 ASTM C754-11, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.4 ASTM F2367-07: Standard Specification for Metal Expanded Steel

.2 Canadian Standards Association (CSA International)

.1 CSA W59-03(R2008),Welded Steel Construction (Metal Arc Welding).

.3 Expanded Metal Manufacturers Association (EMMA)

.1 EMMA 557-99 Standard for Expanded Metal

1.2 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.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert unused metal materials from landfill to metal recycling facility.

Part 2 Products

2.1 MATERIALS

.1 Non-load bearing channel stud framing: to ASTM C645, stud size as noted on drawings and Partition Schedule, roll formed from steelas noted on drawings and Partition Schedule for Secure Demising Wall (SDW); hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.

.2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height. Slotted deflection track 62 mm slotted flange height. Thickness as noted for studs in Partition Schedule.

.3 Metal channel stiffener: cold rolled steel, coated with rust inhibitive coating.

.4 Resilient channel: single leg, galvanized steel thickness 0.478mm, depth 12.7mm.

.5 Expanded Mesh: To EMMA 557-99. Style 19mm-9F. 19mm #9/10 roll-flattened steel mesh. Nominal strand thickness of 3mm. Diamond opening of 14mm x 43mm.

.6 Acoustical sealant: in accordance with Section 07 92 00 – Joint Sealants.

.7 Insulating strip: rubberized, moisture resistant 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.

.8 Welding materials: to CSA W59.

Part 3 Execution

3.1 ERECTION

.1 Install in accordance with ASTM C754 unless otherwise noted.

.2 Align partition tracks at floor and ceiling and secure at 400 mm on centre maximum for normal partitions.

.3 For Secure Demising Wall (SDW) partitions: secure top and bottom tracks at 300mm on centre using expanding (preferably double expanding) mechanical fastener. Non-expanding (e.g. Tapcon") screws are NOT acceptable.

.4 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.5 For normal partitions: place studs vertically at 600 mm on centre (refer to drawings) and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions. Attach studs to bottom track using screws.

.6 For SDW partitions: place studs vertically at 300mm on centre (refer to drawings) and secure to top and bottom tracks with welds or rivets (not screws). Install double studs at door frame openings. Install door frame as per HMMA 840-07 part 3 A,B,C,D, and E except that screws shall be replaced with steel rivets. Install anti-spread bracing approximately 1200mm on centre vertically from the bottom of the wall between the door jamb and adjacent stud on both sides of the frame. Construct corners with double studs.

.7 Erect metal studding to tolerance of 1:1000.

.8 For SDW partitions: Install expanded mesh on "attack" side of partition. Support all edges using anti-spread bracing or studs. Align edges to centre of supports. Secure to studs by welding or use of rivets. Fillet (3mm) weld at 200mm on centre along strand to stud or rivet to studs (preferred) using 1.9mm (3/16") steel pop rivet with 38mm outside diameter/ 1.9mm inside diameter fender washer at 200mm on centre. Do not overlap mesh at supports. Fasten each sheet separately.

.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 two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Weld studs together, placed alongside frame anchor clips.

.12 For SDW partitions: Install 16 ga steel sheet or expanded metal mesh to face of studs for 1200mm each side of door jamb and 1200mm above head of door on inside of room. This is in addition to the expanded mesh on the “attack” exterior side of the partition. Attach as per rivet requirements for mesh.

.13 Do welding work in accordance with CSA W59 unless specified otherwise

.14 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.15 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.16 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.17 Install resilient channels at spacing recommended by manufacturer based on wall type.

.18 Extend partitions to ceiling height except where noted otherwise on drawings.

.19 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use double track slip joint or 50mm ceiling track.

.20 Install continuous insulating strips to isolate studs from uninsulated surfaces.

.21 Install two continuous insulating strips between ceiling track and floor slab and around perimeter of sound control partitions.

.22 Install purpose made foam gasket between top of track and fluted metal deck at sound control partitions.

.23 Install proprietary fire stop material between top of track and fluted metal deck at fire rated partitions.

3.2 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)

.1 ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).

.2 CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1).

.2 Canadian General Standards Board (CGSB)

.1 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.

.2 CAN/CGSB-75.1-M88, Tile, Ceramic.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

.1 Include manufacturer's information on:

.1 Ceramic tile, marked to show each type, size, and shape required.

.2 Levelling compound.

.3 Latex cement mortar and grout.

.4 Commercial cement grout.

.5 Organic adhesive.

.3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Wall tile: submit full size sample of each colour, texture, size, and pattern of tile.

.2 Metal wall base 300mm, inside and outside corner and connector.

.3 Transition strips and corner edges.

1.3 QUALITY ASSURANCE

.1 Quality Assurance Submittals:

.1 Manufacturer's Instructions: manufacturer's installation instructions.

.2 Manufacturer's Field Reports: manufacturer's field reports specified.

1.4 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 Waste Management and Disposal:

.1 Separate waste materials for 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 ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.

.2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.

.3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

1.6 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide minimum 2% of each type and colour of tile required for project for maintenance use. Store where directed.

.3 Maintenance material same production run as installed material.

Part 2 Products

2.1 WALL AND FLOOR TILE

.1 Ceramic tile: to CAN/CGSB-75.1, colour as selected by Departmental Representative.

.2 Wall tile

.1 Type 1 glazed porcelain tile, similar in colour and pattern to:

.1 C&S Tile, Contemporary Line, Handmade Series.

.2 Name: “Glossy”

.3 Colour: Light

.4 Size: 250mm x 760mm.

.2 Type 2 glazed porcelain tile, similar in colour and pattern to:

.1 C&S Tile, Contemporary Line, Handmade Series.

.2 Name: “Mosaic”

.3 Colour: Light Mosaic

.4 Size: 250mm x 760mm.

.3 Type 3 glazed porcelain tile, similar in colour and pattern to:

.1 C&S Tile, Contemporary Line, Tone Series.

.2 Colour: Biscuit

.3 Size: 200mm x 600mm.

.4 Type 4 glass mosiac tile, similar in colour and pattern to:

.1 Daltile, “Color Wave Classic Solids”

.2 Colour: to be selected from manufacturer’s standard range of colours.

.3 Size: 25mm x 25mm mosiac tiles in 299mm x 299 sheet size.

.3 Floor tile

.1 Type 5 unglazed porcelain mosaic suitable for installation on shower floor. Similar in colour and pattern to:

.1 Olympia Tile, Quebec Series.

.2 Name and colour: “Mottled Grey”.

.3 Size: 25mm x 25mm tiles mounted to 305 x 305 sheet.

.4 Coefficient of friction not less than 0.6.

2.2 METAL WALL BASE

.1 Description based on Schluter “Designbase” SL.

.2 Style: Anodized Aluminum Baseboard profile comprised of a symmetrically rounded top, flat exposed face, and 8 mm radius lower section.

.3 Height: Typically 80mm unless otherwise noted

.4 Corners:

.1 Provide with matching inside corners.

.2 Provide with matching outside corners.

.3 Provide with matching connectors.

.4 Provide with matching end caps.

.5 Provide with matching sealing lip.

.5 Finish: satin anodized aluminum.

2.3 MORTAR AND ADHESIVE MATERIALS

.1 Cement: to CSA-A5, type 10.

.2 Sand: to ASTM C144, passing 16 mesh.

.3 Hydrated lime: to ASTM C207, Type N.

.4 Latex additive: formulated for use in cement mortar and thin set bond coat.

.5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.

.6 Adhesives: as recommended by manufacturer.

.7 Epoxy Adhesive: to ANSI A 118.3.

2.4 BOND COAT

.1 Latex Cement mortar: to ANSI A108.1, two-component universal dry-set mortar.

2.5 GROUT

.1 Colouring Pigments:

.1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.

.2 Colouring pigments to be added to grout by manufacturer.

.3 Job coloured grout are not acceptable.

.4 Use in Commercial Cement Grout, Dry-Set Grout, and Latex Cement Grout.

.5 Colour to be selected from manufacturers standard range

.2 Latex Cement Grout: to ANSI A108.1, fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles commercial tile grout.

.3 Epoxy Grout: to ANSI A 118.3.

2.6 WATERPROOF MEMBRANE

.1 Trowel applied flexible, fiber-mesh reinforced membrane to ANSI A118.10 and A118.12.

.2 Isolation membrane to A118.12, standard performance 1.5mm.

.3 Fiberglass mesh as recommended by membrane manufacturer.

2.7 ACCESSORIES

.1 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.

.2 Transition Strips: purpose made metal extrusion; stainless steel type.

.3 Floor Trim

.1 Corner edges: purpose made stainless steel quarter round between horizontal and vertical tiles.

.4 Wall Trim

.1 Corner edges wall: purpose made stainless steel square edge trim.

.5 Floor sealer and protective coating: to tile and grout manufacturers recommendations

2.8 MIXES

.1 Cement:

.1 Scratch coat: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, and latex additive where required. Adjust water volume depending on water content of sand.

.2 Slurry bond coat: cement and water mixed to creamy paste. Latex additive may be included.

.3 Mortar bed for floors: 1 part cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.

.4 Mortar bed for walls: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.

.5 Levelling coat: 1 part cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.

.6 Bond or setting coat: 1 part cement, 1/3 part hydrated lime, 1 part water.

.7 Measure mortar ingredients by volume.

.2 Dry set mortar: mix to manufacturer's instructions.

.3 Mix bond and levelling coats, and grout to manufacturer's instructions.

.4 Adjust water volumes to suit water content of sand.

2.9 PATCHING AND LEVELLING COMPOUND

.1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

.2 Have not less than the following physical properties:

.1 Compressive strength - 25 MPa.

.2 Tensile strength - 7 MPa.

.3 Flexural strength - 7 MPa.

.4 Density - 1.9.

.3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.

.4 Ready for use in 48 hours after application.

2.10 CLEANING COMPOUNDS

.1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.

.2 Materials containing acid or caustic material are not acceptable.

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 WORKMANSHIP

.1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, "Ceramic Tile", except where specified otherwise.

.2 Apply tile or backing coats to clean and sound surfaces.

.3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.

.4 Maximum surface tolerance 1:800.

.5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

.6 Lay out tiles so perimeter tiles are minimum 1/2 size.

.7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.

.8 Make internal angles square, external angles square.

.9 Use square edged tiles and purpose made metal finishing strip at termination of wall tile panels, except where panel abuts projecting surface or differing plane.

.10 Install divider strips at junction of tile flooring and dissimilar materials.

.11 Allow minimum 24 hours after installation of tiles, before grouting.

.12 Clean installed tile surfaces after installation and grouting cured.

3.3 WATERPROOF MEMBRANE

.1 Confirm substrates are smooth, structurally sound and free of any substance that could prevent proper adhesion.

.2 Mix and apply waterproof membrane in accordance with manufactures written instructions.

.3 Embed fiberglass mesh in accordance with manufactures written instructions.

.4 Install a bead of commercial grade silicone caulk around top outer edge of floor drain to provide a watertight seal.

3.4 WALL TILE

.1 Washroom #226 and #227.

.1 Install in accordance with TTMAC detail 305W- Detail B.

.2 Shower #136 and #137.

.1 Install in accordance with TTMAC detail 319 SR- Detail A

.2 Provide epoxy grout.

3.5 FLOOR TILE

.1 Shower #136 and 137

.1 Install in accordance with TTMAC detail 319 SR- Detail A

.2 Provide epoxy grout.

