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**SPECIFICATION VOLUME 1**

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**STRUCTURAL**

S1 Partial Floor Plan

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the repair of block walls and existing structural garage slabs, including routing out block joints and re-pointing and investigation of the extent of slab deterioration by chain dragging the delaminated areas, removing the delaminated concrete debris and sand blasting the sound concrete, cleaning and splicing deteriorated concrete reinforcement, reinstatement of the concrete slab with new 35MPa concrete, and the application of a traffic coat topping, to the existing government building located at 4300 - 55 Street, Red Deer, Alberta.

1.2 CONTRACT METHOD

- .1 Construct Work under stipulated price contract for the extent of the work described on the drawings. Provide unit costs (cost per square metre) for additional work beyond the area identified on the drawings. Any additional work must be approved by the Departmental Representative prior to the work being undertaken. Additional work will be authorized by Change Order.
- .2 Relations and responsibilities between Contractor and subcontractors and suppliers assigned by Owner are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:
  - .1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations thereunder when Contractor is required to furnish such bonds to Owner.
  - .2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide to Owner.

1.3 WORK BY OTHERS

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

1.4 CONTRACTOR USE OF PREMISES

- .1 Restricted use of site until Interim Acceptance/Substantial Performance. The facility must remain in use at all times.
- .2 The construction site is considered a secure work site. All personnel employed on this project, including personnel employed by the general contractor and all personnel employed by sub-trades, will be subject to an RCMP security clearance. Obtain clearance, as instructed, for each individual who will require to enter premises. Follow RCMP procedures on site.

1.5 SECURITY ESCORT

- .1 Personnel employed on this project must be escorted by a Commissaire when executing work.
- .2 Costs for security escort will be the Contractor's responsibility. Hourly rates for the security escort are obtainable from the Office of the Commissaires, 780 451 1974.

1.6 DOCUMENTS REQUIRED

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

.2 Not used.

PART 1 - GENERAL

1.1 ACCESS AND EGRESS

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

1.2 USE OF SITES AND FACILITIES

- .1 Contractor has restricted use of site until substantial performance of the Contract.

1.3 EXISTING SERVICES

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

1.4 SPECIAL REQUIREMENTS

- .1 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.

1.5 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not allowed.
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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by the Departmental Representative are specified under various sections.

1.2 APPOINTMENT AND PAYMENT

- .1 Departmental Representative will appoint and pay for services of testing laboratory except as follows:
  - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
  - .2 Inspection and testing performed exclusively for Contractor's convenience.
  - .3 Tests specified to be carried out by Contractor in various specifications sections.
  - .4 Additional tests required as follows:
    - .1 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
    - .1 Provide access to Work for inspection and testing.
    - .2 Facilitate inspections and tests.
    - .3 Make good Work disturbed by inspection and test.
    - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
  - .2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
  - .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
  - .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and reviewed by Departmental Representative.
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Slab Repair  
Government Building  
Red Deer

PAYMENT PROCEDURES:  
TESTING LABORATORY  
SERVICES

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Page 2

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Departmental Representative will schedule and administer project meetings on an as-needed basis throughout the progress of the work.
- .2 Departmental Representative will prepare agenda for meetings.
- .3 Departmental Representative will provide notice to sub-consultants of meeting dates. Contractor will provide notice to subtrades of meeting dates.
- .4 Contractor to make arrangements for meetings.
- .5 Departmental Representative will preside at meetings.
- .6 Departmental Representative will record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Departmental Representative will reproduce and distribute copies of minutes within four days after meetings and transmit to Contractor and Owner. Contractor will distribute meeting minutes to all subtrades.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and clarify administrative procedures and responsibilities. This meeting may be conducted via conference call.
  - .2 Senior representatives of Owner, Departmental Representative, and Contractor, will be in attendance.
  - .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
  - .4 Agenda to include:
    - .1 Appointment of official representative of participants in the Work.
    - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
-

- .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Delivery schedule of specified equipment in accordance with Section 01 32 16.07 - Construction Progress Schedules.
- .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .8 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Monthly progress claims, administrative procedures, photographs, hold backs.
- .10 Appointment of inspection and testing agencies or firms.
- .11 Insurances, transcript of policies.

### 1.3 PROGRESS MEETINGS

- .1 During course of Work and two (2) weeks prior to project completion, schedule monthly progress meetings. These meetings may be held via conference call.
  - .2 Contractor, major Subcontractors involved in Work and Owner and Departmental Representative are to be in attendance.
  - .3 Notify parties minimum three (3) days prior to meetings.
  - .4 Departmental Representative will record minutes of meetings and circulate to Contractor, Departmental Representatives and Owner within four (4) days after meeting. Contractor to distribute meeting minutes to subtrades.
  - .5 Agenda to include the following:
    - .1 Review, approval of minutes of previous meeting.
    - .2 Review of Work progress since previous meeting.
    - .3 Field observations, problems, conflicts.
    - .4 Problems which impede construction schedule.
    - .5 Review of off-site fabrication delivery schedules.
    - .6 Corrective measures and procedures to regain projected schedule.
    - .7 Revision to construction schedule.
    - .8 Progress schedule, during succeeding work period.
    - .9 Review submittal schedules: expedite as required.
    - .10 Maintenance of quality standards.
    - .11 Review proposed changes for affect on construction schedule and on completion date.
    - .12 Other business.
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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

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Slab Repair	CONSTRUCTION PROGRESS	Sect 01 32 16.07
Government Building	SCHEDULE - BAR (GANTT)	Page 1
Red Deer	CHART	

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## 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.
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Slab Repair	CONSTRUCTION PROGRESS	Sect 01 32 16.07
Government Building	SCHEDULE - BAR (GANTT)	Page 2
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## 1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Acceptance and Final Acceptance 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 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

## 1.4 MASTER PLAN

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

## 1.5 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
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Slab Repair	CONSTRUCTION PROGRESS	Sect 01 32 16.07
Government Building	SCHEDULE - BAR (GANTT)	Page 3
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- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Preparation of slab.
  - .6 Repair of slab and new topping.
  - .7 Application of new epoxy finish to slab.
  - .8 Site clean-up.
  - .9 Demobilization.

#### 1.6 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.

#### 1.7 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.

### PART 2 - PRODUCTS

#### 2.1 NOT USED

- .1 Not used.
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Government Building	SCHEDULE - BAR (GANTT)	Page 4
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PART 3 - EXECUTION

.2 Not used.



PART 1 - GENERAL

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's 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 shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Alberta, 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 15 working 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, in duplicate, containing:
    - .1 Date.
    - .2 Project title and number.
    - .3 Contractor's name and address.
    - .4 Identification and quantity of each shop drawing, product data and sample.
    - .5 Other pertinent data.
  - .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 review of submissions,
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- 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.
  - .9 After Departmental Representative's review, distribute copies.
  - .10 Submit shop drawings electronically for each requirement requested in specification Sections and as Departmental Representative may reasonably request. If drawings are submitted to the General Contractor as hard copy the General Contractor will scan them and submit them electronically to the Departmental Representative.
  - .11 Submit product data sheets or brochures electronically 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. Delete information not applicable to project. Where hard copies are submitted to the General Contractor, the General Contractor will scan them and submit them electronically to the Departmental Representative.
  - .12 Submit manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative. Where hard copies are submitted to the General Contractor, the General Contractor will scan them and submit them electronically to the Departmental Representative via CAIS.
    - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
  - .13 Submit 2 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
  - .14 Delete information not applicable to project.
  - .15 Supplement standard information to provide details applicable to project.
  - .16 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.

- .17 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that the Departmental Representative 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.

### 1.3 PROGRESS PHOTOGRAPHS

- .1 In addition to the progress photographs required to be submitted monthly with each progress claim, the contractor is required to have a digital camera on site at all times and to submit photographs electronically, on a weekly basis, as follows:
  - .1 Exterior viewpoints in sufficient number to describe the general progress of the work.
  - .2 Post all photographs electronically and provide a CD with all photographs turned over to the Departmental Representative prior to Substantial Performance of the Work.

