PROPOSED MIXED USE BUILDING

510-520 Taunton Road East,

Oshawa, Ontario

Structural Pretender

Project 22132

Date: **September 28, 2026**

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PART 1 GENERAL

1.1 Section Includes

.1 Work covered by contract documents
.2 Place of the Work
.3 Site access
.4 Work sequence
.5 Contractor use of premises
.6 Engineer design
.7 Designated substances: ACM and others
.8 Building smoking environment
.9 Special conditions
.10 Site security
.11 “By Others”
.12 Protection of Drawings

1.2 Work Covered by Contract Documents

.1 Work of this Contract comprises the construction of the Proposed Mixed Use Building (Structural Pretender) as indicated on the Contract Drawings and Specifications.

1.3 Place of the Work

.1 The Work of this Contract is located at 510-520 Taunton Road East, Oshawa, Ontario.

1.4 Metric Project

.1 This project is to be based on The International System of Units (SI). Measurements are expressed in metric (SI) units.

.2 All dimensions are to be shown in meters and millimeters.

1.5 Site Access

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

.2 Provide secure construction fencing as specified and where indicated.

1.6 Work Sequence

.1 Construct Work continuously.

1.7 Contractors Use of Premises

.1 Contractor has restricted use of site until Substantial Performance.

1.8 Engineer Design

.1 Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Ontario to design such work. Refer to Section 01 78 00.

1.9 Designated Substances: ACM and Others

.1 Any findings of undeclared ACM, or damaged ACM that could pose a risk to workers is to be brought to the attention of the Owner immediately, and work is to be stopped.

.2 All project design and construction activities must be carried out in compliance with the Regulations.

.3 No asbestos-containing materials, as defined by O. Reg. 278/05, may be specified or used in any project.

1.10 Verification

.1 All dimensions shall be verified on site, and all necessary modifications and adjustments shall be made as necessary to suit.

1.11 Building Smoking Environment

.1 Smoking and vaping are prohibited in all work places within the Owner’s buildings and on the Owner’s property.

1.12 Special Conditions

.1 The following general and special conditions apply:
.1 All openings in existing fire rated assemblies or fire separations which are created by the removal of existing services, plumbing, conduit, ductwork, fittings fixtures or accessories are to be firestopped to maintain the integrity of the existing construction.
.2 All exposed interior surfaces except prefinished surfaces shall be painted whether referred to in the specifications and drawings or not.

1.13 Site Security

.1 Daily Inspection: Provide inspection of the work areas daily while the work is in progress and take whatever measures are necessary to secure the construction zones from theft, vandalism and unauthorized entry.

1.14 “By Others”

.1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope of work but will be required to be done within the General Contractor's contract.

1.15 Use of Drawings

.1 Drawings are not to be scaled.

.2 Copies of architectural and structural “issued for construction” drawings in digital format will be made available for the contractors use under the following conditions.
.1 Copyright remains with BBA.
.2 The drawings will only be used for shop drawings for this project and not be put to any other use.
.3 BBA assumes no liability for errors or omissions in the drawings. The Contractor assumes all

risk and expenses associated with the use of drawings in the production of his work.

.4 References to BBA and other Consultants must be deleted from the title block.

.5 The Contractor signs a release available from BBA that addresses the above items in more detail.

.3 Arrangements for use of Sub-Consultant drawings must be made with the Appropriate Sub-Consultant.

1.16 Protection of Drawings

.1 Copyright of electronic document belongs to the Consultant. Electronic documents may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.

.2 Drawings, specifications and other contract related documents which are posted on Contractor controlled websites for access by sub-trades and suppliers, shall be posted only on password protected platforms with access only to those parties with an expressed interest in the Project.

.3 Provide Consultant and Owner with access to such websites as noted above.

PART 2 PRODUCTS

3.1 Not Used

.1 Not used

PART 3 EXECUTION

3.2 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requests for Information
.2 Submittal Procedures
.3 Screening of RFI's
.4 Response to RFI's
.5 Response Timing

1.2 Request for Information (RFI)

.1 A request for information (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents or to obtain additional information.

.2 An RFI shall not constitute notice of claim for a delay.

1.3 Submittal Procedures

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

.2 Number RFI's consecutively in one sequence in order submitted, in numbering system as established by the Contractor.

.3 Submit one distinct subject per RFI form. Do not combine unrelated items on one form.

.4 RFI Form:
  .1 Submit a draft "Request for Information" form to be approved by the Owner and Consultant.
  .2 Submit RFI's to the Consultant on approved "Request for Information" form. The Consultant shall not respond to an RFI except as submitted on this form.
  .3 Where RFI form does not have sufficient space to provide complete information thereon, attach additional sheets as required.
  .4 Submit with RFI form all necessary supporting documentation.

.5 RFI Log:
  .1 Maintain log of RFI's sent to and responses received from the Consultant, complete with corresponding dates.
  .2 Submit updated log of RFI's at each construction meeting.

.6 Submit RFI's sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do so will not be paid by the Owner.

.7 Only the Contractor shall submit RFI's to the Consultant.

.8 RFI's submitted by Subcontractors or Suppliers directly to the Consultant will not be accepted.

1.4 Screening of RFI's

.1 Contractor shall satisfy itself that an RFI is warranted by undertaking a thorough review of the Contract Documents to determine that the claim, dispute, or other matters in question relating to the performance of the Work or the Interpretation of the Contract Documents cannot be resolved by direct reference to the Contract Documents. Contractor shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review

description, or where the detail provided is, in the opinion of the Consultant, insufficient, shall not be reviewed by the Consultant and shall be rejected.

1.5 Response to RFI's

.1 Consultant shall review RFI's from the Contractor submitted in accordance with this section with the following understandings:
  .1 Consultant's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
  .2 Only the Consultant shall respond to RFI's. Responses to RFI's received from entities other than the Consultant shall not be considered.

1.6 Response Timing

.1 Allow 5 Working Days for review of each RFI by the Consultant.

.2 Consultant's review of RFI commences on date of receipt of RFI submission by the Consultant from Contractor and extends to date RFI returned by Consultant.

.3 When the RFI submission is received by Consultant before noon, review period commences that day. When RFI submittal is received by Consultant after noon, review period begins on the next Working Day.

.4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 5 Working Days, the Consultant will confer with the Contractor within 3 Working Days of receipt of such RFI's, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority among the RFI's submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Administrative
.2 Requests for Information
.3 Shop Drawings and Product Data
.4 Interference Drawings
.5 Samples
.6 Mock-Ups
.7 Certificates and Transcripts

1.2 Administrative

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

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

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

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

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

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

.7 Verify field measurements and affected adjacent work are coordinated.

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

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

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

1.3 Requests for Information (RFI’s)

.1 Refer to Section 01 26 15 – Requests for Information

1.4 Shop Drawings and Product Data

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, product data and other data which the Contractor provides to illustrate details of a portion of Work.

.2 Coordinate each submission with requirements of Work and Contract Documents. Individual

submissions will not be reviewed until all related information is available.