3.6 METAL WALL BASE

.1 Lay out base to keep number of joints at minimum.

.2 Do not begin installation until substrates have been properly prepared.

.3 Install in accordance with manufacturer's instructions.

.4 Set base against wall and floor surfaces tightly.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions.

.7 Install only purpose made corners, connectors and endcaps.

3.7 FLOOR SEALER AND PROTECTIVE COATING

.1 Apply in accordance with manufacturer's instructions.

3.8 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.

3.9 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM E 413-87(1999) Standard Classification for Rating Sound Insulation

.2 ASTM E1264-08e1, Standard Classification for Acoustical Ceiling Products.

.3 ASTM E1477-98a(2013), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.

.4 ASTM E 1414-00a Standard test method for Airborne Sound Attenuation Between Rooms sharing a Common Ceiling Plenum

.2 Canadian General Standards Board (CGSB)

.1 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 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials and Assemblies.

1.2 SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials.

1.3 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 PRE-INSTALLATION MEETING

.1 Convene pre-installation meeting two weeks prior to beginning work of this Section, with contractor's representative, Departmental Representative, and Consultants 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 Co-ordination with other building sub-trades.

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 for reuse and 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, and packaging material for recycling in accordance with Waste Management Plan (WMP).

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Permit wet work to dry before beginning to install.

.2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20-40% before and during installation.

.3 Store materials in work area 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 5% of gross ceiling area for each pattern and type of acoustic lay in tiles 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 Departmental Representative, upon completion of the work of this section.

Part 2 Products

2.1 MATERIALS

.1 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1 and ASTM E1264, designated by “ATC” in Room Finish Schedule.

.1 Type XII, Form 2, Pattern E (match surface of Armstrong Optima Tegular Lay-in)

.2 Class A.

.3 Fibreglass with minimum 70% recycled content.

.4 Pattern: No pattern.

.5 Textures: fine.

.6 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.

.7 Smoke developed 50 or less in accordance with CAN/ULC-S102.

.8 Noise Reduction Coefficient (NRC) designation of 0.95.

.9 Ceiling Attenuation Class (CAC) rating 26, in accordance with ASTM E1264

.10 Light Reflectance (LR) range of 0.90 to ASTM E1477.

.11 Edge type: tegular.

.12 Colour: “white”.

.13 Size: 610 x 610 x 25 mm thick.

.14 Humidity resistant: proprietary coating.

.15 Surface coverings: low VOC paint.

.16 Perimeter trim: On all exposed ends of ceilings provide 150mm high extruded aluminum trim (flat profile). Finish “white” to match grid.

.17 Acceptable manufacturers:

.1 Armstrong, CGC, CertainTeed, Celotex, or approved alternate.

.2 Decorative Panel Type 1: Designated as “DCP-1” in Room Finish Schedule

.1 Fibreglass (> 50% recycled content) with acoustically transparent scrim with factory applied latex paint – colour white

.2 Size: 1220mm x 2135mm

.3 Fire Class A to ASTM E1264

.4 Light Reflectance (LR) range of 0.90 to ASTM E1477

.5 Noise Reduction Coefficient (NRC) designation of 0.95

.6 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.

.7 Smoke developed 50 or less in accordance with CAN/ULC-S102.

.8 No pattern

.9 Texture: fine

.10 Accessories above ceiling will be matte black in colour.

.11 Suspension cables are required to support suspension system.

.12 Suspended system: concealed 15/16” suspension system with purpose made threaded studs to coincide with suspension points of panels. Support point covers shall be white textured cap at underside (exposed) of panel. Support at sufficient spacing to prevent deflection of panels to less than 3mm.

.13 Grommets to match white textured caps. Grommets for suspension of light fixtures below ceiling.

.14 Provide panel stiffeners as required by size of panels

.15 10 year manufacturer’s warranty on panels

.3 Decorative Panel Type 2: Designated as “DCP-2” in Room Finish Schedule

.1 FSC-certified fire retardant particle board with face-cut veneers

.2 Real wood veneer: species to be selected by Departmental Representative from manufacturer’s range

.3 Panels to be perforated with round openings in straight lines (pattern to match Armstrong W4)

.4 Tinted semi-gloss coating on face of panels: colour to be selected from manufacture's range

.5 Size 610mm x 1220mm with 6mm reveal between panels

.6 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.

.7 Smoke developed 50 or less in accordance with CAN/ULC-S102.

.8 Fire Class A ASTM E1264

.9 Suspended installation: concealed 15/16" suspension system with purpose made concealed clips to fasten to T bar

.10 Perimeter Trim: extruded aluminum with matching wood veneer. 150mm height

.4 Decorative Panel Type 3: Designated as "DCP-3" in Room Finish Schedule

.1 Solid Poplar wood cell ceiling

.2 All material to be Class A intumescent treated

.3 Tinted semi-gloss coating on face of panels: colour to be selected from manufacture's range

.4 Panel size 610mm x 610mm x 60mm; 305 x 305 cells; with 6mm reveal between panels

.5 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.

.6 Smoke developed 50 or less in accordance with CAN/ULC-S102.

.7 Fire Class A ASTM E1264

.8 Suspended installation: concealed 15/16" suspension system. Colour "black"

.9 Perimeter Trim: extruded aluminum 150mm height. Colour "black".

.5 Decorative Panel Type 4: Designated as "DCP-4" in Room Finish Schedule

.1 Fibreglass (> 50% recycled content) with acoustically transparent scrim with factory applied latex paint – colour white

.2 Size: 1220mm x 1220mm

.3 Fire Class A to ASTM E1264

.4 Light Reflectance (LR) range of 0.90 to ASTM E1477

.5 Noise Reduction Coefficient (NRC) designation of 0.95

.6 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.

.7 Smoke developed 50 or less in accordance with CAN/ULC-S102.

.8 No pattern

.9 Texture: fine

.10 Suspended installation: concealed 15/16" suspension system with purpose made suspension rods to coincide with suspension points of panels. Support point covers shall be white textured cap at underside (exposed) of panel. Support at sufficient spacing to prevent deflection of panels to less than 3mm.

.11 Provide panel stiffeners as required by size of panels

.12 10 year manufacturer's warranty on panels

.6 Decorative Panel Type 5: Designated as "DCP-5" in Room Finish Schedule

.1 Fibreglass 50mm thick. Scrim and factory-applied paint on all visible sides and edges. Panels include integral hanging clips suitable for intended use.

.2 Size: 254mm x 1168mm x 50mm

.3 Panel Colour: to be selected from manufacturers standard colours by Departmental Representative.

.4 Fire Class: Class A.

.5 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.

.6 Smoke developed 50 or less in accordance with CAN/ULC-S102.

.7 Acoustic performance: sound absorptive design.

.8 Suspended installation: Aircraft cable with all necessary clips, brackets and hangers required for installation.

.1 Colour: cable, clips, brackets and fasteners painted matte black.

.7 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Departmental Representative.

3.2 INSTALLATION

.1 Follow manufacturer's written instructions for installation.

.2 Install acoustical panels and tiles in ceiling suspension system.

.3 Install decorative panel ceilings onto suspension system.

.4 Install extruded aluminum trim to Decorative Panels Types 2 and 3.

.5 Suspend decorative panels DCP-5 approximately 1.5 meters below underside of ceiling. Use manufacturer recommended hardware. Paint cable, clips, brackets and fasteners as required. Coordinate placement of panels with mechanical and electrical systems and as instructed by Departmental Representative.

3.3 APPLICATION

.1 Install all ceiling panels parallel to building lines with edge unit not less than 50% of unit width. Refer to reflected ceiling plan.

.2 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.4 INTERFACE WITH OTHER WORK

.1 Attend Pre-Installation Meeting to coordinate work of ceilings, mechanical and electrical systems.

.2 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

.3 Co-ordinate ceiling components to accommodate components associated with operation and maintenance of Mechanical equipment installed above suspended ceiling.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C635-12, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.

.2 ASTM C636/C636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 DESIGN REQUIREMENTS

.1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

1.3 SUBMITTALS

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

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 for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 SEQUENCING

.1 Layout ceiling grid to ensure main tees do not interfere with access to mechanical units installed above the suspended ceiling. Cross tees to be removable at access points to mechanical units installed above the suspended ceiling.

1.6 PRE-INSTALLATION MEETING

.1 Convene pre-installation meeting at request of Departmental Representative, with contractor's representative, Departmental Representative, and Consultants 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 Co-ordination with Mechanical and Electrical above ceiling systems.

Part 2 Products

2.1 MATERIALS

.1 Heavy duty system to ASTM C635.

.2 Basic materials for suspension system: commercial quality cold rolled steel.

.3 Suspension system: non fire rated, made up as follows:

.1 Two directional exposed tee bar grid.

.2 Perimeter specialty grids.

.3 Recycled Content: 53% post-consumer content, 61% total content.

.4 Exposed tee bar grid components for ATC: shop painted satin sheen. Components die cut. Hot-dipped galvanized steel. Main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Wall moulding: L-shaped, hemmed edges, 43mm leg height, 24 mm reveal, shop painted satin sheen. Perimeter trim as specified in Section 09 51 13.

.1 Colour: White

.2 Acceptable material:

.1 Armstrong Prelude XL;

.2 Donn DX/DXL;

.3 Approved alternate.

.5 Concealed tee bar grid components for DCP 1 acoustic panel ceilings: shop painted satin sheen. Components die cut. Hot-dipped galvanized steel. Main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Wall moulding: L-shaped, hemmed edges, 43mm leg height, 24 mm reveal, shop painted satin sheen.

.1 Colours: ‘black’

.2 Acceptable material:

.1 Armstrong Prelude XL;

.2 Donn DX/DXL;

.3 Approved alternate.

.6 Concealed tee system for DCP 2 wood panel ceilings: shop painted satin sheen. Components die cut. Hot-dipped galvanized steel. Heavy duty main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. 43mm high cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Wall moulding: L-shaped, hemmed edges, 43mm leg height, 24 mm reveal, shop painted satin sheen. Provide all snap bars, hangers, clips and accessories for a complete system.

.1 Colour: an all exposed surfaces: ‘black’

.2 Acceptable material:

.1 Armstrong Prelude XL;

.2 Donn Fineline DXF;

.3 Approved alternate.

.7 Concealed tee system for DCP 3 wood cell ceilings: shop painted satin sheen. Components die cut. Hot-dipped galvanized steel. Heavy duty main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. 43mm high cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Wall moulding: L-shaped, hemmed edges, 43mm leg height, 24 mm reveal, shop painted satin sheen. Provide all snap bars, hangers, clips and accessories for a complete system.

.1 Colour: an all exposed surfaces: 'black'

.2 Acceptable material:

.1 Armstrong Prelude XL;

.2 Donn Fineline DXF;

.3 Approved alternate.

.8 Hanger wire: galvanized soft annealed steel wire:

.1 3.6 mm minimum diameter for access tile ceilings. Increase sizes as required for ceiling loads.

.2 Colour "black".

.9 Hanger inserts: purpose made.

.10 Accessories: splices, clips, wire ties, snap bars, carrying channels, retainers and wall moulding, to complement suspension system components, as recommended by system manufacturer.

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 Installation: in accordance with ASTM C636 except where specified otherwise.

.2 Install suspension system to manufacturer's instructions.

.3 Do not erect ceiling suspension system until work above ceiling has been reviewed by Departmental Representative.