### 1.4 CERTIFICATES AND TRANSCRIPTS

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.
  - .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
  - .4 Environmental protection plan: include:
    - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
    - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
    - .3 Names and qualifications of persons responsible for training site personnel.
    - .4 Descriptions of environmental protection personnel training program.
    - .5 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
-

- .6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
  - .7 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
  - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
  - .9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
  - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
  - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
  - .12 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
  - .13 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
  - .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
  - .15 Pesticide treatment plan: to be included and updated, as required.
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1.3 FIRES

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

1.4 DISPOSAL OF WASTES

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

1.5 DRAINAGE

- .1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sedimentations control plan.
- .3 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .4 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
  - .2 Do not use waterway beds for borrow material without Departmental Representative's approval.
  - .3 Do not dump excavated fill, waste material or debris in waterways.
-



1.7 POLLUTION CONTROL

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

1.8 NOTIFICATION

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.
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Slab Repair  
Government Building  
Red Deer

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ENVIRONMENTAL  
PROCEDURES

Section 01 35 43  
Page 5

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PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with Alberta Building Code (ABC) and the 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 Authority Having Jurisdiction

- .1 For this project the Authority having Jurisdiction is the Municipal District of Big Lakes.

1.3 BUILDING SMOKING ENVIRONMENT

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

1.4 BUILDING AND DEVELOPMENT PERMITS

- .1 The Contractor shall obtain and pay for the appropriate building permit, obtainable from The Municipal District of Big Lakes.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.
-

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 INSPECTION

- .1 Allow Owner and Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative, or instructions, or law of Place of Work.
- .3 Departmental Representative may order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative. Pay costs for additional testing, retesting and reinspection.

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.
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1.4 REJECTED WORK

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

1.5 REPORTS

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

1.6 TESTS

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 INSTALLATION AND REMOVAL

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

1.2 WATER SUPPLY

- .1 A temporary water supply is available from the existing building.

1.3 TEMPORARY POWER AND LIGHT

- .1 Temporary power and light is available from the existing building.

1.4 FIRE PROTECTION

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.
-



PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 INSTALLATION AND REMOVAL

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

1.2 SITE STORAGE/LOADING

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

1.3 CONSTRUCTION PARKING AND SITE ACCESS

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

1.4 SECURITY

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

1.5 OFFICES

- .1 Construction site offices will not be required for this project.
- .2 Provide marked and fully stocked first-aid case in a readily available location, as required by Occupational Health and Safety.

1.6 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.

1.7 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 Permanent facilities may not be used.

1.8 CONSTRUCTION SIGNAGE

- .1 Direct requests for approval to erect Contractor signboard to Departmental Representative.
- .2 Signs and notices for safety and instruction in English. Graphic symbols to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.9 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
  - .2 Clean dirt or mud tracked onto paved or surfaced roadways.
  - .3 Store materials resulting from demolition activities that are salvageable.
  - .4 Stack stored new or salvaged material not in construction facilities.
-

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
  - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

### 1.2 INSTALLATION AND REMOVAL

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

### 1.3 GUARD RAILS AND BARRICADES

- .1 Provide as required by governing authorities.

### 1.4 ACCESS TO SITE

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

### 1.5 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.

### 1.6 FIRE ROUTES

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

### 1.7 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.
-

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste material in accordance with all regulations and local bylaws, and in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

- .2 Not Used.

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 (consistent with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
  - .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous site reviews. Site reviews do not relieve Contractor of responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
  - .3 Acceptable Products/Materials means those items named and specified by manufacturer's reference, meet the specifications in all respects and are acceptable to the Departmental Representative.
  - .4 No Substitutions: all products listed as "no substitutions" in various sections shall be supplied as specified.
  - .5 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
  - .6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
-

- .7 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.
- .8 Conflicting product/material information in the drawings and specifications is to be brought to the Departmental Representative's attention for clarification during the tender period, otherwise the most stringent product/material requirements as determined by the Departmental Representative, will apply.

### 1.3 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

### 1.4 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 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
-



1.5 TRANSPORTATION

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

1.6 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.

1.7 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.

1.8 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.
-

1.9 REMEDIAL WORK

- .1 Immediately 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 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 pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

- .2 Not Used.

PART 1 - GENERAL

1.1 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Only specified products and materials, or products and materials approved by the Departmental Representative during the tender period will be accepted on this project.

1.2 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.

1.3 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.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including other than that caused by Owner or other Contractors.
  - .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
  - .3 Clear snow and ice from access to site, bank/pile snow in designated areas only or remove from site.
  - .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
  - .5 Provide on-site containers for collection of waste materials and debris.
  - .6 Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .7 Remove waste materials and debris from site and deposit in waste container at end of each working day.
  - .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
  - .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
  - .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
  - .11 Remove snow and ice from access to building.
-

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 DISPOSAL OF WASTES

- .1 Dispose of all construction waste material in accordance with Provincial regulations and local bylaws.
- .2 Do not bury rubbish or waste materials.
- .3 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.

1.2 SCHEDULING

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

1.3 CLEANING

- .1 Remove tools and waste materials on completion of work each day, and leave work area in clean and orderly condition.
- .2 Clean up work area as work progresses.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 GENERAL

- .1 Substantial Performance is achieved when there are no construction deficiencies and all items noted below have been completed to the satisfaction of the Departmental Representative.
- .2 Release of Project Holdback: The Project Holdback shall be released on the 46th day after the date of Substantial Performance and upon receipt of an invoice requesting payment, accompanied by a Statutory Declaration indicating all subtrades and suppliers have been paid in full.

1.2 CONTRACTOR'S INSPECTION OF WORK

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

1.3 INSPECTION FOR SUBSTANTIAL PERFORMANCE

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



1.4 DECLARATION OF SUBSTANTIAL PERFORMANCE

- .1 When the Departmental Representative determine that all deficiencies and incomplete work have been corrected and the requirements of the Contract have been substantially performed, Departmental Representative will declare that Substantial Performance has been achieved and the Contractor may post notice of Substantial Performance in accordance with Lien Legislation.
- .2 Upon issuance of the Certificate of Substantial Performance, Departmental Representative will assume responsibility for care, custody and control of the Work, including responsibility for:
  - .1 Facility operation.
  - .2 Maintenance
  - .3 Security
  - .4 Property and liability insurance
  - .5 Utility costs
- .3 NOTE: the Contractor will not be allowed access to the interior of the building after the issuance of the Certificate of Substantial Performance except with written approval from the Departmental Representative for the specific warranty work requiring attention, and the duration of that work.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.2 Not Used.

PART 1 - GENERAL

1.1 SUBMITTALS

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

1.2 FORMAT

- .1 Organize data as instructional manual, one binder is required for each site for architectural and structural components (black).
  - .2 Binder: commercial quality, fabric coated, hard covered, 3 post extension type, attached to spine with metal piano hinges. Acco 05436-0, Expanding Barlock Catalogue Binder, available from Grand & Toy.
  - .3 Cover: identify binder embossed title identifying site location.
-

- .4 Arrange content by systems, under Specification Section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: fold larger drawings and place in a punched plastic sleeve or scan and reduce to size of text pages.
- .8 Electronic Copy: The contractor shall provide one electronic copy of the completed Manuals in the form of a DVD with the information provided in PDF Format.

### 1.3 CONTENTS

- .1 Table of Contents: provide title of project;
  - .1 Date of submission.
  - .2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 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 RECORD DOCUMENTS 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 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.

#### 1.5 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line 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: legibly mark each item to record actual construction, including:
    - .1 Field changes of dimension and detail.
    - .2 Changes made by change orders.
    - .3 Details not on original Contract Documents.
    - .4 References to related shop drawings and modifications.
  
  - .5 Specifications: legibly mark each item to record actual construction, including:
    - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
    - .2 Changes made by Addenda and change orders.
  
  - .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
  
  - .7 NOTE: submission of accurate and complete Record Documents is a prerequisite to Substantial Performance.
  
  - .8 Include manufacturer's printed operation and maintenance instructions.
-

- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

1.6 WARRANTIES AND BONDS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers and manufacturers, within 10 days after completion of applicable items of work.
- .4 Warranty start date to be the date of Substantial Performance of the Work.
- .5 Verify that warranty documents are in proper form, contain full information, are for the warranty period specified, and are notarized.
- .6 Co-execute submittals where required.
- .7 Retain warranties and bonds until time specified for submittal.
- .8 Respond in a timely manner to oral or written notification of required construction warranty repair work.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.
-

PART 3 - EXECUTION

.2 Not Used.