.3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in the Province of Ontario where required by the individual specification sections. Each submittal and each resubmittal must bear the stamp of the Engineer

.4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.

.6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.

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

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

.9 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.

.10 Accompany submissions with transmittal letter containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.11 Submissions shall include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.

.7 Operating weight.
.8 Wiring diagrams.
.9 Single line and schematic diagrams.
.10 Relationship to adjacent work.

.12 After Consultant's review, distribute copies.

.13 Submit one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

.14 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.

.15 Delete information not applicable to project.

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

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

.18 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that the Consultant 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.

1.5 Interference Drawings

.1 Prepare interference drawings to coordinate the installation of the work of all sections, within available space. Conflicts between trades which could be determined beforehand, by the careful coordination and preparation of interference drawings, shall be corrected at no expense to the Owner.

.2 Prepare interference drawings of all buried services as necessary to avoid conflicts with new or existing structures, foundations or services.

.3 Submit interference and equipment placing drawings as specified in Section 01 71 00, when requested by the Consultant.

1.6 Samples

.1 Submit for review samples as requested in respective specification Sections. Label samples with origin, manufacturer, product information, applicable specification section, and intended use.

.2 Notify Consultant in writing, at time of submission of deviations in samples from requirements of

Contract Documents.

.3 Where colour, pattern or texture is criterion, submit full range of manufacturer's samples.

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

.5 Make changes in samples which Consultant may require, consistent with Contract Documents.

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

1.7 Mock-Ups

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Administrative
.2 Fires
.3 Disposal of Wastes
.4 Drainage
.5 Site Clearing and Plant Protection
.6 Pollution Control
.7 Unanticipated Soil Contamination

1.2 References

.1 Statutes of Canada 1999 Chapter 33.
  .1 Canadian Environmental Protection Act 1999.
  .2 SOR/2003-289. Federal Halocarbon Regulations, 2003.
  .3 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
.2 OPSS 805 “Construction Specification for Temporary Erosion and Sediment Control Measures”.
.3 Province of Ontario Environmental Protection Act, R.S.O. 1990, c. E.19
.4 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

1.3 Administrative

.1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation, including those referenced above.

.2 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.

.3 It is the Contractor’s responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.

.4 It is the Contractor’s responsibility to obtain and abide by permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction.

.5 All hazardous materials are to be stored with secondary containment

1.4 Fires

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

1.5 Disposal of Wastes

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.6 Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing deleterious substances into waterways, sewer or drainage systems.

.3 Protect storm drains against entry by sediment, debris, oil, or chemicals.

.4 Control disposal or runoff of water containing deleterious substances or other harmful substances in accordance with local authority requirements.

1.7 Site Clearing and Plant Protection

.1 Protect trees and plants on site and adjacent properties.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

.4 Restrict tree removal to areas indicated.

.5 Prevent unnecessary disturbance of topsoil and underlying soil from vehicles and heavy equipment.

.6 Minimize stripping of topsoil and vegetation.

.7 Comply with the requirements of Ontario Regulation O. REG 406/19, “On-Site and Excess Soil Management”, for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.8 Pollution Control

.1 Maintain, inspect, and repair temporary erosion and pollution control features installed under this contract on a weekly basis. Submit inspection logs to the Owner when requested.

.2 Control emissions from equipment and plant to conform to federal, provincial, and municipal requirements.

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.4 Take all measures necessary to prevent material and mud tracking on adjacent roads and streets.

.5 Use mechanical sweepers as often as necessary to keep adjacent roads and streets clean of material and mud that is deposited from this project.

.6 On site disposal or clean out of concrete trucks is not permitted. Any spillage of concrete onto asphalt or other surfaces must be cleaned up before spillage sets.

1.9 Unanticipated Soil Contamination

.1 Should unanticipated soil contamination be discovered:
  .1 Stop work and assess the situation for safety.
  .2 If situation does not appear to be safe, evacuate workers from area.
  .3 If safe to do so, take immediate steps to control any spread of contamination, in accordance with Contractor’s spill prevention and response plan.
  .4 Immediately contact the Consultant.

.2 Removal and disposal off site of contaminated materials shall comply with the requirements of Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 References
.2 Owner's Regulations
.3 Standards and Definitions
.4 Designated Substances
.5 Hazardous Materials
.6 Spills Reporting
.7 Protection of Water Quality
.8 Potable Water Systems
.9 Soils Management
.10 Access for Inspection and Testing
.11 Other Regulatory Requirements

1.2 References

.1 Perform Work in accordance with Ontario Building Code (OBC), National Fire Code of Canada (NFC), the Canadian Electrical Code CSA C22.1:21, including all Supplements and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Where a material is designated in the Contract Documents for a certain application, unless otherwise specified, that material shall conform to standards designated in the Code. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned Code.

.3 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.
.3 Manufacturer's instructions.

.4 Where requirements of Contract Documents exceed Code requirements provide such additional requirements.

.5 Where the Building Code or the Contract Documents do not provide all information necessary for complete installation of an item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

1.3 Owner's Regulations

.1 Conform to requirements, regulations and procedures of the Owner.

1.4 Standards and Definitions

.1 Where a reference is made to specification standards produced by various organizations and agencies, conform to latest edition of standards, as amended and revised to date of Contract.

.2 Have a copy of each specified standard which relates to your work available on the site to be produced immediately on Consultant's request.

1.5 Hazardous Materials

.1 Definition: "Hazardous Material" is material, in any form, which by its nature, may be flammable, explosive, irritating, corrosive, poisonous, or may react violently with other materials, if used, handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.

.2 Provide SDS for all materials brought to the Place of Work.

.3 Hazardous Materials will not be introduced for experimental or any other use prior to being evaluated for hazards.

.4 Make known to the Consultant those hazardous materials or designated substances intended to be used in the workplace and receive permission to use before introducing to the Owner’s property.

.5 Many common construction materials such as asbestos pipe and various insulations are designated substances and shall not be used under any circumstances.

1.6 Spills Reporting

.1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Consultant. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1999.

.2 All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.

.3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

1.7 Protection of Water Quality

.1 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geo-textile coverage will be required.

.2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the watercourses.

.3 Provide all de-watering and sedimentation control required to properly complete the work of this contract.

.4 Supply, install and maintain silt/sediment control fencing along the edge of the site to intercept construction runoff silt, to the satisfaction of the Owner.

1.8 Potable Water Systems

.1 Potable water systems in completed buildings must meet criteria and guidelines established by Provincial and Municipal authorities, prior to occupancy by the Owner.

.2 Upon completion, submit testing certificates verifying water quality and water systems meets all applicable Provincial and Legislated Standards

1.9 Soils Management

.1 Comply with the requirements of Ontario Regulation O. REG 406/19, “On-Site and Excess Soil Management”, for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.10 Access for Inspection and Testing

.1 Cooperate fully with and provide assistance to, all outside authorities including Building Inspectors, utilities, testing agencies and consultants, with the inspection of the Work.