.4 Secure hangers to overhead structure using attachment methods as indicated and acceptable to Departmental Representative.

.5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.

.6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter, with border units not less than 50% of standard unit width. Conform to general layout indicated on reflected ceiling plan.

.7 Ensure suspension system is co-ordinated with location of related components.

.8 Install wall moulding to provide correct ceiling height.

.9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers.

.10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.11 Interlock cross member to main runner to provide rigid assembly.

.12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.13 Finished ceiling system to be square with adjoining walls and level within 1:1000.

3.3 CLEANING

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

.2 Touch up scratches, abrasions, voids and other defects in painted surfaces.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

.2 ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

1.2 DESIGN REQUIREMENTS

.1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

1.3 SUBMITTALS

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

.2 Product Data

.1 Submit manufacturer's technical data for each type of ceiling unit and suspension system required.

.3 Installation Instructions

.1 Submit manufacturer's installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

Part 2 Products

2.1 MATERIALS

.1 Linear Metal Ceiling (Interior)

.1 Material: Aluminum.

.2 Finish: Post-production, powder-coat painted.

.3 Thickness: 0.7 mm (nominal) (0.025 inch).

.4 Size: Nominal 80 mm wide panels with 20 mm reveal (leave open), 25 mm high x length to suit.

.5 Edge Details: Square.

.6 Color: selected from manufacturers standard range of colours.

.7 Unperforated.

.8 Texture: Smooth.

2.2 SUPSPENSION

.1 Universal hat shaped 1mm (.038 inch) roll-formed aluminum section with hook shaped tabs spaced to receive ceiling panels at 50mm on centre. Support holes spaced 100mm on centre. Factory applied “black” enamel.

.2 Hanger Wire: Minimum 12 gauge pre-stretched galvanized steel wire.

.3 Hanger Clip: Provide carrier steel clip to connect carriers to hanger wires.

.4 Accessories: Provide accessories including panel splices, panel end caps, and trim molding as required to suit installation. Finish to match ceiling panels. Refer to electrical and mechanical for devices in ceilings.

Part 3 Execution

3.1 INSTALLATION

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

.2 Comply with applicable industry standards and local regulations in effect including requirements for wind uplift performance.

.3 Secure hangers to overhead structure using industry approved attachment methods.

.4 Ensure suspension system is co-ordinated with location of related components.

.5 Install wall moulding to provide correct ceiling height.

.6 Completed suspension system to support super-imposed loads, such as lighting fixtures.

.7 Frame at openings for penetrations through metal ceiling such as light fixtures.

.8 Adjust ceiling components to provide a consistent finish and appearance in conformity.

.9 Finished linear metal ceiling system to be square with adjoining walls and level within 1:1000.

3.2 CLEANING

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

.2 Touch up scratches, abrasions, voids and other defects in painted surfaces.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM F1913, Standard Specification for Homogeneous Sheet Vinyl Floor Covering.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 SUBMITTALS

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

.2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

.3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base and edge strips.

.4 Closeout Submittals:

.1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 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 reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.4 AMBIENT CONDITIONS

.1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees for 48 hours before, during and 48 hours after installation.

1.5 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 7 m^2 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 Departmental Representative, upon completion of the work of this section.

.6 Store where directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Static dissipative vinyl tile: to ASTM F1066, designated as "SDT" on Room Finish Schedule. Refer to Electrical for grounding for copper strips.

.1 Pattern: marbelized.

.2 Thickness: 3.0 mm.

.3 Size: 305 mm x 305 mm tile.

.4 1.0 x 10 (to 6^{th}) ohms resistance.

.5 Colour: selected by Departmental Representative.

.6 51 wide x 610 long copper grounding connection strips for under tile.

.7 Acceptable manufacturers:

.1 Armstrong SDT

.2 Johnsonite Granit SD

.3 Or approved alternate.

.2 Resilient base: Rubber ,continuous, top set.

.1 Style:

.1 Typical: cove.

.2 Millwork: toeless unless noted otherwise.

.2 Thickness: 2.03 mm.

.3 Height: 101.6 mm.

.4 Lengths: cut lengths minimum 2400 mm.

.5 Colour: selected by Departmental Representative.

.3 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: maximum VOC limit 50 g/l.

.2 Resilient base adhesives: maximum VOC limit 50 g/l.

.4 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.

.5 Metal edge strips:

.1 Aluminum extruded, smooth, mill finish stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

.6 External corner protectors: stainless steel, type recommended by flooring manufacturer.

.7 Edging to floor penetrations: stainless steel, type recommended by flooring manufacturer.

.8 Sealer and wax: Seal and wax flooring ONLY when recommended by manufacturer. Product to be acceptable to both manufacturer and Departmental Representative.

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 Remove existing resilient flooring.

.2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

.3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.5 Prime and seal 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 to 72 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 month following building occupation.

.2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place. Install application for “heavy duty” traffic; follow manufacturer’s directions.

.3 Lay flooring with seams parallel to exterior wall building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.

.4 Heat weld seams of sheet flooring in accordance with manufacturer's printed instructions.

.5 As installation progresses and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.

.6 Cut flooring around fixed objects.

.7 Install feature strips and floor markings where indicated. Fit joints tightly.

.8 Continue flooring over areas which will be under built-in furniture.

.9 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.10 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

.11 Install metal edge strips at unprotected or exposed edges where flooring terminates.

.12 Install two (2) 50mm wide, 600mm copper grounding strips using purpose made adhesive. Place 450mm of the copper strip onto the dry-to-touch adhesive and carry 150mm of the copper strip up the wall (concealed behind gypsum board finish). Install additional adhesive on top of copper strip for installation of static dissipative floor tile. Coordinate installation of copper grounding strips with Electrical requirements.

3.5 APPLICATION: RUBBER 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.

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.

3.8 WAXING

.1 Seal and wax to be applied to flooring where wax coating is recommended by manufacturer.

.2 Seal and wax in accordance with manufacture's written instructions using product acceptable to manufacturer and to Departmental Representative. Confirm all products to be used prior to use.

3.9 PROTECTION

.1 Protect new floors from time of final set of adhesive until final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Association of Textile Chemists and Colorists (AATCC)

- .1 AATCC 23-2010, Color Fastness to Burnt Gas Fumes.
- .2 AATCC 129-2011, Colour Fastness to Ozone in the Atmosphere Under High Humidities.

.2 American Society for Testing and Materials (ASTM International)

- .1 ASTM D1667-05(2011), Standard Specification for Flexible Cellular Materials-Poly (Vinyl Chloride) Foam (Closed-Cell).
- .2 ASTM D5252-11, Standard Practice for the Operation of the Hexapod Drum Tester.
- .3 ASTM D5417-11, Standard Practice for Operation of the Vettermann Drum Tester.

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-4.2 No.77.1-94/ISO 4919:1978(R2012), Textile Test Methods - Carpets - Determination of Tuft Withdrawal Force.
- .2 CAN/CGSB-4.129-93(R1997), Carpets for Commercial Use.
- .3 CAN/CGSB-25.20-95, Surface Sealer Floors.

.4 Carpet and Rug Institute (CRI)

- .1 CRI-104-2011, Standard Installation of Commercial Carpet.
- .2 IAQ Carpet Testing Program.

.5 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials and Assemblies.

1.2 SUBMITTALS

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

.2 Submit verification to demonstrate compliance with CAN/ULCS102 and CAN/ULCS102.2.

.3 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI) and the Canadian Carpet Institute (CCI).

.4 Submit report verifying that tuft bind meets requirements of CAN/CGSB-4.129 when tested to CAN/CGSB-4.2 No.77.1.

.5 Submit report outlining proposed dust control measures.

.6 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.3 PRODUCT DATA

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

.2 Submit product data sheet for each carpet, adhesive, carpet protection and subfloor patching compound.

.3 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content.

.4 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.

1.4 SAMPLES

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

.2 Submit duplicate 600 x 600 mm pieces of each carpet specified, duplicate pieces for each colour selected, 150 mm lengths of base and divider strips.

1.5 CLOSEOUT SUBMITTALS

.1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

1.6 QUALIFICATIONS

.1 Installer Qualifications:

.1 Flooring contractor requirements.

.1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.

.2 Certified by carpet manufacturer prior to tender submission.

.3 Must not sub-contract labour without written approval of Departmental Representative.

.2 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

1.7 REGULATORY REQUIREMENTS

.1 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI/CCI-IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI/CCI-IAQ label.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Label packaged materials. For carpet tile products indicate nominal dimensions of tile and indicate installation direction.

.2 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.

.3 Store carpeting and accessories in location as directed by Departmental Representative. Store carpet and adhesive at minimum temperature of 18°C and relative humidity of maximum 65% for minimum of 48 hours before installation.

.4 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.

.5 Store materials in area of installation for minimum period of 48 hours prior to installation.

.6 Modular carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Workplan.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

.4 Refer to drawings for areas where existing carpet tiles are to be salvaged.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Departmental Representative.

.2 Temperature: Maintain ambient temperature of not less than 18 °C from 48 hours before installation to at least 48 hours after completion of work.

.3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.

.4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.5 Ventilation:

.1 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.]

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities. Provide fans with HEPA filters.

.3 Provide continuous ventilation during and after carpet application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of carpet installation.

.6 Test existing floor levelling compound for presence of asbestos contamination. Notify Departmental Representative for additional instructions where asbestos is discovered.

.7 Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete.

1.11 EXTRA MATERIALS

.1 Provide extra materials of carpet, carpet base, and adhesives in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide 2% of each colour, pattern and type of carpeting tile for maintenance material.

.3 Extra materials to be from same production run as installed materials.

.4 Identify each package of carpet and each container of adhesive.

.5 Deliver to Departmental Representative and store where directed by Departmental Representative.

Part 2 Products

2.1 MANUFACTURERS

.1 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute IAQ requirements.

2.2 MODULAR CARPET

.1 Acceptable material: (to match existing in building plus additional accent colour)

.1 Salvage carpet in good condition for reuse on this project. Full tiles only.

.2 Tandus, Grid Overlay II, colour: ‘Total Elcipse”. (to match existing in building)

.3 Accent carpet colour: by same manufacturer as base building carpet. Colour to be selected from complete range by Departmental Representative.

.2 Carpet Tile Dimensions: 610 x 610 mm.

.3 Carpet: to CAN/CGSB-4.129 and as follows:

.1 Certified for flammability to Health Canada regulations under "Hazardous Products (Carpet) Regulations", Part II of the Schedule.

.2 Maximum flame spread rating 300, maximum smoke developed classification 500, when tested to CAN/ULC-S102.

.3 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute's IAQ requirements.

.4 Performance rating: to ASTM D5252 or ASTM D5417.

.5 Construction: Stratatec patterned loop.

.6 Pile Surface Appearance:

.1 Multi-level loop.

.7 Pile fibre: to CAN/CGSB-4.129.

.1 Nylon: BCF.

.1 Type: Nylon 6.

.8 Yarn Ply: 2- ply minimum.

.9 Gauge: 50 rows per 10cm.

.10 Stitch Rate: 35. per 10cm.

.11 Tuft Density: 610 g/m².

.12 Pile Height: 4.8mm.

.13 Kilotex Rating: 11.66 kilotex.

.14 Yarn Dye Method: solution dyed.

.15 Colourization: patterned.

.16 Colourfastness to light: to CAN/CGSB-4.2No.18.3.