**1. GENERAL**

**1.1 SECTION INCLUDES**

- .1 The Contract Documents apply to and govern the Work of this section.

**1.2 REFERENCES**

- .1 ACI 315-99 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, Details and detailing of concrete reinforcement.
- .2 ASTM A497/A497M-07 - Steel Welded Wire Reinforcement, Deformed, for Concrete.
- .3 CAN/CSA-G30.18-M92 (R2007) - Billet-Steel Bars for Concrete Reinforcement.
- .4 CSA A23.1-04/A23.2-04 - Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .5 CSA A23.3-04 - Design of Concrete Structures.
- .6 CSA W186-M1990 (R2007) - Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .7 CSA W47.1-03 - Certification of Companies for Fusion Welding of Steel.

**1.3 COORDINATION REQUIREMENTS**

- .1 Coordination: Coordinate with other work and sub-trades having a direct bearing on work of this section.

**1.4 SUBMITTALS**

- .1 Shop Drawings:
  - .1 Provide placing drawings and bar lists and include placing dimensions and necessary placing details. Use large scale details for areas of congested reinforcement.
  - .2 Include details of all doweling.
  - .3 Details in accordance with ACI 315 unless specifically detailed otherwise.
  - .4 Unless otherwise noted on drawings, bar splices to be 40 bar diameters or 400 mm minimum for horizontal splices and 30 bar diameters or 350 mm minimum for vertical splices.
  - .5 Provide corner bars at corners and intersections of grade beams and walls, in accordance with the structural drawings.
  - .6 Check Shop Drawings prior to submission to Consultant.
  - .7 Consultant's review does not relieve Contractor of his responsibility for accuracy of shop drawings.

**1.5 QUALITY ASSURANCE**

- .1 Perform Work in accordance with CAN/CSA A23.1/A23.2.



.2 Perform welding to CSA W186.

.3 Welders: Workmen qualified under CSA W47.1.

## **1.6 DELIVERY, STORAGE, AND PROTECTION**

.1 Store and protect reinforcing steel and welded wire fabric to prevent deterioration or contamination by foreign matter.

.2 Do not use contaminated or deteriorated material.

## **2. PRODUCTS**

### **2.1 MATERIALS**

.1 Reinforcing Steel: To CSA G30.18, Grade 400, 400 MPa yield grade special low alloy deformed billet steel for welding, with equivalent carbon content not exceeding 0.5 and/or for bending where bending radius is smaller than recommended standards.

.2 Dimensions are in metric designation.

.3 Welded Wire Fabric: To ASTM A497/A497M-07, in flat sheets, plain finish.

.4 Chairs, Bolsters, Bar Supports, Spacers: Adequate for strength and support of reinforcing. Where concrete is exposed to elements or where rust is possible, use plastic or non-corrosive material.

.5 Tie Wire: Minimum 1.5 mm annealed type, or patented system approved by the Consultant.

.6 Galvanized Reinforcement: To ASTM A123/A123M, minimum zinc coating 610 g/m<sup>2</sup>.

### **2.2 FABRICATION**

.1 Shop fabricate reinforcing steel from sizes indicated, and to reviewed shop drawings.

.2 Fabricating details in accordance with CSA A23.1.

.3 Identify steel.

.4 Hooks, bends, laps, and similar details to CSA A23.1, and Metric Supplement of the Reinforcing Steel Institute of Ontario (RSIO) Manual of Standard Practice.

.5 Do bending cold unless otherwise approved by Consultant.

.6 Dowel columns and walls into foundations using same reinforcing as that in column and wall unless noted otherwise.

.7 Provide horizontal "L" shaped corner bars of same cross section and spacing as horizontal bars.

.8 Provide all additional support bars as required to support all main reinforcement indicated.

.9 Provide 10M stirrup support bars in hooks or corners of beam stirrups unless noted otherwise on drawings.

- .10 Provide 10M "U" spacers at 3000 mm on centre horizontally and 1500 mm on centre vertically to hold wall reinforcing mats in position.
- .11 Provide mesh over electrical conduit, ductwork, or piping buried in slabs with strips of 152 x 152 x MW13.3 x MW13.3 welded wire fabric 300 mm each side. If principal slab reinforcement is placed above conduit, then place strips under conduit. Position of reinforcing steel takes precedence over conduit, ductwork, or piping.
- .12 Locate reinforcing splices, not indicated on drawings, at points of minimum stress. Location of splices is to be approved by the Consultant.
- .13 Where indicated, weld reinforcing bars in accordance with the applicable requirements of CSA W186. Do not weld reinforcing at any location without written approval of the Consultant.
- .14 Test all welded reinforcement splices unless noted. Such testing to be paid for by the Owner.
- .15 Allow for 2.0 tonnes of extra reinforcing to be placed as directed. Keep records of reinforcing used and other Work requested. Credit contract with unused balance at completion of Work.

### **3. EXECUTION**

#### **3.1 PREPARATION**

- .1 Clean reinforcing to CSA A23.1.

#### **3.2 PLACEMENT**

- .1 Place reinforcement in accordance with reviewed shop drawings and/or contract drawings.
- .2 Support and space reinforcing in alignment and position indicated and as follows:
  - .1 Concrete Slabs On Grade: Support reinforcement on support bars or concrete brick.
  - .2 Structural slabs and toppings: support reinforcement on bar chairs.
  - .3 The minimum concrete cover to be provided is as follows unless detailed otherwise on drawings or specified elsewhere: (dimensions in mm).

<b>CLEAR CONCRETE COVER SCHEDULE</b>					
<b>Exposure Condition</b>	<b>Exposure Class</b>				
	N	F-1, F-2, S-1, S-2	C-XL, C-1, C-3, A-1, A-2, A-3	C-2, C-4	Epoxy-Coated Bars
Interior Columns, Walls and Structural Slabs	1 1/4" (30mm)	-	-	-	No
Ratio of Cover to Nominal Diameter	1.0	1.5	2.0	1.0	
Ratio of cover to Nominal Maximum Aggregate Size	1.0	1.5	2.0	1.0	

.4 Cover and protection for reinforcement in concrete utilized in a corrosive environment shall be as per CSA A23.1.

.5 Ensure alignment of reinforcing steel as follows:

<u>Tolerance, plus or minus</u>	<u>Item</u>
5 mm	Slabs
10 mm	Other structural members
50 mm	Rebar bends & ends

.6 Place reinforcing in accordance with CSA A23.1. Refer to structural drawings for minimum splices. Splices to be Class B unless noted.

.7 Use non-corrosive supports for reinforcing when concrete is exposed.

.8 Supply bar support chairs for top reinforcing bars in sufficient quantity to not exceed 1200 mm average spacing in each direction.

.9 Supply horizontal reinforcing spacers in walls to ensure reinforcing does not move during placement.

.10 Do not rebend or straighten reinforcing steel after initial fabrication unless so indicated on drawings.

.11 Ensure reinforcing is clear and free of loose scale, dirt, oil, and rust and other foreign coatings.

- .12 Support slab on grade and structural slab reinforcing at 900 mm maximum on centre.
- .13 Where a structural concrete members is identified on the drawings, or specifications, it is required to have a fire resistance rating providing minimum concrete cover to reinforcing steel, in accordance with Chapter 2 of the Supplement to National Building Code, "Fire Performance Ratings".

### **3.3 SPLICING OF REINFORCEMENT**

- .1 Splice reinforcement to CSA A23.3 unless indicated otherwise.

### **3.4 WELDING OF REINFORCEMENT**

- .1 Weld reinforcing bars in accordance with CSA W186.

### **3.5 MINIMUM REQUIREMENTS**

- .1 Unless otherwise shown or specified:
  - .1 Minimum requirements for slabs on grade and topping to be 152 x 152 – MW 13.3 x MW 13.3.
  - .2 Minimum requirement for 130 mm slabs and over, 10M at 300 each way.