1.11 Other Regulatory Requirements

.1 Conform to the requirements of the Ontario Ministry of Transportation, Regional and Local authorities regarding transportation of materials.

.2 Obtain required road occupancy permits.

.3 Pay any required roadway damage deposits required by the local municipality.

.4 Conform to the requirements of the Ontario Ministry of the Environment.

.5 Conform to the requirements of the Ontario Ministry of Labour.

.6 Conform to the requirements of the local Conservation Authority.

.7 Conform to all applicable local by-laws, regulations and ordinances.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Inspection
.2 Independent Inspection Agencies.
.3 Access to Work
.4 Procedures
.5 Rejected Work
.6 Reports
.7 Contractors Responsibilities
.8 Tests and Mix Designs
.9 Mock-Ups
.10 Equipment and Systems.

1.2 Inspection

.1 Contractor is responsible for Quality Control (QC).

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

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

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

.5 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 Independent Inspection Agencies

.1 Independent Inspection and Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor and paid from the cash allowances specified in Section 01 21 13. Refer to Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re-inspection.

1.4 Access to Work

.1 Allow inspection and testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 Procedures

.1 Notify Owner and Consultant 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples

1.6 Rejected Work

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other work damaged by such removals or replacements promptly.

.3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Consultant will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.7 Reports

.1 Submit electronic .pdf format inspection and test reports to Consultant.

.2 Provide copies to Subcontractor of work being inspected or tested or manufacturer or fabricator of material being inspected or tested.

1.8 Contractors Responsibilities

.1 Be responsible for the execution of the Construction Quality Plan and is to pay all costs for the execution of the Construction Quality Plan. Designate an experienced site representative for carrying out the Construction Quality Plan.

.2 Provide the Owner with a completed quality product for the Work. Contractor shall be responsible for any costs associated with re-testing and reperforming the Work as a result of the Contractor's poor performance or workmanship or other failure to comply with the Contract Documents.

.3 All Work shall be done by persons qualified in their respective trades, and the workmanship shall be first-class in every respect. Contractor is responsible for ensuring employees are appropriately trained. All materials and equipment furnished shall be the best of their respective kinds for the intended use and unless otherwise specified, same shall be new and of the latest design.

.4 The Consultant will have the authority to reject Work that does not conform to the Contract Documents or may require special inspection or testing, whether or not such Work is to be then fabricated, installed or completed.

.5 Failure by a Contractor to conduct its operations, means and methods and coordinate proper

sequencing of the Work may cause the Owner to withhold payment or any other means deemed necessary to correct non-conforming Work.

.6 The Owner shall engage a testing firm to perform such engineering laboratory services and on-site inspection as deemed necessary by the Owner. The testing firm will determine compliance with the requirements of the Contract Documents. This Work will not be a service to the Contractors for the performing of tests and checking of materials required of the Contractors.

.7 Copies of test and inspection reports will be furnished to the Contractor. The laboratory and its representatives will be instructed to promptly call to the attention of the Contractor, any instance of non-compliance with the requirements of the Contract Documents. Failure to so notify the Contractor shall not relieve the Contractor of any of its responsibilities for compliance or making good workmanship or materials which are not in compliance with the requirements of the Contract Documents. The agency shall notify the Consultant and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services

.8 Contractor's construction materials, procedures and work shall be subject to specified testing procedures and shall be in conformance with the Contract Documents as verified by Testing Agency.

.9 Cooperate with the testing firm and provide labor to assist with sample preparations where applicable.

.10 Except where specifically indicated to be provided by another entity as identified, inspections, tests, and similar quality control services including those specified to be performed by independent agency are the Contractor’s responsibility, and costs thereof are not to be included in contract sum.

.11 Cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to Work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at Project site.

.12 Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of Work and without the need of removal/replacement of work to accommodate inspections and tests. Scheduling of times for inspections, tests, taking of samples, and similar activities is Contractor’s responsibility.

.13 Where sampling and testing is required for Sections of Work listed in the Contract Documents, the tests shall be performed by an independent testing lab and paid for by the Contractor.

.14 Test procedures to be used shall be submitted for approval of the Consultant where other than those specified are recommended by the testing agency.

.15 Testing Agency Duties: The independent Testing Agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner, the Consultant and Contractors in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

.16 Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.9 Tests and Mix Designs

.1 Furnish test results and mix designs as requested.

1.10 Mockups

.1 Prepare mockups for Work specifically requested in specifications.

.2 Construct in locations acceptable to Consultant.

.3 Prepare mockups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mockups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Mock-ups may remain as part of Work unless indicated otherwise.

1.11 Equipment and Systems

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Barriers.
.2 Environmental Controls.
.3 Traffic Controls.
.4 Fire Routes.

1.2 Installation and Removal

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

.2 Remove from site all such work after use.

1.3 Site Fencing

.1 Provide temporary fencing around whole work site. Use modular free-standing fencing: galvanized, minimum 1.8m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed. Equip all gates with locks and keys. Maintain fence in good repair.

1.4 Guard Rails and Barricades

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs and wherever else necessary to prevent accidental falls.

.2 Provide as required by governing authorities.

1.5 Weather Enclosures

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

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

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

1.6 Dust Tight Screens

.1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

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

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 Protection of Building Finishes

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Consultant locations and installation schedule 3 days prior to installation.

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

1.9 Protection of Surrounding Work

.1 Provide protection for finished and partially finished Work from damage.

.2 Provide necessary cover and protection.

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

1.10 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 the public.

1.11 Fire Routes

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Product quality, availability, storage, handling, protection, and transportation.
.2 Manufacturer's instructions.
.3 Quality of Work, coordination and fastenings.
.4 Dielectric Separation
.5 Tolerances for Execution of Work.
.6 Protection of Work in progress.
.7 Existing Utilities

1.2 Definition – Basis of Design

.1 Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
  .1 Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

.2 Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
  .1 Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.

.3 Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 -Submittal Procedures.

1.3 Quality

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

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

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

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

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

1.4 Availability

.1 Review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Consultant.

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

1.6 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. Contractor shall be responsible for the unloading, handling and storage of such products.

1.7 Manufacturer’s Instructions

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re installation at no increase in Contract Price or

Contract Time.

1.8 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.

.2 Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

.3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.

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

1.9 Coordination

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 Concealment

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.11 Remedial Work

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 Location of Fixtures

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Consultant of conflicting installation. Install as directed.

1.13 Fastenings

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 Fastenings – Equipment

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 Dielectric Separation

.1 Ensure that a dielectric separator is provided in a permanent manner over entire contact surfaces to prevent electrolytic action (galvanic corrosion) between dissimilar materials. Similarly, prevent corrosion to aluminum in contact with alkaline materials such as contained in cementitious materials.

1.16 Tolerances for Execution of Work

.1 Unless specifically indicated otherwise, Work shall be installed plumb, level, square and straight.