.17 Colour Fastness to Atmospheric Fading: to AATCC 129 and AATCC 23.

.18 Primary Backing: non-woven synthetic.

.19 Secondary Backing: thermoplastic polyolefin compound.

.1 Recycled content: 100%.

.2 Density: as per ASTM D1667.

.3 Backing thickness: 2.4mm.

.4 Total weight: 2543g/m².

.20 Adhesive: mill applied releasable dry adhesive.

2.3 ACCESSORIES

.1 Base:

.1 Carpet base: 100mm high. Broadloom to match carpeting. Bound top edge. Colour ‘black’.

.2 Refer to Section 09 65 16 Resilient Sheet Floor for rubber base.

.2 Adhesive:

.1 Pressure sensitive type: recommended by carpet manufacturer for direct glue down installation of modular carpet or speciality backed carpets.

.3 Carpet protection: non-staining heavy duty kraft paper.

.4 Concrete floor sealer: to CAN/CGSB-25.20, Type 1.

.5 Subfloor patching compound: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.

.6 Edge strips:

.1 Smooth, mill finish stainless steel with lip to extend under modular carpet, shoulder flush with top of adjacent floor finish.

.7 Transition Strips:

.1 Smooth, mill finish stainless steel with lip to extend under modular carpet, transition to top of polished concrete.

Part 3 Execution

3.1 DEMOLITION

.1 Remove and divert unusable carpet for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Workplan. Coordinate with Departmental Representative.

.2 Salvage reusable carpet, not showing any marking or damage, for selective reinstallation. Dispose of damaged or worn carpet.

3.2 SUB-FLOOR TREATMENT

.1 Concrete shall be inspected to determine special care required to make it a suitable foundation for carpet. Cracks 3 mm wide or protrusions over 0.8 mm will be filled and levelled with appropriate and compatible latex patching compound.

.2 Do not exceed manufacturer's recommendations for patch thickness.

.3 Large patch areas are to be primed with a compatible primer.

.4 Concrete substrates shall be cured, clean and dry.

.5 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminates, including sealers, that may interfere with the bonding of the adhesive.

.6 Wherever a powdery or porous concrete surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.

3.3 PREPARATION

.1 Prepare floor surfaces in accordance with CRI 104 Standard for Installation of Commercial Carpet.

.2 Pre-condition carpeting following manufacturer's printed instructions.

3.4 INSTALLATION

.1 Install carpeting using minimum of pieces.

.2 Install in accordance with manufacturer's printed instructions and in accordance with Carpet and Rug Institute Standard for Installation of Commercial Carpet, CRI 104.

.3 Install carpet after finishing work is completed but before demountable office partitions and telephone and electrical pedestal outlets are installed.

.4 Finish installation to present smooth wearing surface free from conspicuous seams, burring and other faults.

.5 Use material from same dye lot. Ensure colour, pattern and texture match within any one visual area. Maintain constant pile direction.

.6 Adhesive seams and cross-joints. Seam edges must be sealed.

.7 Fit neatly around architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses, and around projections.

.8 Install carpeting to underfloor duct system and to access covers.

.9 Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

.10 Install carpet smooth and free of bubbles, puckers, and other defects.

3.5 BINDER BARS

.1 Install binder bars at exposed carpet edges and centre under doors in door openings.

3.6 MODULAR CARPET

.1 Apply acrylic release type adhesive and install modular carpet in accordance with manufacturer's written instructions.

.2 Lay modular carpet with butt seams.

.3 Roll modular carpet with appropriate roller for complete contact of carpet with mill-applied adhesive to sub-floor.

3.7 SEAMS

.1 Seal edges of cut-outs as recommended by manufacturer.

.2 Carpet visibility of seams and joints to acceptable industry standards.

3.8 SALVAGED CARPET TILES

.1 Do not mix new and salvaged carpet tile. Install salvaged carpet only in rooms where entire room can be completed with salvaged carpet tile.

.2 Install salvaged carpet in accordance with instructions for new carpet tile.

3.9 BASE INSTALLATION

.1 Install carpet base as noted in schedules and drawings.

.2 Install resilient base in accordance with Section 09 65 19.

3.10 PROTECTION OF FINISHED WORK

.1 Vacuum carpets clean immediately after completion of installation. Protect traffic areas.

.2 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.

.3 Install carpet protection to satisfaction of Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM International)

.1 ASTM C423-01, Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.2 ASTM E84 – Standard Test Methodfor Surface Burning Characteristics of Building Materials.

.2 Underwriter Laboratories of Canada (ULC)

.1 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre, for Buildings.

.2 CAN/ULC – S102 Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data

.1 Submit manufacturer's printed product literature, specifications and data sheets.

.2 Shop Drawings

.1 Submit shop drawings indicating panel sizes and configuration.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

Part 2 Products

2.1 MATERIALS

.1 Acoustical construction products must:

.1 Not require being labelled as poisonous, corrosive, flammable or explosive under the Consumer Chemical and Container Regulations of the Hazardous Products Act.

.2 Be accompanied by detailed instructions for proper handling and installation so as to minimize health concerns.

2.2 ACOUSTIC WALL PANELS

.1 Acoustic core material: to CAN/CGSB-92.1.

.1 NRC designation of 0.80 or greater.

.2 Panel core: resin edge hardened fibreglass core with 96 – 112 kg/m³ (6-7 lbs/ft²) density. Resin hardened at clip locations.

.3 Thickness: 25 mm.

.4 Edges: standard square edge with integral concealed edge reinforcing if required by panel sizes.

.5 Panels and visible edges to be wrapped with fire retardant fabric material.

.1 Flame spread class of 25 or less to CAN/ULC S102.

.6 Fabric: polyester woven fabric, minimum 10.0±0.5 Oz./lineal year. All fabric from same dye lot.

.1 Colour and pattern to match Victor "Wisper" Xpress line.

.2 Fabric wear: to ASTM D-4157; 100,000 double rub.

.3 Acceptable Manufacturer: Victor Fabric, Guilford of Maine, or approved equivalent.

.4 Colour selected from manufacturer's standard range of colours.

.7 Metal support clips: galvanized steel Z-clips to suit acoustic panel requirements.

.8 Dimensions: refer to drawings for sizes and locations.

.9 Acceptable manufacturers:

.1 Armstrong "Soundsoak"

.2 Decoustics

.3 Conwed

.4 Avanti

.5 Approved equivalent.

Part 3 Execution

3.1 INSTALLATION

.1 Ensure substrate surface is straight to tolerance of plus or minus 3 mm over 3000 mm.

.2 Install according to manufacturer's written instructions.

.3 Install acoustic units to clean, dry and firm gypsum board substrate using concealed clips.

.4 Install acoustic units plumb and aligned. Arrange units as indicated.

.5 Cut panels to suit electrical and mechanical items mounted to walls and ceilings.

.6 Cut panels around openings in wall.

.7 Wrap fabric back to panels wherever panels are cut, cover exposed panel edges.

3.2 CLEANING

.1 Keep acoustic installation and all components clean. Remove blemishes immediately.

3.3 PROTECTION

.1 Use polyethylene to protect finished acoustical treatment from damage.

.2 Remove prior to substantial completion.

3.4 SCHEDULES

.1 Refer to drawings for locations and sizes.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual – latest edition.

1.2 QUALITY ASSURANCE

.1 Qualifications:

.1 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.2 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

.3 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.

.4 Standard of Acceptance:

.1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Soffits: 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.

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 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 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards.

1.4 MAINTENANCE

.1 Extra Materials:

.1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Submit 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.

1.5 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 degrees C to 30 degrees C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Remove paint materials from storage only in quantities required for same day use.

.10 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.11 Fire Safety Requirements:

.1 Provide one 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 the National Fire Code of Canada.

.2 Waste Management and Disposal:

.1 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.2 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).

.3 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.4 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.6 AMBIENT CONDITIONS

.1 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 degrees C.

.2 Substrate temperature is over 32 degrees 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 degrees 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 (clay and concrete brick/block).

.2 15% for wood.

.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "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 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 degrees 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.

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 Use only MPI listed L rated materials.

.4 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, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.5 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.6 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61.0 degrees C or greater.

2.2 COLOURS

.1 Selection of colours will be from manufacturer's full range of colours.

.2 Where specific products are available in restricted range of colours, selection will be based on limited range.

.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.

.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.

.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 and as noted on Finish Schedule.

2.5 EXTERIOR PAINTING SYSTEMS

.1 EXT 2.1 - Asphalt Surfaces: zone/traffic marking for drive and parking areas, etc.

.1 EXT 2.1B - Alkyd zone/traffic marking finish.

.2 EXT 5.3 - Galvanized Metal: galvanized steel angles.

.1 EXT 5.3M - High Performance Architectural Latex over waterborne primer.

.2 Premium grade: clean and etch, apply prime coat (#134) and 2 top coats (#311)

.3 Gloss level: G5 semi-gloss.

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 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting 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 painted in accordance with MPI requirements.

.4 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 pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 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.

3.3 EXISTING CONDITIONS

.1 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.

3.4 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.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect passing pedestrians, and general public in and about building.

.5 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.

.6 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas.

3.5 APPLICATION

.1 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.

.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.

.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.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, duct work, grilles and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.

.2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.3 Do not paint over nameplates.

3.7 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.

3.8 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.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition.

END OF SECTION

Part 1 General

1.1 REFERENCES

.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, 2004.

.5 National Fire Code of Canada - 2010

.6 Society for Protective Coatings (SSPC)

.1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

1.2 QUALITY ASSURANCE

.1 Qualifications:

.1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three 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 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 48 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. Approved mock-up may not remain as part of finished work.

.3 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.3 SCHEDULING

.1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Departmental Representative for changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants.

1.4 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 two 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, stain, clear coating, and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:

.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 installation and 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.

1.5 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 primer, stain, and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.3 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

1.6 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 degrees C to 30 degrees 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 9 kg Type ABC 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 reuse and 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, and packaging material for recycling in accordance with Waste Management Plan (WMP).

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.

.6 Ensure emptied containers are sealed and stored safely.

.7 Unused paint and coating materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.

.8 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.

.9 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.10 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.11 To reduce the 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).

.12 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.7 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

- .1 Ventilate enclosed spaces in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .3 Provide continuous ventilation for seven days after completion of application of paint.
- .4 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
- .5 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.
- .6 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 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 degrees C.
  - .2 Substrate temperature is above 32 degrees 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 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
  - .5 Rain or snow is 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 28 days.
  - .2 15% for wood.
  - .3 12% for plaster and 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.

.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.

.3 Apply paint when previous coat of paint is dry or adequately cured.

.4 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 Departmental Representative 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 the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Provide paint materials for paint systems from single manufacturer.

.3 Only qualified products with E3 "Environmentally Friendly" rating are acceptable for use on this project. Do not exceed VOC limits of Green Seal Standard GS-11 “Paints” 1993 and latest revision.

.4 Conform to latest MPI requirements for interior painting work including preparation and priming.

.5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.

.6 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.7 Provide paint products meeting MPI "Environmentally Friendly" E3 ratings based on VOC (EPA Method 24) content levels.

.8 Use MPI listed materials having minimum E3 rating where indoor air quality (odour) requirements exist.

.9 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:

.1 Water-based.

.2 Non-flammable.

.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, andtoxic 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 and recycled water-borne surface coatings.