### **3.6 FIELD QUALITY CONTROL**

- .1 Field Services:
  - .1 Field Services by the Consultant or his representative consists of periodic visits to the site for generally familiarizing with the progress and quality of the Work and to determine in general if it is progressing according to the contract documents, and the necessary paperwork related to these services.
  - .2 Field Services by the Consultant or his representative do not in any way relieve the Contractor of his responsibility to carry out the Work per the contract documents and contract drawings.
  - .3 The word "Consultant" is used in this specification to mean "Consultant" or "Consultant's Representative".
- .2 Inspection:
  - .1 General Contractor is responsible for reinforcing size, location and proper placement.
  - .2 Inspection for size, location and proper placement may be made at any time at discretion of Consultant or Consultant's representative.
  - .3 Remove and replace reinforcement not in accordance with the drawings.
  - .4 Provide adequate notice of scheduled pours to facilitate inspection.
- .3 Damage:
  - .1 Make good all areas damaged in connection with the contract regardless of the limits of the contract as shown on the drawings.

**3.7 CLEANING**

- .1 Clean up and remove from site, all rubbish and surplus material remaining from this Work.

**END OF SECTION**

**1. GENERAL**

**1.1 SECTION INCLUDES**

- .1 The Contract Documents apply to and govern the Work of this section.

**1.2 REFERENCES**

- .1 ASTM C33-08 - Concrete Aggregates.
- .2 ASTM C94/C94M-09 - Ready-Mixed Concrete.
- .3 ASTM C260-06 - Air-Entraining Admixtures for Concrete.
- .4 ASTM C494/C494M-08a - Chemical Admixtures for Concrete.
- .5 ASTM C1017/C 1017M-07 - Chemical Admixtures for Use in Producing Flowing Concrete.
- .6 ASTM D1752-04a(2008) - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .7 ASTM D2822-05 - Asphalt Roof Cement.
- .8 CAN/CSA A3000-08 - Cementitious Materials Compendium.
- .9 CSA A23.1-04/A23.2-04 - Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .10 CSA A23.3-04 - Design of Concrete Structures.
- .11 CSA A283-06 - Qualification Code for Concrete Testing Laboratories.
- .12 CSA G30.18-92 (R2007) - Billet-Steel Bars for Concrete Reinforcement.
- .13 Concrete Reinforcing Steel Institute (CRSI) where noted.
- .14 Alberta Building Code 2006.
  - .1 Provincial safety standards where applicable.
  - .2 Erection, Maintenance and Removal of Formwork Conform to applicable safety regulations.

**1.3 DESIGN REQUIREMENTS**

- .1 Contractor is responsible for design of concrete formwork and adequate shoring systems.
- .2 Specific concrete and reinforcing specification requirements are included on structural drawings.

**1.4 COORDINATION REQUIREMENTS**

- .1 Coordination: Coordinate with other work and sub-trades having a direct bearing on work of this section.
- .2 Scheduling: If requested, prepare and submit for review a schedule and proposal outlining the following:
  - .1 Time of major structural pours.
  - .2 Heating, curing and protection provisions.
  - .3 The concrete forms stripping procedures including elapsed time from concrete placement.

- .4 Shoring and re-shoring procedures and timing of removal of shores.

## 1.5 QUALITY ASSURANCE

- .1 Failure to comply with the requirements of these specifications will result in the structure being considered potentially deficient. In such a case the Consultant or his representative shall have the right to require one or more of the following:
  - .1 Changes in the mix proportions for the remainder of the Work.
  - .2 Additional curing on those portions of the structure represented by test specimens that failed to meet specified requirements.
  - .3 Non-destructive testing (refer to CSA A23.2, Annex A).
  - .4 Test cores drilled from portions of the structure in question in accordance with CSA A23.2, Test Method 14C.
  - .5 Load testing of structure or structural elements in accordance with CSA A23.3.
  - .6 Reinforce by additional construction or replace as directed by the Consultant at Contractor's expense when concrete is judged inadequate by structural analysis or be results of load tests.
  - .7 Such other tests as the Consultant may specify.
  - .8 Note: Cores should not be drilled from the tension zone of a structural member because the presence of cracks may adversely affect the measured compressive strength.
- .2 Additional testing may be ordered by the Consultant at any time even though required tests indicate that strength requirements have been met. In this instance, Owner will pay for those tests that meet the specified requirements and the Contractor will pay for the test and the repair to work that does not.
- .3 Pay for all costs of evaluation tests and additional engineering analysis that are required to demonstrate the adequacy of the structure where it does not meet the requirements of this specification and drawings or where concrete has been placed before formwork and reinforcing have been inspected and approved by Consultant.

## 1.6 SUBMITTALS

- .1 Provide submittals accordance with Section 01 33 00.
- .2 Product Data:
  - .1 Provide data on all concrete making materials specified or proposed.
  - .2 Provide all proposed concrete mix designs.
  - .3 Provide data on all concrete accessories specified or proposed.
- .3 Shop Drawings: Prepare and submit for review a location diagram and proposed details for all planned construction joints to the Engineer for approval prior to the concrete pour.
- .4 Test Data: Submit test data confirming specified concrete strengths are being achieved.
  - .1 Tests to be performed by a testing laboratory approved by the Consultant or his representative and paid for by the General Contractor.
  - .2 Allow for casual labour and expenses in connection with materials testing.
  - .3 Submit two (2) copies of test results to Structural Engineer, General Contractor and Consultant immediately upon completion of testing.

.4 Compressive Strength Tests:

- .1 One set of three (3) standard test specimens to be made for each class of concrete in any one days pour of more than five (5) cubic metres. For pours of more than sixty (60) cubic metres, one (1) set per each sixty (60) cubic metres.
- .2 One additional standard test specimen to be made during cold weather construction. Cure this specimen on job site under same conditions as concrete it represents.
- .3 Concrete to be sampled at the point of deposit of the concrete into the forms.
- .4 Test specimens to be cast, cured and tested in accordance with CSA A23.2 by personnel from the designated testing laboratory.
- .5 For each set of test specimens, a slump test and entrained air test is to be included (for air entrained concrete).

.5 Concrete Test Reports:

- .1 Test Reports to include the following information:
  - .1 Project Name.
  - .2 Date and time of sampling.
  - .3 Supplier, truck number and time of concrete truck departure from concrete plant.
  - .4 Specified strength.
  - .5 Cement type.
  - .6 Admixtures.
  - .7 Exact location in structure of sampled concrete.
  - .8 Slump.
  - .9 Maximum aggregate size.
  - .10 Air content, if applicable.
  - .11 Test strength and age at test.
  - .12 Date specimen received in the testing laboratory.
  - .13 Technical identification.
- .6 Concrete tests will be considered satisfactory if the average of all sets of three (3) consecutive strength tests equal or exceed the specified strength and no individual strength test is more than 3.5 MPa (500 psi) below the specified strength.

- .5 Submit proposed methods of protection of concrete when air temperatures are expected to be above 25 degrees C or below 5 degrees C.
- .6 Submit responses to all site review reports stating that all reported defects and deficiency items were corrected or what action taken.

**1.7 DELIVERY, STORAGE, AND PROTECTION**

- .1 Store and protect materials and work from damage by frost and weather, and deterioration or contamination by foreign matter.



- .2 Do not use contaminated or deteriorated materials.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 Ready Mix Concrete: To CSA A23.1 supplemented by ASTM C94/C94M.
- .2 Cement: To CSA A3001.
- .3 Water: Potable, to CSA A23.1.
- .4 Aggregates: to CSA A23.1 and ASTM C33. Nominal size 20 mm coarse aggregate, 10 mm for toppings. Contractor may use smaller size.
- .5 Chemical Admixtures: To ASTM C494/C494M or ASTM C1017/C1017M.
- .6 Air Entrainment: To ASTM C260.
- .7 Concrete Curing Compound: Chlorinated liquid rubber type, membrane forming.
- .8 Joint Filler: To ASTM D1752, resilient, non-extruding, non-bituminous.
- .9 Non-shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 16 MPa at 2 days and 48 MPa at 28 days to CSA A23.1.
- .10 Mastic Cement: To ASTM D2822, plastic cement, cutback asphalt.
- .11 Bonding Agent: Polymer resin emulsion, for mixing with cement and water, similar to "Daraweld". For bonding two concretes, to CSA A23.1.
- .12 Vapour Barrier: 10 mil polyethylene film.