.2 Unless acceptable tolerances are otherwise specified in specification sections, or are otherwise required for proper functioning of equipment, site services and mechanical and electrical systems:
- .1 “Plumb and level” shall mean plumb or level within 1 mm in 1m.
- .2 “Square” shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
- .3 “Straight” shall mean within 1 mm under a 1 m long straight edge.
- .4 “Flush” shall mean within:
  - .1 6 mm for exterior concrete, masonry and paving materials.
  - .2 1 mm for interior concrete, masonry, tile and similar surfaces.
  - .3 0.5 mm for other interior surfaces.

.3 Allowable tolerances shall not be cumulative

1.17 Protection of Work in Progress

.1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by Consultant, at no increase in Contract Price or Contract Time.

.2 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of the Consultant.

1.18 Existing Utilities

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants 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.

1.19 Hazardous Materials

.1 Report any found or suspected hazardous materials to the Owner.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Field Engineering survey services.
.2 Survey services to establish and confirm inverts for Work.
.3 Recording of subsurface conditions found.

1.2 References

.1 Owner's identification of existing survey control points and property limits.

1.3 Submittals

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

.2 Submit name and address of Surveyor to Consultant.

.3 On request of Consultant, submit documentation to verify accuracy of field engineering work.

.4 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.4 Examination of Work and Site

.1 Examine the site and existing buildings to be fully informed of their particulars as related to the Work.

.2 Verify dimensions of completed Work in place before fabrication of Work to be incorporated with it. Ensure that all necessary job dimensions are taken for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions.

.3 No claims for extra payment will be paid for extra work made necessary or for difficulties encountered due to conditions of the site which were visible or reasonably inferable from an examination of the site at the time prior to tender closing date and furthermore, failure of the Contractor to visit and examine the site shall be deemed a waiver of all claims for extra payment due to any condition of the site existing prior to tender closing date.

.4 As-found damage: Record by photography and submit evidence to Consultant before commencing work, any found damaged surfaces or materials adjacent to new work, and not included under scope of this new work. Remedial work to any damage, not so recorded, shall be the responsibility of the Contractor.

1.5 Qualifications of Surveyor

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

1.6 Survey Reference Points

.1 Existing control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Consultant.

.4 Report to Consultant when reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.7 Survey Requirements

.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement and landscaping features.

.4 Stake slopes and berms.

.5 Establish pipe invert elevations.

.6 Stake batter boards for foundations.

.7 Establish foundation and floor elevations.

.8 Establish lines and levels for mechanical and electrical work.

1.8 Existing Services

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings. The Contractor is responsible for coordination of all utility locates.

.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut off points as directed by Consultant.

.3 Where Work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to building occupants, pedestrian and vehicular traffic.

.4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

.5 Install temporary drain plugs to prevent construction debris from blocking pipes downstream of the work.

1.9 Location of Services, Equipment and Fixtures

.1 Location of services, equipment, fixtures and outlets indicated on drawings or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance. Include existing equipment which affects or will be affected by the work.

.3 Inform Consultant of impending installation and obtain approval for actual location.

.4 Location of site services where required, is approximate and is based on information provided by the Owner. Undertake all locates to determine exact locations of existing services and lay out new services to avoid any conflicts with new building elements, including site improvements, building foundations and other new or existing services.

.5 Submit field drawings and interference drawings to indicate relative position of various services and equipment. Refer to requirements for interference drawings specified elsewhere.

.6 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.

.7 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus and connections are coordinated.

.8 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance and access are indicated and maintained.

.9 Submit interference drawings to Owner and Consultant in accordance with Section 01 33 00.

.10 Unless specifically indicated by the Consultant, interference drawings will be received for information only and will not be reviewed.

1.10 Records

.1 Maintain a complete, accurate log of control and survey work as it progresses.

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

1.11 Subsurface Conditions

.1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requirements and limitations for cutting and patching the Work.

1.2 Submittals

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

.2 Submit written request and obtain Consultant's approval in advance of cutting or alteration which affects:
- .1 Structural integrity of any element of Project.
- .2 Integrity of weather exposed or moisture resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight exposed elements

.3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 .Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Date and time work will be executed.

1.3 Materials

.1 As specified and required for original installation.

.2 Requests for change in materials shall include documentation indicating conformance to project requirements and intent.

1.4 Definitions

.1 Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

.2 Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

PART 2 PRODUCTS

2.1 Materials

.1 General: Comply with requirements specified in other Sections.

.2 In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

.3 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 Preparation

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

3.2 General

.1 Carry out all cutting, fitting and patching required for the work of the Contract.

.2 Repair all wall and floor surfaces where items have been removed.

.3 Make good all finishes as required.

.4 Repaint damaged wall surfaces.

.5 Fit several parts together, to integrate with other Work.

.6 Uncover Work to install ill-timed Work.

.7 Remove and replace defective and non-conforming Work.

.8 Provide cutting and patching of all openings in non-structural elements of Work as necessary to complete installation of mechanical and electrical Work. Include complete removal and replacement of such elements as necessary to provide construction access.

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

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

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

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

.13 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.14 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with “ULC approved firestopping material, full thickness of the construction element. Include any openings in existing building elements created by removal of existing services or equipment.

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

3.3 Cutting and Patching

.1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

.2 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

.3 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

.4 Temporary Support: Provide temporary support of work to be cut.

.5 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

.6 Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 - Summary of Work.

.7 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

.8 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   .2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   .3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   .4 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
   .5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
   .6 Proceed with patching after construction operations requiring cutting are complete.

.9 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
   .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
   .2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and

refinishing.

.1 Clean piping, conduit, and similar features before applying paint or other finishing materials.

.2 Restore damaged pipe covering to its original condition.

.3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, colour, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.

.1 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

.4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

.5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

.10 Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.4 Subfloor Levelling

.1 Where new flooring is to be installed on new concrete slab or on framed floors, subfloor shall be levelled in accordance with flooring manufacturer's specifications and tolerances and with ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

3.5 Fire Barrier Seals

.1 Ensure fire separations are maintained as indicated on the drawings. patch and firestop all penetrations accordingly.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Progressive Cleaning
.2 Final Cleaning

1.2 References

.1 National Fire Protection Association (NFPA)
  .1 NFPA 241-22 Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.3 Project Cleanliness

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only.

.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 Provide and use clearly marked separate bins for recycling.

.7 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.

.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 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

PART 2 PRODUCTS

2.1 Products

.1 All cleaning materials and products shall be low VOC type. Submit list of cleaning products including SDS for approval prior to commencement of cleaning operations.

.2 Use only cleaning materials recommended by manufacturer of surface to be cleaned and recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 Final Cleaning

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.

.6 Clean lighting reflectors, lenses, and other lighting surfaces. Clean and/or replace lamps, light fixtures, grilles and lenses.

.7 HEPA vacuum clean and dust building interiors, behind grilles, louvres and screens.

.8 Thoroughly vacuum clean interior of electrical equipment.

.9 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.10 Clean and seal concrete floor surfaces with non-skid matte sealer.