.12 Ensure manufacture and process of both water-borne surface coatings and recycled 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, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E3 rating.

.14 Recycled water-borne surface coatings to contain 50 % post-consumer material by volume.

.15 Recycled water-borne surface coatings must not contain:

.1 Lead in excess of 600.0 ppm weight/weight total solids.

.2 Mercury in excess of 50.0 ppm weight/weight total product.

.3 Cadmium in excess of 1.0 ppm weight/weight total product.

.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.

.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

2.2 COLOURS

.1 Departmental Representative will provide Colour Schedule after Contract award.

.2 Selection of colours from manufacturer’s full range of colours.

.3 Where specific products are available in restricted range of colours, selection based on limited range.

.4 Each coat in multi 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.

.2 Where thinner is required, use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

.4 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
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 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 indicated herein and as noted on Finish Schedule.

2.5 INTERIOR PAINTING SYSTEMS

.1 INT 3.1 Concrete vertical surfaces: underside of concrete floor slabs. Includes all mechanical and electrical components attached to the underside of the slab.

.1 INT 3.1C – High-performance architectural latex over waterborne alkali-resistant primer.

.2 Premium grade: prime coat (#3), two top coats (#138).

.3 Gloss level: G2 rating.

.2 INT 5.1 Structural Steel and Metal Fabrications: OWSJ, miscellaneous metal, sprinkler lines, non-galvanized metal mechanical cabinets and housings.

.1 INT 5.1RR – high performance architectural latex (over alkyd primer).

.2 Premium grade: prime coat (#79), two top coats (#138).

.3 Gloss level: G2 rating.

.4 Coordinate painting of metal products with Section 05 50 00 Metal Fabrications.

.3 INT 5.3 Galvanized metal: doors, frames, railings, misc. steel, over-head decking, pipes and ducts.

.1 INT 5.3M – High-performance architectural latex, low odour/low VOC, G5 premium finish, over one coat of surface tolerant primer.

.4 INT 6.3 Dressed lumber:

.1 INT 6.3A - High performance architectural latex. (wood trim):

.1 Premium grade: prime coat (#39), two top coats (#141).

.2 Gloss level: G5 rating.

.2 INT 6.3EE Polyurethane Varnish over waterborne stain: (base cabinet 7 mailbox, bench seats)

.1 Premium grade: Semi-transparent stain (#90), 3 top coats (#56).

.2 Gloss level: G6 rating.

.5 INT 9.2 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock type material", and textured finishes:

.1 INT 9.2B – High Performance Architectural Latex G3 over latex primer.

.2 Premium grade: prime coat (#50), two top coats (#139).

.3 Gloss level: G3 rating.

.6 INT 10.1 Canvas and Cotton Coverings

.1 INT 10.1A Latex (over latex primer sealer)

.1 Premium grade: latex primer sealer (#50), 2 top coats (#53).

.2 Gloss level: G1 rating..

Part 3 Execution

3.1 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Coordinate painting of metal products with Section 05 50 00 Metal Fabrications.

3.2 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.

3.3 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 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.

.3 Maximum moisture content as follows:

.1 Stucco, plaster and gypsum board: 12%.

.2 Concrete: 12%.

.3 Clay and Concrete Block/Brick: 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 Departmental Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect passing pedestrians, building occupants and public in and about the building.

.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. Signs to approval of Departmental Representative.

.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, or wiping with dry, clean cloths.

.2 Wash surfaces with a biodegradable detergent 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 Remove existing door numbers prior to painting of existing frames.

.5 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 pretreatment as soon as possible after cleaning and before deterioration occurs.

.6 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.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.

.8 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 brushing with clean brushes and vacuum cleaning.

.9 Touch up of shop primers with primer as specified.

.10 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.5 APPLICATION

.1 Apply paint by brush and roller. 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 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

.4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 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.

.8 Finish closets and alcoves as specified for adjoining rooms.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Finished areas: Unless noted otherwise, paint all exposed conduits, piping (unless protected by metal clad pipe insulation, hangers (unless prefinished), and other mechanical and electrical equipment with colour and finish as selected by Departmental Representative.

.2 Paint exposed ductwork in finished areas unless noted.

.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 Keep sprinkler heads free of paint.

.6 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.7 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.8 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.

.9 Do not paint interior transformers and substation equipment.

3.7 FIELD QUALITY CONTROL

.1 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.

.2 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Cooperate with inspection personnel and provide access to areas of work.

.4 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

3.8 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 Departmental Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

3.9 SCHEDULE

.1 As noted in contract documents.

.2 Ceilings

.1 Only rooms with continuous, wall-to-wall, suspended ceilings are considered to be concealed all other rooms are exposed or semi-exposed.

.2 Main floor: For exposed and semi-exposed ceilings paint entire underside of overhead concrete floor slab. Paint all items attached to the surface of the overhead concrete slab as well as all items suspended from the slab including but not limited to electrical, mechanical and fire protection equipment and piping.

.3 Second floor: For exposed and semi-exposed ceilings repaint OWSJ – color to match existing exposed joists in building corridor. For exposed and semi-exposed ceilings mask metal deck including all items attached to the surface of the deck. Paint all items suspended from the deck including but not limited to electrical, mechanical and fire protection equipment and piping – color will be different from OWSJ.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION SUBMITTALS

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

.2 Shop Drawings:

.1 Submit shop drawings, catalogue sheets and full size templates.

.2 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, mounting methods, schedule of signs.

.3 Submit full size templates for individually fabricated or incised lettering indicating word and letter spacing.

.3 Samples:

.1 Submit duplicate representative sample of each type of sign, sign image and mounting method including, but not limited to: graphics, cast letters, sign box installation method, channel letters, and wall plates fixed mounting installation method.

1.3 INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature panel signage or components, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for illuminated signs 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.

Part 2 Products

2.1 MATERIALS

.1 Prefinished sheet aluminum: utility sheet with manufacturer applied baked enamel finish.

.2 Engraving sheet: Minimum 1.6mm 2-ply laminated colour plastic engraving sheet (lamicoid), colour of lamacoid to be selected from standard range. Approximate colour to be medium navy blue with white lettering.

.3 Self-stick foam tape: 2.4 mm thick, 352.4 kg/m^3 density polyurethane open-cell foam tape for sign purposes, with synthetic self-stick adhesive on both sides.

.1 Width: to suit sign sizes.

2.2 LANGUAGE

.1 All exterior and interior signage is to be bilingual unless otherwise noted.

.2 Stair and washroom signage is to include braille and as noted.

2.3 EXTERIOR SIGNAGE

.1 Refer to drawings and schedule.

.2 Refer to section 05 50 00 Metal Fabrications for steel post.

.3 STOP SIGNS

.1 Prismatic finish, reflective for day and night visibility. Red background with white lettering.

.2 Pre-drilled for mounting.

.3 Provide cast aluminum breakaway fitting. Similar to Signal Industries Ltd "Quickfix System".

.4 MISCELLANEOUS EXTERIOR SIGNS

.1 Refer to drawings for additional locations, sizes and details.

2.4 INTERIOR SIGNAGE

.1 Refer to drawings and schedule.

.2 ROOM NUMBER

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Size: 50mm high x 100mm long.

.3 Engraved lamacoid insert, thickness to suit frame. Colour of lamacoid to be selected from standard range.

.4 Locate door numbers on outer side of door, confirm location with Departmental Representative.

.5 Provide new room number signage for all doors on all floors in both existing and new work areas.

.3 WASHROOM

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Each sign to be engraved with international symbol of man and/or woman.

.3 Signs to be complete with drill holes and tamperproof screws for anchoring. Mount at 1500mm height on door.

.4 Correspond signs according to schedule and plans.

.4 HANDICAP SIGNS

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Each sign is to be engraved with international symbol of accessibility for the handicapped.

.3 Signs to be complete with drilled holes and tamperproof screws for anchoring. Mount at 1500mm height on door.

.4 Correspond signs according to schedule and plans.

.5 DRY FIRE AREA

.1 Flat extruded aluminum frame all four sides, removable matching endcaps. Clear brushed aluminum finish.

.2 Size 250mm high x 250 mm wide.

.3 Engraved lamacoid insert, thickness to suit frame. Colour: red background with white lettering.

.6 LOCKER SIGNAGE

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Size 150mm high x 150 mm wide.

.3 Engraved lamacoid insert, thickness to suit frame. Colour: red background with white lettering.

.7 MEETING ROOM, QUIET ROOM, INTERVIEW ROOM, UNIT IDENTIFICATION, OCCUPANT LOAD

.1 Wall mounted extruded aluminum frame with removable matching endcaps. Clear anodized finish.

.2 Mounting: mechanical with pre-drilled holes or double sided tape.

.3 Size: suitable for 215 x 280 paper or vinyl insert.

.4 Cover: removable clear polycarbonate sheet, non-glare.

.5 Design based on Vista signage system.

.8 IN USE/VACANT

.1 Aluminum slider plate with engraved lamacoid.

.2 Lamacoid thickness to suit slider frame.

.3 Front panel slides back and forth revealing pre-selected wording.

.4 Clear anodized frame, removable matching endcaps..

.5 Size 75mm high x 200 mm wide.

.6 Colour of lamacoid to be selected from standard range.

.7 Provide sliding sign “In Use/Vacant” in French and English.

.8 Prepare wall plates for fixing by self-stick foam tape. Include back up plates for fixing to uneven surfaces where required.

.9 ELEVATOR, STAIR, MECHANICAL ROOM, HIGH VOLTAGE, MOP AND BUCKET

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Engraved lamacoid insert, thickness to suit frame. Colour of lamacoid to be selected from standard range.

.3 Size: 150mm x 150mm.

.10 EYE WASH

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Engraved lamacoid insert, thickness to suit frame. Colour: green background with white pictorial.

.3 Size: 180mm high x 250mm wide.

.11 FIRST AID

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Engraved lamacoid insert, thickness to suit frame. Colour: Colour of lamacoid to be selected from standard range.

.3 Size: 200mm high x 250mm wide.

.12 WASHROOM CHECKLIST

.1 Plexiglass frame and clear cover to hold removable paper. Paper must slide in and out of the frame easily without the use of any tools.

.2 Size: suitable for 215 x 280 paper insert.

.13 WASHROOM PRODUCT DISPOSAL

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Engraved lamacoid insert, thickness to suit frame. Colour: red background with white letters.

.3 Size: 152mm high x 100mm wide.

.14 FIRE EXTINGUISHER

.1 PVC plastic, projecting “V” shape sign, 90° bend. Pre-drilled mounting holes. Visible from either side. Colour: white background, red lettering and symbol.

.2 Size: 150mm x 100mm

.15 NAME PLATE (mail box identification)

.1 Flat extruded aluminum frame, removable matching endcaps. Clear brushed aluminum finish.

.2 Size: 50mm high x 100mm long.

.3 Cover: removable clear polycarbonate sheet, non-glare.

.4 Design based on Vista signage system.

2.5 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.

Part 3 Execution

3.1 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 Install new signage minimum of one week following painting.

.3 Erect and secure signs plumb and level at elevations as directed by Departmental Representative.

.4 Comply with sign manufacturer's installation instructions and approved shop drawings.

.5 Install signs after surfaces to receive signage are finished.

3.2 CLEANING

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

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

.2 Leave signs clean.

.3 Remove debris from interior of sign boxes.

.4 Touch up damaged finishes.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.3 SCHEDULE

.1 Includes installation unless otherwise noted.