**2.2 CONCRETE MIXES**

- .1 Supply "Controlled Concrete" with the minimum compressive strengths as defined by CSA A23.1 as noted on the drawings in accordance with the following table:

3. CONCRETE STRENGTH AND MIX SPECIFICATIONS								
EXPOSURE CLASS	USE	CEMENT TYPE	MINIMUM COMPRESSIVE STRENGTH	MAXIMUM WATER TO CEMENTING MATERIALS RATIO	AIR CONTENT (%)	SLUMP	MAXIMUM AGGREGATE SIZE	Fly Ash Content % and Silice Fume
C-1	Interior Columns, Interior Walls, Structural Slabs	GU	35 MPa at 28 days	0.4	5 - 8	80 mm ±20 mm	20 mm	15% and 7.5%

- .1 Please refer to table for fly ash content.
- .2 Aggregate nominal maximum size shall satisfy the requirement of CSA A23.1.
- .3 Air Content: All mix types to be air-entrained in accordance with CSA A23.1.
- .4 Do not change concrete mix proportions or source material for architectural concrete without written approval of the Consultant.

**3.2 ADMIXTURES**

- .1 Use accelerating admixtures in cold weather only when approved by the Consultant. If approved, the use of admixtures will not relax cold weather placement requirements.
- .2 Do not use calcium chloride or any admixtures containing chloride ion.
- .3 Use set-retarding admixtures during hot weather only upon a written approval of the Consultant to prevent cold joints in concrete.
- .4 Admixtures must be used in strict accordance with the manufacturer's recommendations.
- .5 Non-specified admixtures would not be permitted unless approval in writing by the Consultant is obtained.

**4. EXECUTION**

**4.1 WORKMANSHIP**

- .1 Maintain accurate records of poured concrete items to indicate date, location of pour, quantity, air temperature and associated concrete testing.
- .2 Ensure that reinforcement and inserts are not disturbed during concrete placement.
- .3 In locations where new concrete is dowelled to existing work, drill holes in existing concrete and insert steel dowels and pack solidly with non-shrink grout to positively anchor dowels.
- .4 Excessive honeycomb or embedded debris in any concrete shall deem it defective. Remove and replace defective concrete.

**4.2 CONCRETE COVER OVER REINFORCEMENT**

.1 Ensure alignment of reinforcing steel as follows:

<u>Tolerance, plus or minus</u>	<u>Item</u>
5 mm	Slabs
10 mm	Other structural members
50 mm	Rebar bends & ends

The minimum concrete cover to be provided is as per specification section: 03 20 00 or as shown in the drawing.

- .2 The cover and protection for reinforcement in concrete utilized in a corrosive environment shall be as per CSA A23.1.

#### **4.3 CONCRETE SUPPLY**

- .1 Ready mix concrete to be used.
- .2 All concrete to contain a cement dispersing agent in accordance with the manufacturer's recommendations.

#### **4.4 PLACING CONCRETE**

- .1 Notify Consultant a minimum of 24 hours prior to commencement of concrete placement.
- .2 Place concrete in accordance with CSA A23.1 and additionally, as specified herein.
- .3 Clean previously placed concrete with steel brush and dampen prior to placing the next layer. Use mild acid only on approval by the Consultant.
- .4 In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels, and set solidly with H.I.T. two (2) parts adhesive as supplied by Hilti, or approved alternative.
- .5 Ensure all hardware and all other items to be cast into concrete are held securely and will not cause undue hardship in placing concrete.
- .6 Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, and other critical items are not disturbed during concrete placement.
- .7 Wire all waterstop to reinforcing to prevent folding during concrete placement.
- .8 Revise, reseal and correct improperly positioned reinforcing hardware and other embedded items immediately before concrete placement.
- .9 Place concrete in approximately horizontal layers such that each lift can be vibrated into the previous lift to that lines and levels indicated on the drawings.
- .10 Place concrete directly into its final position in forms. Do not spread concrete with vibrators.
- .11 Maximum vertical free fall of concrete is not to exceed 1200 mm in unexposed work or 800 mm in exposed work. Confine concrete with a suitable vertical drop pipe to prevent segregation.
- .12 Use internal vibrators in all sections where the sections are sufficiently large and supplement with external vibrators in the event satisfactory surfaces cannot be obtained.
- .13 Place concrete as a continuous operation, stopping only at construction joints indicated on the drawings or with the approval of the Consultant as follows:
  - .1 At centre of span of suspended slabs, beams, and joists.
  - .2 In walls and columns immediately above or below floor construction joints or directly over centroid of pile or pile cap, if applicable.
- .14 Construction joints in walls and grade beams, maximum spacing 12 m or as detailed.

- .15 Construction joints in walls must be watertight.
- .16 Separate exterior slabs on grade from vertical surfaces with 6 mm thick joint filler from bottom of slab to within 6 mm of finished slab surface.
- .17 Consolidate and screed floors, maintaining surface flatness of maximum 3 mm on 3 m. Pitch to drains 20 mm/m nominal, or as indicated on the drawings.
- .18 Use cold weather concreting, curing and protection methods in accordance with CSA A23.1 when the ambient temperature falls below 5°C. When the ambient temperature rises above 25°C, use hot weather concreting, curing and protection methods.
- .19 Maintain accurate records of concrete placement. Record date, location of placement, quantity, air temperature and all associated concrete testing.
- .20 Ensure specified concrete cover around reinforcing is maintained.
- .21 Honeycomb that exceeds 150 mm in any direction or embedded debris in concrete are not acceptable. Notify Consultant upon discovery of such defect.
- .22 Remove and replace defective concrete as directed by the Consultant.

#### **4.5 PLACING OF ARCHITECTURAL AND EXPOSED CONCRETE**

- .1 Place concrete in maximum horizontal lifts of 400 mm. Limit length of concrete placement to prevent cold joints.
- .2 Do not place concrete form one end for full height of placement.
- .3 Use sufficient vibration, consolidation and methods to ensure dense smooth concrete lines and surfaces free from bugholes, honeycomb, and cold joints.
- .4 Ensure that vibrator penetrates into the layer of fresh concrete immediately below the layer being placed to prevent stratification.
- .5 In hot weather, use set retarding agents to prevent cold joints, with permission of Consultants.
- .6 Review methods of concrete placing with Consultant prior to placement.
- .7 All concrete that is noted on drawings to receive a sandblast finish shall be rendered to a medium texture using approved equipment. Provide sample area of finish for Consultant's review and approval prior to commencing with work.

#### **4.6 COLD WEATHER CONCRETE WORK**

- .1 Cold weather concreting requirements are to be met when temperature falls below 5°C or there is a probability of falling to 5°C or below during the placing period.
- .2 Cold weather construction methods, curing and protection are to conform to CSA A23.1.
- .3 Concrete temperature at placing to be between 15°C and 30°C.
- .4 Placed concrete to be protected and maintained at a temperature of at least 10°C for not less than three (3) days or not less than 20°C for two (2) days and all concrete to be maintained above freezing for a minimum of seven (7) days.
- .5 Concrete to be protected from alternate freezing and thawing for a minimum of fourteen (14) days.
- .6 Protected and heated concrete to be brought gradually to ambient air temperature at a drop of not more than 15°C per 24 hour period.

- .7 Coverings for heating enclosure to be clear of concrete and forming surface for air circulation.
- .8 Frozen or otherwise defective concrete will be rejected.

#### **4.7 HOT WEATHER CONCRETE WORK**

- .1 When the air temperature is at or above 25°C or there is a probability of it rising to that limit or above during the placing period, the temperature of the concrete when deposited is not to be more than 25°C. To accomplish this, the mixing water, and if necessary the aggregate are to be cooled.
- .2 Where pours are massive, or where surfaces are to be trowel finished, or wood floated, use a retarder that will slow the initial set of the concrete.
- .3 When the air temperature is at or above 25°C, exposed surface of the concrete are to be shaded from the direct rays of the sun and sheltered from direct wind. Alternatively, all placing and finishing to be done at night.
- .4 Moist cure the concrete instead of using curing compounds.