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

.12 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.13 Broom clean and wash exterior paved areas, walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Clean and sweep roofs. Clear all drains, scuppers, gutters and downspouts.

.16 Remove debris and surplus materials from crawl spaces and other accessible concealed spaces.

.17 Remove snow and ice from access to building.

3.2 Waste Management and Disposal

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 References.
.2 Submittals.
.3 Definitions.
.4 Waste Management Goals for the Project.
.5 Documents.
.6 Waste Management Plan.
.7 Waste Audit.
.8 Waste Reduction Work Plan.
.9 Materials Source Separation Program.
.10 Disposal of Wastes.
.11 Scheduling.
.12 Storage, Handling and Protection.
.13 Application.
.14 Diversion of Materials.

1.2 References

.1 O. Reg. 102/94 Waste Audits and Waste Reduction Work Plans.
.2 O. Reg. 278/05 Occupational Health and Safety Act

1.3 Submittals

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

.2 Submit a completed Waste Management Plan (WMP) including Waste Reduction Workplan (WRW) and Materials Source Separation Program description prior to project start-up.

1.4 Definitions

.1 Waste Management Plan (WMP): Contractor's approved overall strategy for waste management including waste audit, waste reduction workplan and materials source separation program.

.2 Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors which contribute to waste.

.3 Waste Reduction Work Plan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

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

.5 Waste Management Coordinator (WMC): Designate individual who is in attendance on-site, full-time. Designate, or have designated, individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.

.6 Separate Condition: Refers to waste sorted into individual types.

1.5 Waste Management Goals for the Project

.1 The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing over packaging and poor quantity estimating.

.2 Of the waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling. Waste disposal in landfills or incinerators shall be minimized.

1.6 Documents

.1 Maintain at job site, one copy of following documents:
.1 Waste Audit
.2 Waste Reduction Workplan
.3 Material Source Separation Plan

1.7 Waste Management Plan

.1 Waste Management Plan: Submit a Waste Management Plan within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner. The Plan shall contain the following:
.1 Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight). In the case of demolition, a list of each item proposed to be salvaged during the course of the project should also be prepared
.2 Alternatives to Land Filling: Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.

.2 Post WMP or summary where workers at site are able to review its content.

1.8 Waste Audit

.1 Prepare Waste Audit prior to project start-up.

.2 Record, on Waste Audit , extent to which materials or products used consist of recycled or reused materials or products

1.9 Waste Reduction Work Plan

.1 Prepare WRW prior to project start-up.

.2 Reduce construction and demolition waste in compliance with O. Reg. 102/94.

.3 Reduction will involve action to minimize quantity of waste at source. Reuse products which would become waste where practical. Recycling will involve collection and source separation at the site, of materials for use as feedstock in manufacturing of new products.

.4 Conform to local Municipal and Regional Landfill Solid waste management requirements. Consider reduction, reuse and recycling of waste generated during construction such as dimensional lumber, clean drywall, concrete, brick, scrap metal and corrugated cardboard.

1.10 Materials Source Separation Program

.1 The Waste Management Plan shall include a Source Separation Program for recyclable waste and shall be in accordance with the established policies currently in place at the local Municipality, and the requirements of O. Reg. 102/94.

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

.3 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.

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

.5 Provide containers to deposit reusable and/or recyclable materials.

.6 Locate containers to facilitate deposit of materials without hindering daily operations.

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

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

1.11 Disposal of Wastes

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

.2 Provide appropriate on-site containers for collection of waste materials and debris. Containers for volatile wastes shall be closed containers and shall be removed from site daily.

.3 Provide and use clearly marked separate bins for recycling.

.4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.

.5 Remove waste material and debris from site and deposit in waste container at end of each working day.

.6 Do not permit waste to accumulate onsite.

.7 Burying of rubbish and waste materials is prohibited.

.8 Disposal of waste into waterways, storm, or sanitary sewers is prohibited.

1.12 Scheduling

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

1.13 Storage, Handling and Protection

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

.2 Materials from building demolition to be salvaged or re-used are to be removed and salvaged.

.3 Unless specified otherwise, materials for removal become Contractor's property.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Application

.1 Do work in compliance with Waste Management Plan.

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

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

3.2 Designated Substances

.1 All designated substances abatement, removal and disposal shall be completed in accordance with O. Reg 278/05 and all other applicable legislation.

3.3 Diversion of Materials

.1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Owner, and consistent with applicable fire regulations. Mark containers or stockpile areas.

.2 On-site sale of materials is not permitted.

End of Section

.

PART 1 GENERAL

1.1 Section Includes

.1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 References

.1 Canadian Construction Documents Committee
  .1 CCDC 2-2020 Stipulated Price Contract including Supplementary Conditions.
.2 OAA/OGCA Document 100 - Recommended Procedures Regarding Substantial Performance of Construction Contracts and Completion Takeover of Projects.
.3 The Construction Act.

1.3 Inspection and Declaration

.1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
  .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  .2 Request Consultant's review.

.2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:
  .1 Work has been completed and inspected for compliance with Contract Documents.
  .2 Defects have been corrected and deficiencies have been completed.
  .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
  .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA, ESA and other regulatory agencies have been submitted.
  .5 Operation of systems have been demonstrated to Owner's personnel.
  .6 Work is complete and ready for Final Review by the Consultant.

.4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.

.5 Declaration of Substantial Performance: when Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and Payment of Holdback for specifics to application.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.5 – Final Payment for specifics to application.

.8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2, General Conditions Article 5.4 - Substantial Performance of Work and Payment of Holdback.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

.

PART 1 GENERAL

1.1 Section Includes

.1 As built, samples, and specifications.
.2 Equipment and systems.
.3 Product data, materials and finishes, and related information.
.4 Operation and maintenance data.
.5 Spare parts, special tools and maintenance materials.
.6 Warranties and bonds.
.7 Final site survey.

1.2 Submittals

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

1.3 Submission

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 At least 2 weeks prior to commencement of scheduled commissioning activities, submit 2 copies of the draft Operating and Maintenance Manuals, for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor 1 draft copy, with review comments, for revision. Submit 1 copy of the revised Operating and Maintenance for approval prior to the production of final copies. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final Operating and Maintenance Manuals.

.3 Building will not be deemed ready for use unless the draft copies of the Operating and Maintenance Manuals and the "As-built" Record Documents have been submitted and reviewed by the Consultant.

.4 Building will not be deemed ready for use unless the completed and submitted Operating and Maintenance Manuals and "As-built" Record Documents have been accepted by the Consultant.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.4 Format

.1 Organize data in the form as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

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

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project

and identify subject matter of contents.

.5 Arrange content by Section numbers and sequence of Table of Contents.

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

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

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

.9 Provide 1:1 scaled CAD files in .dwg format. Provide duplicate copies on memory stick.

1.5 Contents Each Volume

.1 Table of Contents: provide title of project;
- .1 Date of submission; names.
- .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
- .3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:
- .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

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

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

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.6 As-Builts and Samples

.1 In addition to requirements in General Conditions, maintain at the site for Consultant one record copy of:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Consultant.