.2 All signage in English and French. Wording in schedule is shown only in English.

.3 Read schedule in combination with drawings.

.4 Refer to drawings for exterior signage.

.5 Signage “Type A” room numbers will be installed on each door, new and existing, on each floor.

TYPE	SIGNAGE NAME	# REQ'D	ROOM NO. or LOCATION	ADDITIONAL NOTES
A	Room number			
B	Women shower room	1	136	Pictorial
C	Women locker room	1	128	Pictorial
D	Men shower room	1	137	Pictorial
E	Men locker room	1	129	Pictorial
F	Women washroom with handicap	2	112 & 226	
G	Men washroom with handicap	2	111 & 227	
H	Dry fire area	2	128 & 129	Red background with white lettering
J	Lockers	4	136 & 137	"DAY USE ONLY"
K	Meeting room	9	To be determined	"MEETING ROOM #(1-9) Install adjacent to the door.
L	Quiet room	2	To be determined	"QUIET ROOM #(1-2)"
M	Interview room	2	To be determined	"INTERVIEW ROOM #(1-2)"
N	In use / vacant	11	To be determined	
O	Elevator sign	2	To be determined	
P	Stair sign	2	S1 & S3	Descending pictorial complete with braille
Q	Mechanical room	1	S6	
R	High voltage sign	1	004	Pictorial
S	Mop and bucket	3	134, 213 plus 1 TBD	Pictorial
T	Eye wash station	3	To be determined	
U	First aid	13	To be	4 of the signs are supply only

			determined	
V	Unit identification	15	To be determined	“NRPC”x2, “FIS”, TECH”, “ICE” “CMB”, “DSS”x4, “MAIL ROOM”, “CPIC”, “COMMISSIONAIRE”, “LTES”,
W	Washroom checklist	6	103, 111, 112, 136, 137, 226 & 227	
X	Occupant load	1	To be determined	
Y	Washroom product disposal	8	1 sign in each women’s washroom stall and 1 in universal washroom	“PLEASE DISPOSE FEMININE PRODUCTS IN BINS PROVIDED. DO NOT FLUSH DOWN TOILET”
Z	Fire extinguisher	42	All floors	Graphic wall mounted above fire extinguishers
AA	Name plate	120	Mail box in room 109	Confirm names and mounting locations.
BB	Universal Washroom	1	103	
CC	Storage	3	To be determined	

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A480/A480M -14a, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting, Sheet, and Strip.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.3 CSA Group

.1 CSA B651-12, Accessible Design for the Built Environment.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 National Electrical Manufacturers Association (NEMA)

.1 ANSI/NEMA LD-3-2005, High-Pressure Decorative Laminates (HPDL).

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 plastic toilet compartments and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.4 Shop Drawings:

.1 Indicate fabrication details, plans, elevations, hardware, and installation details.

1.3 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, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect toilet compartments from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.4 WARRANTY

.1 Manufacturer's standard 25 year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship.

Part 2 Products

2.1 MATERIALS

.1 Solid phenolic plastic toilet partitions.

.1 Solidly fused plastic laminate with melamine surfaces; integrally bonded colored face sheets and black phenolic-resin core stiles, doors, panels, and screens.

.2 Exposed edges.

.3 Mounting configuration:

.1 Floor-mounted, overhead braced with satin finish, 1.65 mm extruded aluminum headrails with anti-grip profile.

.4 Finished thickness:

.1 Stiles and Doors: 19 mm.

.2 Panels and Screens: 13 mm.

.5 Panel heights:

.1 Door/Panel height: 1470mm. Floor clearance 300mm.

.2 Laminated plastic sheets: High-pressure laminated plastic NEMA LDS-1985 minimum thickness 0.050 inch (1.33 mm) with matte finish.

.1 Wood grain pattern selected from manufactures range.

.3 Stainless steel sheet metal: to ASTM A480/A480M, Type 304 with satin finish.

.4 Sealer: water resistant sealer or glue as recommended by laminate manufacturer.

.1 Sealer: maximum VOC limit 250 g/L.

.5 Pilaster shoe: 0.8 mm (22ga) stainless steel, 100 mm high.

.6 Attachment: stainless steel tamper proof type screws and bolts.

2.2 COMPONENTS

.1 Hinges:

.1 Continuous.

.2 Heavy duty, non-lubricating,

.3 Material/finish: stainless steel casting.

.4 Swing: outward and inward.

.5 Return movement: gravity.

.6 Emergency access feature.

.2 Latch set: surface mounted, combination latch, door-stop, keeper and bumper, emergency access feature, stainless steel.

.3 Wall and connecting brackets: stainless steel extrusion or casting.

.4 Floor-anchored stiles complete with expansion shields and threaded rods. Levelling devices corrosion- resistant.

.5 Coat hook: combination hook and rubber door bumper, stainless steel.

.6 Door pull: barrier-free type suited for outswinging doors, stainless steel.

2.3 FABRICATION

.1 Doors, panels and screens: 25 mm thick, solid plastic laminate panels, to sizes indicated.

.2 Pilasters: 19 mm thick, constructed same as door, to sizes indicated.

.3 Laminate plastic to core material ensuring core and laminate profiles coincide to provide continuous support and bond over entire surface.

.4 Provide internal reinforcement at areas of attached hardware and fittings.

.1 Temporarily mark location of reinforcement for all washroom accessories.

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 plastic toilet compartments installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative

.2 Inform Departmental Representative 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 Departmental Representative.

3.2 INSTALLATION

.1 Ensure supplementary anchorage, if required, is in place.

.2 Do work in accordance with CSA B651.

3.3 ERECTION

.1 Install products in strict compliance with manufacturer's written instructions and recommendations.

.2 Partition erection:

.1 Install partitions secure, plumb and square.

.2 Secure pilasters to floor with pilaster supports anchored with minimum 50 mm penetration in structural floor.

.3 Secure pilaster shoes in position.

.4 Set bottom of doors parallel, 300 mm off the floor.

.5 Leave 12 mm space between wall and panel or end pilaster.

.6 Anchor mounting brackets to masonry or concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors.

.7 Attach panel and pilaster to brackets with through type sleeve bolt and nut.

.8 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with stainless steel shoes.

.9 Equip each door with hinges, latch set, and each stall with coat hook mounted on door. Adjust and align hardware for proper function. Set door open position at 30 degrees to front.

.10 Equip outswinging doors with door pulls on outside and inside of door in accordance with CSA B651.

.11 Install hardware.

.3 Floor supported and ceiling braced partition 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 and reuse 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 SCHEDULE

.1 Toilet partitions: Rooms 226 & 227.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 CSA International

.1 CSA B651-12, Accessible Design for the Built Environment.

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 shower and dressing compartments and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Installation Drawings:

.1 Submit installation drawings.

.2 Indicate fabrication details, plans, elevations, hardware, and installation details.

.4 Samples:

.1 Submit duplicate 300 x 300 mm samples of panel showing finishes, edge and corner construction and core construction.

1.3 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, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect shower and dressing compartments from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Shower compartments.

.1 Stainless steel sheet metal: to ASTM A167, Type 304.

.2 Minimum stainless steel core thickness:

.1 Doors and panels: 0.80 mm.

.2 Pilaster: 1.3 mm.

.3 Reinforcement: 3.0 mm.

.3 Pilaster ceiling trim: 0.80 mm thick (22ga) stainless steel, 100 mm high.

.4 Curtain rods and hooks: see section 10 28 10 – Toilet and Bath Accessories.

.5 Shower curtain: see Section 10 28 10 – Toilet and Bath Accessories.

.6 Attachment: stainless steel tamperproof type screws and bolts.

2.2 COMPONENTS

.1 Wall and connecting brackets: stainless steel extrusion or casting.

2.3 FABRICATION

.1 Panels: minimum 25 mm thick, two sheets of 0.80mm (22ga) stainless steel formed and bonded under pressure to honeycomb core.

.1 Panel height: 1460mm, mounted 450 above finished floor.

.2 Provide 200x200mm reinforcing in panels for attachment of curtain rods. Refer to drawings for location. Refer to Section 10 28 10 Toilet and Bath Accessories.

.2 Pilasters: minimum 25 mm thick, two sheets of 1.3mm (18ga) stainless steel formed and bonded under pressure to honeycomb core.

.1 Pilaster height: top of floor to underside of ceiling. Approximate height 2700, refer to drawings.

.2 Pilaster width: 150 mm.

.3 Seal finish edges with 0.80mm (22ga) stainless steel for panels and 1.3mm (18ga) stainless steel for pilasters, welded, interlocking molding.

.1 Chamfer exposed edges uniformly at approximately 20 degrees.

.2 Include formed and closed edges for panels and pilasters.

.1 Miter and weld corners and grind smooth.

.3 Include internal reinforcement at areas of attached hardware and fittings.

2.4 FINISHES

.1 Finish: panels and pilasters: #4 satin finish.

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 shower and dressing compartment installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative 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 Departmental Representative.

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 PREPARATION

.1 Ensure supplementary anchorage is in place.

3.4 ERECTION

.1 Do work in accordance with CSA B651 and manufacturer's written instructions.

.2 Partition and pilaster 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 using bolts and toggle type anchors.

.4 Attach panel and pilaster to mounting brackets with through type sleeve bolt and nut.

.5 Provide for adjustment of ceiling braced pilasters variations with screw jack through steel saddles made integral with pilaster.

.1 Make adjustment and attachment of overhead pilasters.

.1 Conceal ceiling fixings with stainless steel shoes.

.6 Include templates and drilling dimensions for locating threaded studs through finished ceilings.

3.5 ADJUSTING

.1 Adjust panels to be plumb and level.

3.6 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.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by shower and dressing compartment installation.

3.8 SCHEDULE

.1 Shower partition: Rooms 136 & 137.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM E84, 10b Standard Test Method for Surface Burning Characteristics of Building Materials

.2 ASTM D 256, 10 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data

.1 Submit manufacturer's printed product literature, specifications and data sheets.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

Part 2 Products

2.1 CORNER GUARDS:

.1 Stainless Steel, type 304, 90 x 90 x 1525 mm high, 1.2mm thick (18 gauge). Finish: #4 satin. Corners shall be rounded with no sharp edges. Field applied adhesive mounting.

Part 3 Execution

3.1 EXAMINATION

.1 Verify substrates are properly prepared.

.2 Wall surfaces to receive impact-resistant wall covering materials shall be dry and free from dirt, grease, loose paint, and scale.

3.2 INSTALLATION

.1 Avoid materials with chips, cracks, voids, stains, or other defects that might be visible in the finished work.

3.3 CORNER GUARDS

.1 Install corner guards with construction adhesive as recommend by manufacturer.

.2 Install corner guards as indicated in drawing.

.3 Mount corner guards 200mm above finished floor or as noted in drawings.

3.4 CLEANING

.1 Remove excess adhesive in manner recommended by manufacturer.

.2 Clean plastic covers and accessories using a standard non-ammonia based household cleaning agent.

3.5 SCHEDULES

.1 Corner Guards

.1 Provide 10 corner guards.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.

.2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.

.3 CGSB 31-GP-107Ma-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-B651-07(2012), Barrier-Free Design.

.2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.2 SHOP DRAWINGS

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

.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.

1.3 SAMPLES

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

.2 Samples to be returned for inclusion into work.

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 EXTRA MATERIALS

.1 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.