#### **4.8 TOLERANCES**

- .1 Concrete work to be within the tolerances listed below:
  - .1 Variations of the linear building lines from established position in plan: 6 mm.
  - .2 Variation in cross-sectional dimensions of thickness of slabs: minus 6 mm OR plus 6 mm.
  - .3 Variations from the level or from grades indicated for surfaces of slabs shall not exceed 3 mm under a 3 m straight edge immediately after trowelling.
- .2 Remove and replace concrete that does not meet the above requirements at no cost to the Owner.

#### **4.9 PATCHING**

- .1 Patch imperfections when concrete is defective as follows:
  - .1 Chip down edges perpendicular to surface.
  - .2 Wet the area and brush on 1:1 cement-sand grout.
- .2 Patch with 1:2 cement-sand mortar with 10% hydrated lime.

#### **4.10 INSERTS/EMBEDDED PARTS/OPENINGS**

- .1 Provide formed openings where required for pipes, conduits, sleeves, and other work to be embedded passing through concrete members.
- .2 Refer to mechanical and electrical drawings for sleeves and openings required through structural components. These must not reduce the structural capacity. Locations and sizes not shown on the structural drawings are to be approved in writing by the Consultant.
- .3 Maximum size of electrical conduit in structural slabs is 1/3 of solid portion of slab thickness, and where more than two are adjacent to each other, they must be spaced at least 100 mm apart. Conduit must be placed in middle third of slab unless otherwise specified or approved in writing by the Consultant.
- .4 Reinforce around openings as noted on structural drawings.
- .5 Accurately locate and set in place, items that are to be cast directly into concrete.

- .6 Coordinate work of other sections and cooperate with the trade involved in forming and/or setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts. Do not perform work unless specifically indicated on drawings or approved prior to installation.
- .7 Install all concrete accessories in accordance with drawings and manufacturer's recommendations; straight, level, and plumb. Ensure adequate support to prevent movement during concrete placement.
- .8 Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close temporary ports or openings with tight fitting panels, flush with inside of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.
- .9 The only application where the use of fixed pins will be acceptable is for the installation of strapping and fixing and care must be taken to do as little damage as possible to the surrounding concrete.
- .10 Do not use aluminum inserts or conduits.

#### **4.11 GROUTING**

- .1 Grout beneath steel base and bearing plates after the steel has been erected. This grout is to be expanding type and be mixed and used according to the manufacturer's printed instructions.

#### **4.12 CURING**

- .1 Concrete curing to CSA A23.1.
- .2 Basic Curing: Keep concrete surface continuously moist until concrete temperature due to hydration has peaked and dropped several degrees, or for three days at a minimum temperature of 10°C.
- .3 Additional Curing: Immediately following basic curing and before the concrete has dried, cure for an additional four days, maintaining the temperature of the air in contact with the concrete above 10°C.
- .4 Acceptable curing methods:
  - .1 Ponding or continuous sprinkling.
  - .2 Absorptive mat or fabric kept continuously wet.
  - .3 Damp sand, earth, or similar moist material.
  - .4 Continuous steam vapour mist bath not exceeding 70°C.
  - .5 Curing compound.
  - .6 Waterproof paper or plastic film.
  - .7 Other moisture-retaining method approved by the Consultant.
- .5 Do not use curing compounds on concrete surfaces, which are expected to receive topping, hardener, or other type of bonded finish unless approved by the Consultant.
- .6 Protect freshly placed and consolidated concrete against damage or defacement from adverse weather conditions.
- .7 Exposed concrete walking surfaces not to receive an integral hardener: Coat with curing compound or curing method that provides permanent seal.
- .8 In areas with an exposed concrete floor surface, apply the hardener and dust-proofing agent strictly to the manufacturer's instructions.

- .9 Submit proposed methods of protection and curing when air temperature is at or above 25°C or at or below 5°C, or likely to be so with 24 hours of placing time.
- .10 Water for curing shall be clean and free from materials that will cause staining or discoloration of the concrete.
- .11 For horizontal surfaces, spread 50 mm of moist sand over the entire surface and keep saturated with water.
- .12 For vertical surfaces such as walls, columns, piers, loosen the forms, leave them in place and continuously apply water between the form and the concrete surface. Alternatively the forms may be removed and an absorptive woven fabric applied and kept continuously moist.
- .13 If moist curing is not used, then sprayed curing compounds are to be used.
- .14 Curing compounds to be of the liquid membrane type for curing concrete and shall be applied in strict accordance with the manufacturer's printed instructions.
- .15 Curing compounds used for exposed concrete must not discolor the concrete, nor be such as to prohibit the subsequent application of paint, tiles, parging or other coatings.
- .16 For horizontal surfaces, after the completion of finishing operations and immediately after the disappearance of surface moisture, apply the sprayed curing compound.

#### **4.13 PROTECTION**

- .1 Protection for concrete to CSA A23.1.
- .2 Under adverse weather conditions, make suitable arrangements to prevent damage to fresh concrete. All forms and reinforcing in contact with fresh concrete must have a surface temperature greater than 5°C.
- .3 Do not place concrete on frozen ground.
- .4 Do not place concrete on soil that has suffered any appreciable change in moisture until the soil has either dried out or been wetted so that its moisture content is normal and equal to that of the surrounding soil.
- .5 Conveying equipment, if supported by formwork, must not impart harmful vibrations to the green concrete nor cause misalignment of forms.
- .6 Protect freshly finished concrete floors from the elements and from defacement due to other construction or building operations. Provide and use tarpaulins or other protective material when necessary to cover completely or enclose all freshly finished concrete floors.

#### **4.14 FIELD QUALITY CONTROL**

- .1 Field Services:
  - .1 Field Services by the Consultant or his representative consists of periodic visits to the site for generally familiarizing with the progress and quality of the Work and to determine in general if it is progressing according to the contract documents, and the necessary paperwork related to these services.
  - .2 Field Services by the Consultant or his representative do not in any way relieve the Contractor of his responsibility to carry out the Work per the contract documents and contract drawings.
  - .3 The word "Consultant" is used in this specification to mean "Consultant" or "Consultant's Representative".
- .2 Damage:



- .1 Make good all areas damaged in connection with the contract regardless of the limits of the contract as shown on the drawings.

**4.15 CLEANING**

- .1 Clean up and remove from the site all rubbish and surplus material remaining from this work.

**END OF SECTION**

**1. GENERAL**

**1.1 SECTION INCLUDES**

- .1 The Contract Documents apply to and govern the work of this Section.

**1.2 REFERENCES**

- .1 ASTM C207--06 - Hydrated Lime for Masonry Purposes.
- .2 ASTM C1489-01(2008)e1 - Lime Putty for Structural Purposes.
- .3 CSA 165 Series-04 – Concrete Masonry Units.
- .4 CSA A179-04 - Mortar and Grout for Unit Masonry.
- .5 CAN/CSA A3000-08 - Cementitious Materials Compendium.
- .6 CSA S304.1-04 – Design of Masonry Structures.

**1.3 QUALITY ASSURANCE**

- .1 Perform masonry work in accordance with requirements of CSA S304.1, unless indicated otherwise herein.
- .2 Perform mortar and grout work in accordance with requirements of CSA A179, unless indicated otherwise herein.
- .3 Masonry Contractor shall be a Member in good standing of the Masonry Contractors Association of Alberta.

**1.4 TESTING**

- .1 Testing of mortar mixes is to be performed by a firm appointed by and paid for by the Owner if required by the Consultant.
- .2 If mortar mixes do not conform with requirements stated herein, re-establish and re-submit mortar mix for further testing. Pay all costs for required testing.

**1.5 JOB CONDITIONS**

- .1 Maintain materials and surrounding air temperature to minimum 10°C prior to, during and 48 hours after completion of masonry work.
- .2 During freezing or near freezing weather ensure provision of adequate equipment and/or cover to maintain a minimum temperature of 10°C and to protect masonry work completed or in progress.

**1.6 SCAFFOLDING EQUIPMENT**

- .1 Furnish, install and maintain scaffolding as long as necessary and remove when no longer required, safe and adequate scaffolding and other equipment necessary for the proper execution of the work.