1.7 Recording Actual Site Conditions

.1 Record information on set of drawings, provided by Consultant.

.2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
- .1 Measured depths of elements of foundation in relation to finish first floor datum.
- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.

.4 Submit following drawings:
- .1 Record changes in red. Mark on one set of prints and at completion of project prior to final inspection, produce electronic “as-built” records on disk using latest version of AutoCad. Annotate “AS-BUILT RECORD” in each drawing title block.
- .2 All changes shall be shown on a separate drawing layer named "as-built".
- .3 At least 2 weeks prior to commencement of scheduled commissioning activities, submit one copy of the draft “As-built” Project Record Documents for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor the draft copy, with review comments, for revision. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final “As-built” Project Record Documents and disk of “as-built” record drawings.

.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.

1.8 Final Survey

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 Equipment and Systems

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance

curves, with Engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor’s co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.

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

1.10 Materials and Finishes

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.11 Spare Parts

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Spare parts as identified in individual sections are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.

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

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

1.12 Maintenance Materials

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Maintenance materials are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.

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

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

1.13 Special Tools

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

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

.3 Special tools are to be delivered to the Owner prior to the application for Substantial Performance.

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

1.14 Storage, Handling and Protection

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.
.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.15 Warranties and Guarantees

.1 Separate each warranty or guarantee 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 guarantees, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

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

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

.6 Co-execute submittals when required.

.7 Retain warranties and guarantees until time specified for submittal.

1.16 Independent Specialty Engineers Sign-Off

.1 Prior to Substantial Performance, provide copies of signed and stamped engineers review and sign-off letters stating that the work has been built in accordance with their drawings and designs. Conditional or vague letters of sign-off will not be accepted. All specialty design engineers for all sub-contractors and suppliers will be required to review the work in progress at appropriate intervals to ensure compliance with their designs and drawings and shall provide final sign-off letters. Provide copies of all field reports issued by specialty engineers. Carry all costs associated with full compliance with this requirement.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 20 00 Concrete Reinforcing
.2 Section 03 30 00 Cast-in-Place Concrete
.3 Section 05 50 00 Metal Fabrications
.4 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 American Concrete Institute (ACI)
  .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
  .2 ACI 347R-14 Guide to Formwork for Concrete
  .3 ACI SP-4-14 Formwork for Concrete
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples
  .3 CSA O86:19 Engineering Design in Wood
  .4 CSA O121-2017 (R2022) Douglas Fir Plywood
  .5 CSA O141:23 Canadian Standard Lumber
  .6 CSA S269.1-16 (R2021) Falsework and Formwork
.3 Canadian General Standards Board (CGSB)
  .1 CGSB 41-GP-35M Polyvinyl Chloride Waterstop
.4 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 1204 Material Specification for Polyvinyl Chloride Waterstops

1.4 Submittals

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

.2 Shop Drawings:
  .1 Submit shop drawings showing type, extent and locations of items to be built into concrete.
  .2 Sleeving Drawings: Submit drawings showing sleeves required through floors, roof and other structural members.
  .3 Submit drawings showing size and spacing of conduits and piping.
  .4 Coordinate with other Divisions prior to submittal.
  .5 Do not commence placing sleeves, conduits, or piping before drawings have been reviewed and Consultant's comments incorporated on drawings issued to site.
  .6 Assume responsibility for accuracy of Work. Review of submitted shop drawings does not relieve Contractor from compliance with requirements of Contract Documents.

.3 Required by Regulatory Agencies: Submit shop drawings bearing signature and seal of Professional Engineer responsible for formwork design, as may be required by regulatory Agencies. Proceed with construction of formwork only with their approval.

1.5 Quality Assurance

.1 Obtain a copy of CSA A23.1/A23.2 and maintain on site

.2 Design of Formwork: Assume full responsibility for complete structural design and construction of formwork in accordance with CSA S269.1 and CSA O86, as applicable.
.1 The design and engineering of the formwork, as well as its' construction, shall be the responsibility of the Contractor.

.3 Formwork shall be designed for the loads and lateral pressures outlined in the ACI publication "SP-4 Formwork for Concrete" and wind pressures and allowable stresses as set down in the National Building Code and in accordance with CSA A23.1 and A23.2. Formwork shall be of sufficient strength and rigidity to support all concrete and construction loads, taking into account proposed rate and method of pouring concrete so that the resultant finished concrete shall conform to the shapes, lines and dimensions of the members shown on the drawings.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Protect formwork to prevent functional damage and damage to faces affecting appearance of concrete surfaces exposed to view.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 All materials shall be new, in accordance with referenced standards.

.2 Plywood: Douglas Fir, conforming to CSA O121. Sound undamaged sheets finished one side, fabricated especially for use as concrete form panels, with sealed edges. Minimum 17mm thickness.

.3 Lumber: Conforming to CSA O141, with grade stamp clearly visible.

.4 Chamfers: Cut from 19mm x 19mm wood, smooth with no open defects.

.5 Form Ties: snap ties, with spreader washer and 25mm break back.

.6 Void Form: Honeycomb cellular core structure manufactured from kraft fibre. Top and sides protected with wax coated corrugated board, and bottom unprotected.

.7 Round Column Fibre Forms: Sonotube “W” Coated, by Sonoco Limited.

.8 Joint Tape: non-staining, water impermeable, self-release.

.9 Nails, Spikes and Staples: Galvanized, conforming to CSA B111.

.10 Dovetail Anchor Slots: As specified in Section 04 05 19.

.11 Waterstops: PVC Waterstop to CGSB 41-GP-35M, types 2 and 3 and OPSS 1204:
.1 Construction Joints, Internal Waterstop. 150 mm wide, ribbed, centre bulb style tapered thickness varying from 9.5 mm minimum near centre to 6.4 mm minimum near edge.
.1 Wirestop PVC Waterstop type CR-6380, with steel wire fastening loops, by Paul Murphy Plastics Company.
.2 Vinylex PVC Waterstop type RB6-38 ribbed with centre bulb, by Gamco Inc.
.3 Durajoint PVC Waterstop type 5, by Durajoint Concrete Accessories.
.4 PVC Waterstop Type 6380, by W. R. Meadows of Canada Ltd.

.12 Form Release Agent: Colourless mineral oil which will not stain concrete.

.13 For concrete surfaces exposed to view, provide panels smooth and free of defects which would be reproduced as concrete blemishes.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which affects this work.

.2 Notify the Consultant of any conditions which would prevent proper completion of this work.

.3 Commencement of work implies acceptance of existing conditions.

3.2 Erection

.1 Verify lines, levels and centres before proceeding with formwork. Ensure dimensions agree with drawings.

.2 Align joints and make watertight, to prevent leakage of cement paste and disfiguration of concrete.

.3 Construct formwork to produce concrete with dimensions, lines and levels within tolerances specified in ACI 347R-14.