.2 Deliver special tools to Departmental Representative.

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 A167, Type 302, with satin finish.

.3 Stainless steel tubing: Type 302, commercial grade, seamless welded, 1.2 mm wall thickness.

.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.

2.2 COMPONENTS

.1 All washroom components shall be supplied by the same manufacturer, from the same design series wherever possible.

.2 Toilet tissue dispenser: double roll type, surface mounted, chrome plated steel frame, capacity of 500 double ply roll, roll under spring tension for controlled delivery.

.1 Acceptable material:

.1 Bobrick Contura Series – B-4288

.2 Approved alternate.

.3 Paper towel dispenser:

.1 Supplied by Owner and installed by Contractor.

.4 Soap dispenser:

.1 Supplied by Owner and installed by Contractor.

.5 Feminine napkin disposal bin: stainless steel, surface unit, continuous hinged door, embossed with universally accepted symbol, removable plastic receptacles fitted with spring clip for deodorizer block.

.1 Acceptable material:

.1 Bobrick Contura Series B-270.

.2 Approved alternate.

.6 Waste receptacle: 320mm x 320 mm x 560 mm high, stainless steel, open top, no cover.

.1 Acceptable material:

.1 Bobrick B-2260

.2 Approved alternate.

.7 Mirror:

.1 Refer to Section 08 80 50 – Glazing.

.2 Sizes as indicated in drawings.

.8 Grab bars: 32 mm dia x 1.6 mm wall tubing of stainless steel, 76 mm diameter wall flanges, concealed screw attachment, flanges welded to tubular bar, provided with steel

back plates and all accessories. Peened surface at area of hand grips. Grab bar material and anchorage to withstand downward pull of 2.2 kN.

.9 Clothes Hook

.1 Type 304, 3.2 mm stainless steel, all welded construction with no sharp corners. Satin finish. Square style hook.

.1 Acceptable material:

.1 Bobrick B-233

.2 Approved alternate.

.10 Mop/Broom Holder:

.1 Stainless steel, spring-loaded rubber cams with anti-slip coating, plated steel retainers. Length 610 mm with three holders.

.1 Acceptable material:

.1 Bobrick B-223

.2 Approved alternate.

.11 Waste Chute

.1 Circular stainless steel, rolled lip. Inside diameter 140mm.

.1 Acceptable material:

.1 Bobrick B-529

.2 Approved alternate.

.12 Shower rods:

.1 Stainless steel, 25mm diameter, 1.0 mm wall thickness steel tubing of required length with satin chrome finished flanges, 24 shower curtain hooks and curtain hold-back hook and chain. Shower rod material and anchorage to withstand downward pull of 0.9 kN.

.1 Acceptable manufacturer

.1 Bobrick B-6107 Series.

.2 Approved alternate.

.13 Shower shelf:

.1 405mm long x 125mm wide, 1.2mm (18-gauge), type 304 stainless steel, satin finish. 19mm return edge; front edge hemmed. Brackets are 1.6mm (16-gauge).

.14 Shower curtain:

.1 0.178 mm thick translucent vinyl, anti-bacterial, fire resistive, self extinguishing vinyl laminated fabric shower curtain, nickel-plated brass grommets at top. Provide curtain hold-back hook and chain at each curtain.

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 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 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, satin finish.

.2 Manufacturer's or brand names on face of units not acceptable.

Part 3 Execution

3.1 INSTALLATION

.1 Install and secure accessories rigidly in place as follows:

- .1 Stud walls: install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
- .2 Provide blocking for Owner supplied, Contractor installed items.
- .3 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/wall cavity.
- .4 Solid masonry, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.
- .5 Toilet/shower compartments: use male/female through bolts.

.2 Install grab bars on built-in anchors provided by bar manufacturer.

.3 Use tamper proof screws/bolts for fasteners.

.4 Fill units with necessary supplies shortly before final acceptance of building.

.5 Install mirrors in accordance with Section 08 80 50 - Glazing.

3.2 SCHEDULE

.1 Locate accessories where indicated. Exact locations determined by Departmental Representative.

.2 Room 103 Accessible washroom

.1 Paper towel dispenser (supplied by Owner installed by Contractor)
.2 1 mirror (refer to Section 08 80 50 Glazing)
.3 1 toilet tissue dispenser
.4 1 waste receptacle
.5 1 soap dispenser (supplied by Owner installed by Contractor)
.6 1 feminine napkin disposal bin
.7 1 coat hook
.8 1 grab bar 610 long
.9 1 grab bar 915 long

.3 Room 129

.1 1 mirror (refer to Section 08 80 50 Glazing)

.4 Rooms 134

.1 1 Mop/Broom Holder

.5 Room 136

.1 4 clothes hooks
.2 2 shower rods
.3 2 shower curtains
.4 2 shower shelves

.6 Room 137

.1 4 clothes hooks
.2 2 shower rods
.3 2 shower curtains
.4 2 shower shelves

.7 Room 226

.1 1 mirror (refer to Section 08 80 50 Glazing)
.2 1 toilet tissue dispenser
.3 1 waste chute
.4 1 waste receptacle
.5 1 paper towel dispenser (supplied by Owner installed by Contractor)
.6 1 soap dispenser (supplied by Owner installed by Contractor)
.7 1 feminine napkin disposal bin
.8 1 coat hook
.9 1 grab bar 610 long
.10 1 grab bar 915 long

.1 Room 226

.1 1 mirror (refer to Section 08 80 50 Glazing)
.2 1 toilet tissue dispenser

.3 1 waste chute
.4 1 waste receptacle
.5 1 paper towel dispenser (supplied by Owner installed by Contractor)
.6 1 soap dispenser (supplied by Owner installed by Contractor)
.7 1 coat hook
.8 3 grab bar 610 long
.9 1 grab bar 915 long

END OF SECTION

1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)
  .1 ANSI/NFPA 10-2002, Portable Fire Extinguishers.

.2 Underwriters' Laboratories of Canada (ULC)
  .1 CAN/ULC-S508-M90(R1995), Rating and Fire Testing of Fire Extinguishers and Class "D" Extinguishing Media.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

1.3 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

2 Products

2.1 MULTI-PURPOSE DRY CHEMICAL EXTINGUISHERS

.1 Stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C Class protection, as indicated in equipment schedule.

.2 Sizes: Wall hung - 4.5 kg (10 lb) 4-A: 60-B:C, and Cabinets - 2.2 kg (5 lb) 2-A: 10-B:C.

2.2 CARBON DIOXIDE EXTINGUISHER

.1 Carbon dioxide type aluminum with stainless steel handle and lever and double lined frost free swivel discharge horn. ULC labelled for B and C Class protection, as indicated in equipment schedule.

2.3 EXTINGUISHER BRACKETS

.1 Type recommended by extinguisher manufacturer.

2.4 CABINETS

.1 Semi-recessed type as indicated, constructed of 1.6 mm thick steel, 180^{o} opening door of 2.5 mm thick steel with latching device.

.2 Cabinet to maintain fire resistive rating of construction in which they occur.

.3 Cabinet door: with 5 mm full glass panel.

.4 Finish:
  .1 Tub: prime coated.
  .2 Door and frame: No.4 satin finish stainless steel.

2.5 IDENTIFICATION

.1 Identify extinguishers in accordance with recommendations of ANSI/NFPA 10 and CAN/ULC-S508.

.2 Attach tag or label to extinguishers, indicating month and year of installation. Provide space for service dates.

3 Execution

3.1 INSTALLATION

.1 Install or mount extinguishers in cabinets or on brackets as indicated on drawings.

.2 Providing backing as required for installing recessed or semi-recessed cabinets into walls with less than the required depth.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Section includes member storage lockers.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.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 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-44.40-2001, Steel Clothing Locker.

1.3 SHOP DRAWINGS

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

.2 Indicate type and class of locker, thicknesses of metal, fabricating and assembly methods, assembled banks of lockers, tops, hooks, shelves, bases, trim, numbering, filler panels, end/back panels, doors, handles, locking method, ventilation method, and finishes.

1.4 SAMPLES

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

.2 Submit duplicate 50 x 50 mm samples of colour and finish on actual base metal.

Part 2 Products

2.1 CLOTHING LOCKERS (INDICATED AS "LKI" ON DRAWINGS)

.1 Lockers: to CAN/CGSB-44.40.

.2 Steel: cold rolled to ASTM A1008.

.3 Basis of Design: Shanahan's – "Police and Crew Series, Double Door"

.4 Single tier locker.

.1 Size: 610 mm wide x 610 mm deep x 1829 mm high, minimum 1.5 mm steel thickness.

.2 Side and back panels: .56 mm (24 Ga) cold rolled steel.

.3 Vent holes: vent openings in top and bottom of doors plus additional vent holes in body top of locker. Vent holes in body top to be equal in area to vent holes in top of doors.

.4 Assembly: factory assembled welded construction.

.5 Doors:

.1 Double doors.

.2 Double pan construction. Outer panel shall be no less than .90mm (20 Ga) cold rolled steel to ASTM A1008. Inner panel .56 mm (24 Ga) cold rolled steel. Sandwich panel construction welded and complete with honeycomb core. Vent slots in top and bottom of door.

.3 Full length astragal welded to active door (right hand).

.4 Rubber bumpers.

.6 Door hinges: Frame to be equipped with 3 – 64mm long, 5 knuckle hinges, 2 mm (14 Ga).

.7 Door handle: recessed handle stainless steel box and pull.

.8 Shelves and centre divider

.1 Notched into frame, thickness .90mm (20 Ga).

.1 Top shelf, full width of locker; bottom shelf, half width of locker; vertical divider to underside of top shelf; and pull out drawer (full extension), half width of locker complete with keyed cylinder cam lock.

.9 Accessories

.1 Coat rod – 19 mm diameter.

.2 Coat hooks – 6 mm diameter zinc plated steel, 5 per locker.

.10 Locking system: padlocks provided by Owner.

.11 Options: to CAN/CGSB-44.40,

.1 Base: 100 high steel base, colour to match locker frames.

.2 Finished end panels: minimum 0.9 mm steel thickness, colour to match locker frames.

.3 Steel trim including corner angles and jamb trim: minimum 0.9 mm steel thickness, colour to match locker frames.

.4 Filler Panels: minimum 0.9 mm steel thickness, colour to match locker frames.

.5 Number plates: to manufacturer's recommendations.

.12 Finish

.1 Metal finish: Steel surfaces shall be thoroughly cleaned and undercoated with an iron phosphate treatment utilizing a wash and etching process. The paint finish shall be 2 coats of high quality alkyd baking enamel to 40% - 45% gloss, electro-statically applied to a minimum thickness of 1mm.

.2 Color to be selected from manufacturer’s standard color selector.

Part 3 Execution

3.1 INSTALLATION

.1 Lockers

.1 Assemble and install lockers in accordance with manufacturer's written instructions.

.2 Securely fasten lockers to floor assembly and blocking in walls.

.3 Install locker bases and level as required.

.4 Install filler panels (false fronts) where indicated and where obstructions occur.

.5 Install finished end panels to exposed ends of locker banks.

.6 Install sloped false tops and gable ends.

.7 Install locker numbers.

3.2 SCHEDULE

.1 Room 128 – 14 lockers.

.2 Room 129 – 32 lockers.