## **2. PRODUCTS**

### **2.1 MORTAR MATERIALS**

- .1 Mortar shall be Type "S" conforming to CSA A179.
- .2 Portland Cement used in mortar shall conform to CSA A3001.
- .3 Where lime putty is used in preparing mortar, it shall be made by soaking quick lime in water for at least 24 hours by soaking hydrated lime in water for at least 12 hours.
- .4 Masonry cement used in mortar shall conform to CSA A3002.
- .5 Aggregates: Standard masonry type, conforming to requirements of CSA A179; to be clean and dry and protected against dampness, freezing and foreign matter.
- .6 Hydrated Lime: Conforming to requirements of CSA ASTM C207.
- .7 Quicklime: Non-Hydraulic type conforming to requirements of ASTM C1489.
- .8 Premix Mortar: Commercially prepared type conforming to requirements of CSA A179.
- .9 Water: Clean and free from injurious amounts of oil, alkali, organic matter or other deleterious material.
- .10 Additional admixtures may be used only with written permission of the Consultant.

## **3. EXECUTION**

### **3.1 MORTAR MIX**

- .1 Thoroughly mix mortar ingredients, in quantities needed for immediate use.
- .2 Add admixtures and colour agent in strict accordance with manufacturer's recommendations. Ensure uniformity of mix and coloration.
- .3 Do not use anti-freeze compounds to lower the freezing point of mortar.
- .4 If necessary, retemper mortar within two (2) hours of mixing to replace water lost by evaporation. Do not retemper mortar after two (2) hours of mixing.

### **3.2 JOINING OF WORK**

- .1 Where fresh masonry joins masonry that is particularly set or totally set, the exposed surface of the set masonry shall be cleaned and lightly wetted so as to obtain the best possible bond with the new work.
- .2 Remove loose masonry and mortar. If it becomes necessary to "Stop Off" a horizontal run of masonry, this shall be done only by raking back ½ masonry unit length in each course. Tothing will not be permitted except upon written approval of the Consultant.
- .3 Where masonry abutts completed masonry, ensure that joint reinforcing is continuous, except at control joints.

### **3.3 JOINTS**

- .1 All masonry joints exposed to view shall be finished as follows:

Concrete masonry to match existing condition.

Joints shall be pointed as work progresses.

### **3.4 WINTER CONSTRUCTION**

- .1 In accordance with CSA S304.1 and CSA 371.
- .2 For masonry work that will be done below 5°C:
  - .1 Measure temperatures of masonry material prior to use.
  - .2 Maintain temperatures as close as possible for mortar batches.
  - .3 Ensure maintenance of mortar temperatures on mortar boards does not exceed 50 °C.
  - .4 Use dry masonry units or units which have not been wet and are frozen.
  - .5 Lay masonry on unfrozen surfaces free from snow or ice.
  - .6 Use windbreaks during laying masonry not protected by enclosures when wind exceeds 25 km/hr.
  - .7 Provide a high-low registering thermometer where directed on site.
- .3 When mean air temperature will, over a 24 hours period, go below 5°C but, not below 0°C, conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C. Protect entire constructed masonry by enclosing within weatherproof membrane for 24 hours.
- .4 When mean air temperature will, over a 24 hours period, go below 0°C but not below -4°C, conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C, and maintain temperature of mortar boards above 0 °C. Protect entire constructed masonry by enclosing within weatherproof membrane for 24 hours.
- .5 When mean air temperature is below -4°C, conduct laying of masonry in enclosures heated to maintain air temperature above 0°C. Conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C, and heat units, if necessary, so that temperature of unit at time of laying is minimum -7 °C. Maintain enclosure in position for 24 hours and maintain air temperature within enclosure at minimum 0°C.

### **3.5 CLEANING**

- .1 Before cleaning, all holes in exposed masonry shall be filled, and defective joints shall be cut out and repointed with mortar. Exposed masonry shall be protected against staining by wall coverings and excess mortar shall be wiped off the surface of the masonry units as the work progresses.
- .2 Before applying any cleaning agent to the entire wall, apply to a sample wall area of approximately 2m<sup>2</sup>, in a location approved by Consultant. No further cleaning work may proceed until the sample area has been approved by the Consultant, after which time the same cleaning materials and methods will be used on the remaining wall area.

- .3 If still brushes do not suffice, the surface of the masonry shall be THOROUGHLY wetted with clear, clean water, and then scrubbed with a solution of Sure-Klean or Brick-Klenz, or approved equal may be used in strict accordance with another THOROUGH rinsing with clear, clean water. A solution with muriatic acid shall not be used.
- .4 If masonry is cleaned with any solution containing acid, all sash, metal lintel and other corrosive parts shall be protected.

### **3.6 COMPLETION AND CLEAN UP**

- .1 On completion or whenever directed by the Consultant, the Contractor shall clean up and remove from the premises all rubbish and waste material and leave everything in a neat and finished condition.

**END OF SECTION**

### 1.1 General

### 1.2 SECTION INCLUDES

- .1 Fluid applied membrane coating.

### 1.3 REFERENCES

- .1 ASTM D412 - Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
- .2 ASTM D903 - Peeling or Stripping Strength of Adhesive Bond.
- .3 ASTM D1044 - Resistance of Transparent Plastics to Surface Abrasion.
- .4 ASTM D1360 - Fire Retardancy of Paints (Cabinet Method).
- .5 ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- .6 ASTM E96 - Test Methods for Water Vapour Transmission of Materials.
- .7 ULC (Underwriters Laboratories of Canada) - List of Equipment and Materials for:
  - .1 Building Materials.
  - .2 Fire Resistance.
  - .3 Firestop Systems and Components.

### 1.4 SUBMITTALS

- .1 Submission Procedures: Section 01 33 00.
  - .2 Product Data: Include product characteristics, limitations, and identify dissolving solvents, fuels, and potential destructive compounds.
  - .3 Manufacturer's Installation Instructions: Include special environmental conditions required to install the Product and Potential incompatibilities with adjacent materials.
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1.5 MAINTENANCE DATA

- .1 Submission Procedures: Section 01 33 00.
- .2 Maintenance Data: Include procedures for stain removal, repairing surface, and cleaning.

1.6 QUALIFICATIONS

- .1 Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- .2 Applicator: Company specializing in performing the work of this section approved by manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, protect, and handle products in accordance with manufacturer's recommendations.
- .2 Maintain ambient temperature of 13 degrees C (55 degrees F).
- .3 Keep away from fire or open flame.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install materials when temperature is below 10 degrees C (50 degrees F) or above 32 degrees C (90 degrees F).
- .2 Maintain this temperature range, 24 hours before, during and 72 hours after application.
- .3 Restrict traffic from area where materials are being installed or are curing.

1.9 WARRANTY

- .1 Provide five (5) year warranty. Include coverage for delamination of system from substrate, degradation of waterproofing ability.
-

## 1.10 Products

### 1.11 MATERIALS

- .1 Pigmented, textured, two-component, solvent-free, odourless, moisture-insensitive, water-based, epoxy resin. Provides a non-slip floor finish with good abrasion and chemical resistant properties:
  - .1 Two-Coat Application System.
  - .2 Properties at 23°C (73°F) and 50% R.H.
    - .1 Density kg/L (lb/US gal.):
      - .1 Component A: 1.9 (15.8)
      - .2 Component B: 1.05 (8.73)
      - .3 Component A+B: 1.6 (13.34)
    - .2 Curing Time: 20°C (68oF), fully cured after 10 days.
    - .3 Solid Content: 67% by weight. Abrasion Resistance: 259 mg (0.0091 oz).
    - .4 Chemical Resistance: Resistance against saturated salt solutions, diluted alkaline solutions, all fuels, mineral oils, grease and cleaning solutions.
    - .5 Surface Preparation: Concrete compressive strength should be at least 25 MPa (3625 psi) at 28 days and at least 1.5 MPa (218 psi) in tension at the time of product application.
- .2 Accessories:
  - .1 Provide manufacturer's recommended primer for substrate.
- .3 Base:
  - .1 Provide 100mm high resilient base to all rooms receiving a traffic coating.
- .4 Acceptable products:
  - .1 SikaFloor Duochem 6001 or approved alternative.
  - .2 Resilient Base: 100mm high with integral cove. Johnsonite or approved equal.