.4 Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in and passing through concrete members.

.5 Install chamfers at all external corners exposed to view.

.6 Waterstops:
.1 Install waterstops to provide continuous water seal.
.2 Do not distort or pierce waterstop in way as to hamper performance.
.3 Do not displace reinforcement when installing waterstops.
.4 Use equipment to manufacturer's requirements to field splice waterstops.
.5 Tie waterstops rigidly in place.
.6 Use only straight heat sealed butt joints in field.
.7 Use factory welded corners and intersections unless otherwise approved by Consultant.

.7 Voidform: Install voidform and place 7.5 mm thick plywood over voidform, to provide firm surface for supporting reinforcement.

.8 Round Fibre Forms:
.1 At concealed locations, provide uncoated fibre form.

.2 Provide round fibre form where indicated for piers, equipment bases, light pole bases, fence foundation and wherever indicated or required.

.9 Adequately brace and shore formwork to sustain loads (both concrete and working loads) applied during construction.

.10 Be responsible for safety of the structure both before and after the removal of forms, until the concrete has reached its specified 28 day strength.

3.3 Built-In Work

.1 Form openings and build in anchors, inserts, sub-frames, key-ways, sleeves, miscellaneous metal items, reglets and similar items furnished under Work of other Sections, which are indicated on Drawings and on shop drawings of other trades, and as required for proper completion of Work.

.2 Do not embed wood in concrete.

.3 Anchor Bolts: Tie anchor bolts securely in position to prevent movement during concrete placing. Use template to locate bolts. Verify that bolts have specified projection above concrete.

.4 Openings or Sleeves Not Shown on Structural Drawings:
.1 Obtain Consultant's written approval before forming openings of sleeves through columns and beams, or through slabs within 1800 mm of their supports.
.2 Obtain Consultant's written approval before forming openings or sleeves larger than 200 mm square in any location.

.5 Embedded Pipe or Conduit Not Shown or Detailed on Structural Drawings:
.1 Obtain Consultant's written approval before placing conduit or pipe which would be embedded in finished structure.

.6 Confirm that built-in items that penetrate surface waterproofing are installed to meet requirements of waterproofing trade.

3.4 Construction Joints

.1 Form construction and expansion joints with bulkheads to ensure straight lines. Immediately before subsequent pour at construction joint, remove bulkhead and tighten forms so that concrete surfaces will be on same plane with no overlapping of concrete.

.2 Review with Consultant proposed location and details of construction joints in walls, columns, beams and slabs.
.1 Construction joints shall present appearance of normal form panel joint.
.2 Install continuous shear key in construction joints in walls and framed floors which are 152mm or more thick.
.3 Provide vertical construction joints in walls at not more than 20 metres centre to centre.
.4 Provide waterstops in accordance with manufacturer’s instructions at construction joints in walls which retain earth. Waterstops shall be continuous.

3.5 Treatment of Formwork Surfaces

.1 Form Release Agent:
.1 Coat formwork with form release agent before reinforcement, anchors, accessories, and other built in items are installed.

.2 Do not coat plywood forms pre-treated with release agent.
.3 On surfaces to receive finish materials, adhesives, sealers, paint or other coatings or materials, use a compatible release agent.

3.6 Stripping of Formwork

.1 Strip formwork on vertical surfaces when concrete has hardened sufficiently that no damage will result from stripping operations.

.2 Do not remove plywood formwork by jerking loose or by metal pinch bars. Use wood wedges and gradually force panels loose. Leave plywood forms in place as long as possible to permit maximum shrinkage away from concrete.

.3 Take particular care not to damage external corners when stripping formwork.

.4 When forms are stripped during curing period, cure and protect exposed concrete in accordance with Section 03 30 00 - Cast-in-Place Concrete.

3.7 Defective Work

.1 Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective work.

.2 Replace defective work, as directed by Consultant.

.3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if work has proven to be deficient.

.4 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 30 00 Cast-in-Place Concrete
.3 Section 04 05 19 Masonry Anchorage and Reinforcing
.4 Section 04 22 00 Concrete Unit Masonry

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A143/A143M-07(2020) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
  .2 ASTM A1064/A1064M-22 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
.2 American Concrete Institute (ACI)
  .1 ACI SP-66 (04) ACI Detailing Manual
.3 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA A23.3:19 Design of Concrete Structures
  .3 CSA G30.18:21 Carbon Steel Bars for Concrete Reinforcement
  .4 CSA G40.20-13/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .5 CSA W186:21 Welding of Reinforcing Bars in Reinforced Concrete Construction
.4 Reinforcing Steel Institute of Canada (RSIC)
  .1 RSIC Reinforcing Steel Manual of Standard Practice

1.4 Submittals

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

.2 Shop Drawings:
  .1 Submit shop drawings, including placing drawings and bar lists.
  .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice and the typical details included with Contract Documents.
  .3 Prepare placing drawings to minimum scale of 1:50.
  .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
  .6 Show concrete cover to reinforcement.
  .7 Show location of construction joints.

.3 Inspection Reports: Inspection and Testing Company shall:
  .1 Submit written reports of inspection and tests.
  .2 Distribute reports as follows:
    .1 Consultant.

.2 Contractor.

.4 Quality Assurance Submittals:
.1 Mill Test Report: provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
.2 Submit in writing proposed source of reinforcement material to be supplied.

1.5 Quality Assurance

.1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.

.2 Qualifications: Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186.

.3 Source Quality Control: Source Quality Control may be performed by an Inspection and Testing Company appointed by Consultant.

.4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.

.5 Identify and correlate reinforcing steel from Canadian mills with test reports for compliance with requirements specified.

.6 Test unidentified reinforcing steel at expense of Contractor. Perform testing for each 1 tonne or part thereof supplied for incorporation in Work.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 In accordance with reference standards.

.2 Substitute different size bars only if permitted in writing by Consultant.

.3 Bar Reinforcing Steel:
.1 Bars which are to be welded by arc-welding process: to CSA G30.18, Grade 400W.
.2 Other bars: to CSA G30.18, Grade 400R.

.4 Plain round bars: to CSA G40.20-04/G40.21.

.5 Welded Wire Fabric: to ASTM A1064/A1064M and in flat sheets, not rolls.

.6 Cold-drawn annealed steel wire ties: to ASTM A497.

.7 Chairs, bolsters, bar supports, spacers: to CSA A23.1.

.8 Mechanical splices: subject to approval of Consultant.

2.2 Fabrication

.1 Fabricate reinforcing steel only in permanent fabricating shop.

.2 Fabricate reinforcing steel in accordance with shop drawings.

.3 Tag reinforcing bars to indicate placement as designated on shop drawings.

.4 Splices:
.1 Provide splices only where specifically indicated on Drawings.
.2 Stagger alternate mechanical splices 750 mm apart.
.3 Stagger alternate end bearing splices 750 mm apart.
.4 Install on threaded splices, plastic internal coupler thread protector and plastic bar end thread protector.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which affects this work.