END OF SECTION

PART 1 General

1.1 REFERENCES

.1 ASTM B209 - 14 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

1.2 SUBMITTALS

.1 Shop Drawings:

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

.2 Indicate rough-in dimensions, anchorage details, hardware and accessories details.

.3 Consultant will confirm numbering sequence on shop drawings. Numbering will coincide with suite numbers.

.2 Submit cut sheets or product literature that clearly indicates percentage by weight of post-consumer and / or post-industrial recycled content of the product.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

PART 2 Products

2.1 ACCEPTABLE MANUFACTURERS / PRODUCTS

.1 P. Riopel Inc., Model 8500

.2 Approved substitution.

2.2 MATERIALS AND FABRICATION

.1 Mailboxes: Front-Loading Mailboxes: Consisting of multiple compartments with fixed, solid compartment backs, enclosed within a surface mounted wall box. Provide access to compartments for distributing incoming mail from front of unit by unlocking master lock and swinging side-hinged master door to provide accessibility to entire group of compartments. Provide access to each compartment for removing mail by swinging compartment door.

.2 Bank of mailboxes, refer to drawings for mailbox arrangement. Module sizes:

.1 305mm W x 125mm H x 355mm D

.2 305mm W x 265mm H x 355mm D

.3 Mounting: surface mounted.

.4 Front-Loading Master Door:

.1 Fabricated from extruded aluminum and braced and framed to hold compartment doors; with master door lock and concealed, full-length, extruded aluminum integral hinge on one side. Fabricate master door to remain open while mail is deposited.

.2 Master Door Lock: Prepare master door to receive common key lock furnished by manufacturer.

.5 Compartment Doors:

.1 Fabricated from extruded aluminum. Equip each compartment door with lock, engraved identification, and concealed, continuous hinge on one side.

.2 Identification:

.1 Number plates: engraved plastic plate with clear window and metal backing.

.3 Compartment Door Locks:

.1 5-pin tumbler, cylinder cam locks capable of at least 1000 key changes; with 2 keys for each compartment door. Key each compartment differently.

.4 Frames: Fabricated from extruded aluminum with snap on trim.

.6 Concealed Components and Mounting Frames:

.1 Aluminum.

.2 Steel sheet.

.7 Material and Finish: Aluminum.

.1 Finish: Anodized aluminum: Clear.

PART 3 Execution

3.1 INSTALLATION

.1 Install mail boxes in accordance with shop drawings and manufacturer's printed installation instructions.

.2 Align, plumb, and level; anchor in accordance with manufacturer's requirements.

3.2 ADJUSTING

.1 Adjust doors and locks to operate correctly.

3.3 CLEANING

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

.2 Clean surfaces to mailbox manufacturer’s instructions.

3.4 SCHEDULE

.1 Room 133 as noted in drawings.

END OF SECTION

PART 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

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 plastic toilet compartments and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.4 Shop Drawings:

.1 Indicate fabrication details, plans, elevations, hardware, and installation details.

1.3 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, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 Products

2.1 MAGNETIC GLASS BOARD

.1 Premanufactured glass surfaced, wall mounted, dry erase board.

.2 Glass: 6.4 mm tempered safety glass. Suitable for use with any markers including permanent markers. Eased corners and smooth edges.

.1 Size: as noted in drawings.

.2 Colour: white.

.3 Magnetic finish.

.3 Hardware: stainless steel standoffs not to exceed 32mm in length. Stainless steel caps. Provide all necessary hardware for anchoring to wall.

.4 Similar to: Clarus ”Glassboard Depth”.

PART 3 Execution

3.1 INSTALLATION – MAGNETIC GLASS BOARD

.1 Install glass board in accordance with manufacturers written instructions.

.2 Install glass board level.

3.2 CLEANING

.1 Clean surfaces after installation using manufacturer's recommended cleaning procedures.

3.3 SCHEDULE

.1 As noted in drawings.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials

.1 ASTM D 3574 Standard Test Methods for Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams

.2 Canadian General Standards Board

.1 CAN/CGSB-4.2 No. 27.5 Textile Test Methods: Flame Resistance — 45° Angle Test — One-Second Flame Impingement.

1.2 SUBMITTALS

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

.1 Submit duplicate samples minimum 200mm x 200mm of manufacturer's standard colours for selection by Departmental Representative.

.2 Closeout submittals:

.1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Work plan.

.2 Collect and separate plastic, paper, packaging and corrugated cardboard in accordance with Waste Management Plan

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Do not install until all dust-generating activities have been completed.

Part 2 Products

2.1 FOAM

.1 High density, fire resistant foam suitable for use as a seat cushion.

.2 Density: To ASTM D 3574, 44.85 kg/m3 (2.8 LB/Cubic Ft)

.3 Firmness: To ASTM D 3574, 25% ILD 1.27 kg (35 LB)

.4 Typical life: 12 to 18 years.

2.2 FABRIC

.1 Flammability: meet all applicable flammability requirements.

.2 Content: Cotton, polyester or nylon in any combination.

.3 Size: Roll 1370mm wide.

.4 Weight:

.1 Backrest: Minimum 480 gr/lm.

.2 Seat: Weight: Minimum 700 gr/lm.

.5 Finish: Perfluorooctanoic acid (PFOA) free stain resistant.

.6 Performance: 100,000 double rubs.

.7 Acceptable manufacturer: Maharam

.1 Backrest and as noted on drawings:

.1 Fabric 1 (FAB-1): “Bright Cube” 466329-003 Aqua.

.2 Seat and as noted on drawings:

.1 Fabric 2 (FAB-2): “Mode” 466337-031 Paradise.

2.3 ACCESSORIES

.1 As recommended by manufacturer

Part 3 Execution

3.1 EXAMINATION

.1 Coordinate with Section 06 40 00 Architectural woodwork.

.2 Confirm all dimensions.

3.2 INSTALLATION

.1 Adhere foam to plywood base as noted in drawings.

.2 Sand edges of plywood where fabric wraps over corners to minimize fabric wear at these points.

.3 Wrap fabric around back of plywood and mechanically fasten to the back of the plywood. Wrap fabric a minimum of 50mm on to back of plywood.

.4 Install fabric to eliminate visible seams on seat cushions and back rests.

3.3 CLEANING

.1 Perform cleaning in accordance with Section 01 74 11 – Cleaning.

.2 Perform cleaning after installation to remove construction and accumulated environmental dirt.

3.4 PROTECTION

.1 Protect fabric from time of installation until final inspection.

3.5 SCHEDULE

.1 Bench Seating room 234.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102-88(R2000), Surface Burning Characteristics of Building Materials.

1.2 DESIGN REQUIREMENTS

.1 Design roller shades to following requirements:

.1 Housing designed for dual shade system complete with 1 blackout and 1 sunshade.

.2 Be designed in a manner that allows wear susceptible parts to be replaceable by either the user or the manufacturer.

.3 A guarantee of at least five years of available replacement parts following discontinue of the products manufacture.

.4 Be accompanied by instructions for replacing or repairing worn parts, including inventory numbers for parts and procedures for ordering replacement parts.

.5 A program that allows for the refurbishing or return of used roller shades.

.6 Be designed in a manner that permits effective disassembly of components in order to permit recycling of materials for which recycling markets exist.

1.3 SUBMITTALS

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

.1 Indicate dimensions in relation to window jambs, operator details, head and sill anchorage details, hardware and accessories details.

.2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit duplicate samples of manufacturer's standard colours for selection by Departmental Representative.

.2 After approval samples will be returned for incorporation into the Work.

.3 Closeout submittals:

.1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Work plan.

.2 Collect and separate plastic, paper, packaging and corrugated cardboard in accordance with Waste Management Plan

1.5 ENVIRONMENTAL REQUIREMENTS

.1 Do not install until all dust-generating activities have been completed.

Part 2 Products

2.1 MANUAL DOUBLE SHADE SYSTEM

.1 Size: Approximately 1120mm wide x 1525mm high. Confirm dimensions on site.

.2 Operation:

.1 Manual dual chain operation with infinite positioning.

.3 Assembly:

.1 Fully factory assembled shade unit consisting of 2 end brackets, 2 side channels, bottom draw bars, shade tubes, extruded aluminum fascia, hem bar and fabrics specified.

.2 Mounting type: between jamb

.3 End bracket: Two-piece moulded ABS construction with 64mm diameter nylon drive sprocket. Bracket colour shall coordinate with fascia colour.

.4 Side channels: 0.5mm minimum aluminum or sheet steel, u-shaped, with legs not less than 45 mm long for 50 mm² blinds or 20 mm long for 25 mm² blinds. Round or bead edges in contact with blinds. Finish inside surfaces of side channels in a dull gray or black colour.

.5 Bottom draw bar: aluminum hembar complete with soft vinyl seal at bottom. Interlock with sill channels by means of heavy duty automatic spring latch.

.6 Shade tube: 38 mm extruded aluminum shade tube, 1.52 mm minimum thickness. Three internal continuous reinforcing fins.

.7 Fascia: 1.7 mm minimum thickness, complete with three continuous screw flute, extruded aluminum finish – colour to be selected by Departmental Representative from standard colours.

.8 Drive assembly: factory set for size and travel of shades, capable of field adjustment without having to dis-assemble the hardware. Provide built-in shock absorber system to prevent chain breakage under normal usage conditions.

.9 Drive chain: No. 10 stainless steel bead chain formed in a continuous loop. Chain shall have 90 lbs. Test strength.

.10 Exterior hembar: extruded aluminum with plastic end finials.

.4 Shade Fabric:

.1 Shade fabric: 35% fibreglass and 65% vinyl on fibreglass, mesh weight 403 g/m², yarn diameter (inches) .011, fabric thickness 0.43 mm, openness factor 5%, UV blockage approximately 95%, breaking strength (lb) 250 warp and 235 fill. Colour to be selected from manufacturer's standard range.

.2 Acceptable product/manufacturer:

.1 Phifer SheerWeave style 2360.

.2 MechoShade 1300 Series.

.3 Solarfective Solarblock

.4 Approved alternate.

.5 Blackout Fabric:

.1 Shade fabric: 35% fibreglass and 65% vinyl on fibreglass, blackout film, mesh weight 671 g/m², fabric thickness 0.58 mm, openness factor 0% (opaque), UV blockage approximately 95%, breaking strength (lb) 253 warp and 263 fill. Colour to be selected from manufacturer's standard range.

.2 Acceptable product/manufacturer:

.1 Phifer SheerWeave style 7100.

.2 MechoShade 0100 Series.

.3 Solarfective SolarStop

.4 Approved alternate

Part 3 Execution

3.1 EXAMINATION

.1 Confirm all opening dimensions.

3.2 INSTALLATION

.1 Install in accordance with manufacturer's printed directions and reviewed shop drawings.

.2 Install square, plumb, true to line with operable parts adjusted for correct function.

.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 Provide decorative valance with matching insert typical at all locations.

3.3 DEMONSTRATION

.1 Brief Departmental Representative and staff representatives regarding operation, adjustments, proper care, cleaning and maintenance.

3.4 CLEANING

.1 Perform cleaning in accordance with Section 01 74 11 – Cleaning.

.2 Perform cleaning after installation to remove construction and accumulated environmental dirt.

3.5 PROTECTION

.1 Protect new blinds from time of installation until final inspection.

3.6 SCHEDULE

.1 Double shade system to be installed on new and existing exterior windows within rooms numbered: 106, 138, 203, 206, 207, 208, 214, 232 and 233.

END OF SECTION