### 1.12 Execution

#### 1.13 EXAMINATION

- .1 Verify that substrate is ready to receive work, surface is clean, dry and free of substances which could affect bond.
- .2 Verify environmental conditions, adjacent and abutting work and substrates are prepared in accordance with manufacturing recommendations for application. Where deficiencies are found, they are to be clearly identified and remedied to meet manufacturer's recommendations.



- .3 Provide all products necessary to comply with manufacturer's recommendations, including but not limited to: cleaners, primers, separation products, fillers.
- .4 Do not begin work until concrete substrate has cured 28 days, minimum, and measured moisture content is not greater than 16 percent.
- .5 Test concrete surfaces with litmus paper for acceptable level of alkalinity.
- .6 Commencing work will constitute acceptance of conditions.

#### 1.14 PREPARATION

- .1 Clean substrate surface free of foreign matter.
- .2 Patch concrete substrates with filler to produce surface conducive to bond.
- .3 Protect adjacent surfaces.

#### 1.15 INSTALLATION

- .1 Apply system materials in accordance with manufacturer's written instructions.
- .2 Apply first coat diluted by 10% water, 5 m<sup>2</sup>/L (200 ft<sup>2</sup> / US gal).
- .3 Allow 12 hours for first coat to cure, apply second coat (undiluted) 3 m<sup>2</sup>/L (120 ft<sup>2</sup> / US gal).
- .4 Use manufacturer's recommended textured roller to achieve coating non-slip, non-skid texture.
- .5 Apply 10% by weight of oven dried silica sand for vehicle and pedestrian ramps.

#### 1.16 PROTECTION OF FINISHED WORK

- .1 Protect finished work.
  - .2 Do not permit traffic over unprotected surfaces.
-

1.17SCHEDULE

- .1 Provide traffic coating to entire floor and integral cove base to entire perimeter to room numbers 103, 106, 109, 111, 115, 116 and 121.
- .2 Provide a continuous, 100mm high integral cove resilient base to all locations where traffic coatings are scheduled.

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
  - .1 Material and installation of site applied paint finishes to new interior surfaces, including site painting of shop primed surfaces.

1.2 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 - current edition
- .6 Society for Protective Coatings (SSPC)
  - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
- .7 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34

1.3 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 Conform to latest MPI requirements for interior painting work, including preparation and priming.
- .3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
- .4 Paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.
- .5 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements and submit to Departmental Representative if requested.
- .6 Standard of Acceptance:
  - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Final coating to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .7 Pre-Installation Meeting:
  - .1 Convene pre-installation meeting one week prior to beginning work of this Section.
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .3 Coordination with other building subtrades.
    - .4 Review manufacturer's installation instructions and warranty requirements.
- .8 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

#### 1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Provide paint products meeting MPI "Environmentally Friendly" E1, E2, E3 ratings based on VOC (EPA Method 24) content levels. Wherever possible the lowest VOC rated product (E3) is to be used.

#### 1.5 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 in and about the building.

#### 1.6 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Product Data:
    - .1 Submit product data and manufacturer's installation/application instructions for each paint and coating product to be used.
    - .2 Submit manufacturer's product data for the use and application of paint thinner.
    - .3 Submit 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 Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures. Indicate where colour availability is restricted.
    - .2 After colours have been selected by Departmental Representative, 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:  
50 mm concrete block for finishes over concrete or concrete masonry surfaces.  
When approved, retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- Manufacturer's Instructions:
- .1 Submit manufacturer's installation and application instructions.
- Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
- .2 Product name, type and use.
  - .3 Manufacturer's product number.
  - .4 Colour numbers.
  - .5 MPI Environmentally Friendly classification system rating.
  - .6 Manufacturer's Material Safety Data Sheets (MSDS).
-

1.7 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 All materials to be new, unopened and clearly identified. Insert cross-referenced to room locations into the O & M Manual.
  - .4 Deliver to Departmental Representative and store where directed.

1.8 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 dry chemical fire extinguisher adjacent to storage area.
    - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
    - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
  
  - .9 Waste Management and Disposal:
    - .1 Dispose of waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
    - .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.
    - .3 Ensure emptied containers are sealed and stored safely.
    - .4 Unused paint and coating materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.
    - .5 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.
    - .6 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
    - .7 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
    - .8 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).
    - .9 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
-

1.9 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
    - .1 Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
    - .2 Provide continuous ventilation for seven days after completion of application of paint.
    - .3 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
    - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
    - .5 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 authority, Paint Inspection Agency Authority 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 are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
      - .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
    - .2 Perform painting work when maximum moisture content of the substrate is below:
      - .1 Allow new concrete to cure minimum of 28 days.  
Maximum moisture content 12%.
    - .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
-



- .4 Test concrete 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.

## 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, unless approved by Departmental Representative.
  - .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 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.
-

2.2 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award.
- .2 Colour schedule: no more than three colours will be selected in each area.
- .3 Selection of colours from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Departmental Representative's written approval.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Where necessary use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

Gloss @ 60	Sheen @ 85	degrees	degrees	Gloss Level
Max. 5	Max. 10	- Matte	Finish (flat)	Gloss Level 1
Max. 10	10 to 35	- Velvet-Like	Finish	Gloss Level 2
10 to 25	10 to 35	- Eggshell	Finish	Gloss Level 3
to 35	min. 35	- Satin-Like	Finish	Gloss Level 4
70	- Traditional	Semi-Gloss	Finish	Gloss Level 5
- Traditional	Gloss	Gloss Level 6	70 to 85	Gloss Level 7
Finish	More than 85	- High Gloss		

- .2 Gloss level ratings of painted surfaces as speified and as noted on Finish Schedule.

## 2.5 INTERIOR PAINTING SYSTEMS

- .1 Concrete horizontal surfaces: floors (Unless a traffic coating is specified):
  - .1 INT 3.2C - Epoxy low gloss finish.
- .2 Concrete masonry units: smooth face block:
  - .1 INT 4.2D - High performance architectural latex G5 finish. (Unless a High Build Coating is specified)
- .3 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
  - .1 INT 5.3B - Waterborne light industrial G5 coating.

## PART 3 - EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

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

### 3.2 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

### 3.3 EXAMINATION

- .1 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 Concrete: 12 %.
  - .2 Clay and Concrete Block/Brick: 12%.

### 3.4 PREPARATION

- .1 Protection:
    - .1 Protect existing building surfaces and adjacent structures from paint splatters, 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 general public in and about the building.
  - .2 Surface Preparation:
    - .1 Removal of electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.
    - .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, wiping with dry, clean cloths or compressed air.
    - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
    - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
    - .4 Allow surfaces to drain completely and allow to dry thoroughly.
    - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
    - .6 Use trigger operated spray nozzles for water hoses.
    - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
-

- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 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.
- .6 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.
- .7 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 blowing with clean dry compressed air or vacuum cleaning.
- .8 Touch up of shop primers with primer as specified.
- .9 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

### 3.5 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush, roller, air sprayer or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
  - .2 Brush and Roller Application:
    - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
    - .2 Work paint into cracks, crevices and corners.
    - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
    - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
    - .5 Remove runs, sags and brush marks from finished work and repaint.
-

- .3 Spray application:
  - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
  - .4 Brush out immediately all runs and sags.
  - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish closets and alcoves as specified for adjoining rooms.
- .10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

### 3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Prime and paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in garage area with colour and finish to match adjacent surfaces, except where items are plated with a prefinished cladding or otherwise noted. Mechanical and electrical installation and equipment to be identified in accordance with the requirements of the electrical and mechanical specification divisions.
  - .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.
  - .4 Keep sprinkler heads free of paint.
-

- .5 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 eye level 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.
- .6 Field inspection of painting operations to be carried out by Departmental Representative.
- .7 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .8 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

### 3.7 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.
- .6 Where a finished wall or ceiling is worked on, or damaged, by other trades or the General Contractor, after corrective work is completed to the wall or ceiling, repaint entire wall or ceiling surface to the nearest natural break in the wall or ceiling plane, such as an internal or external corner, projecting column, or ceiling bulkhead.