.2 Examine formwork to verify that it has been completed, and adequately braced in place.

.3 Notify the Consultant of any conditions which would prejudice proper completion of this work.

.4 Commencement of work implies acceptance of existing conditions.

3.2 Installation

.1 Place reinforcing steel in accordance with reviewed placing drawings, typical details, and CSA A23.3.

.2 Adequately support reinforcing and secure against displacement within tolerances permitted.

.3 Place reinforcing steel to provide minimum spacing and proper concrete cover as noted on drawings.

.4 Do not cut reinforcement to incorporate other Work.

.5 Relocate or rebend bars only on written instructions of Consultant.

.6 Tie reinforcement in place. Do not weld.

3.3 Adjusting

.1 Adjust and secure reinforcement in correct position immediately before concrete is placed.

.2 Remove contaminants which lessen bond between concrete and reinforcement.

3.4 Field Quality Control

.1 Provide competent supervisor, with at least three years of experience in reinforcement placement, to direct placement of reinforcement.

.2 Inspect placement of reinforcement for conformance with Drawings and Specifications, before each concrete placement, and correct as necessary.

.3 Consultant's periodic review of selected areas of reinforcement are for verification of conformity to design concept and general arrangement only and shall not relieve Contractor of responsibility for quality control, errors, or omissions, or conformance with requirements of Contract Documents.

3.5 Defective Work

.1 Incorrectly fabricated, misplaced or omitted reinforcement will be considered defective Work.

.2 Replace or adjust defective reinforcement before concrete is placed as directed by Consultant.

.3 Replace or strengthen concrete work which is deficient as a result of incorrectly fabricated, misplaced, or omitted reinforcement, which was not corrected before concrete was placed.

.4 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if Work has proven to be deficient.

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 20 00 Concrete Reinforcing
.3 Section 03 41 23 Precast Concrete Stairs
.4 Section 04 05 19 Masonry Anchorage and Reinforcing
.5 Section 04 22 00 Concrete Unit Masonry
.6 Section 05 50 00 Metal Fabrications
.7 Section 07 92 00 Joint Sealants
.8 Section 10 80 00 Miscellaneous Specialties

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C260/C260M-24 Standard Specification for Air-Entraining Admixtures for Concrete
  .2 ASTM C295/C295M-19 Standard Guide for Petrographic Examination of Aggregates for Concrete
  .3 ASTM C309-25 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
  .4 ASTM C330/C330M-23 Standard Specification for Lightweight Aggregates for Structural Concrete
  .5 ASTM C494/C494M-24 Standard Specification for Chemical Admixtures for Concrete
  .6 ASTM C881/C881M-20a Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
  .7 ASTM C1017/C1017M-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  .8 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  .9 ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
  .10 ASTM D570-22 Standard Test Method for Water Absorption of Plastics
  .11 ASTM D624-00(2020) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
  .12 ASTM D638-22 Standard Test Method for Tensile Properties of Plastics
  .13 ASTM D1259-06(2025) Standard Test Methods for Nonvolatile Content of Resin Solutions
  .14 ASTM D1751-23 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
  .15 ASTM D2240-15(2021) Standard Test Method for Rubber Property—Durometer Hardness
  .16 ASTM D5329-20 Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements
.2 American Concrete Institute (ACI)
  .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
  .2 ACI 232.1R-12 Report on the Use of Raw or Processed Natural Pozzolans in Concrete
.3 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
  .2 CSA A283:19 Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000-18 Cementitious Materials Compendium
.4 Ontario Provincial Standard Specifications (OPSS)
.1 OPSS 1010 Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material.
.2 OPSS 1212 Material Specification for Hot-Poured Rubberized Asphalt Joint Sealing Compound.
.5 Government of Canada Treasury Board Secretariat (TBS)
.1 Standard on Embodied Carbon in Construction

1.4 Submittals

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

.2 Samples: Submit for inspection, material samples of specified mix designs.

.3 Concrete Mix Designs:
.1 Submit concrete mix designs for review. Specify intended use for each mix design.
.2 Review of mix design does not relieve Contractor from responsibility for compliance with Contract Documents.
.3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1. Mix design shall be adjusted to prevent alkali aggregate reactivity problems.
.4 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CSA A23.1.
.5 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
.6 Submit in writing, proposed method of in-situ strength testing.

.4 Inspection Reports: Inspection and Testing Company shall:
.1 Submit written reports of inspection and tests.
.2 Distribute reports as follows:
.1 Consultant;
.2 Contractor.
.3 On concrete cylinder test reports, include:
.1 Specific location of concrete represented by sample
.2 Design strength.
.3 Unit weight of sample
.4 Class of exposure
.5 Aggregate size and mixtures incorporated
.6 Date, hour and temperature at time sample taken
.7 Percentage air content
.8 Test strength of cylinder
.9 Type of failure if test fails to meet specification.

1.5 Quality Assurance

.1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.

.2 Pre-Construction Conference:
.1 At least 35 days prior to the start of concrete construction schedule, conduct a meeting to review proposed mix designs and to discuss detailed requirements of the proposed concrete operations. Review requirements for submittals, coordination, and availability of materials.

Establish work progress and sequencing schedules and procedures for material testing, inspection and certifications.

.3 Source Quality Control:
- .1 Both source quality control, and field quality control specified in Article 1.5.4, may be performed by an Inspection and Testing Company appointed by Consultant.
- .2 Review provided by Inspection and Testing Company does not relieve the Contractor of his sole responsibility for quality control over Work. Performance or non- performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .3 Inspection and Testing Company shall be certified under CSA A283, Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
- .4 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
- .5 Payment for additional tests (including testing of structure and its performance and load testing) required by changes of materials or mix design requested by Contractor, and failure of completed Work to meet specified requirements, shall be made at Contractor's expense.
- .6 Perform Work of source quality control in accordance with CSA A23.2 and to include:
  - .1 Verification that ready-mix supplier is qualified to supply concrete in accordance with Specification.
  - .2 Review of proposed concrete mix designs.
  - .3 Sampling, inspection, and testing of materials as may be required.

.4 Field Quality Control:
- .1 Inspection and Testing Company, when appointed as specified for Source Quality Control, shall perform sampling, inspection and testing of concrete work at site.
- .2 Perform sampling, inspection and testing in accordance with CSA A23.2, and to include:
  - .1 Making of standard slump tests.
  - .2 Obtaining of three standard specimens for strength tests from each 100 m of concrete, or fraction thereof, of each mix design of concrete placed in any one day. In addition, for slabs-on-grade, obtain beam specimens for determination of modulus of rupture.
  - .3 Verification that test specimens are stored within an enclosure, maintained at specified temperatures.
  - .4 Making compression tests of each set of three specimens, one at 7 days and two at 28 days; modulus of rupture tests at 90 days.
  - .5 Verification of air content of air-entrained concrete.
    - .1 For Class of exposure F-1, and C-2, test at frequency in accordance with CSA A23.1.
    - .2 Make first test before placing any concrete.
    - .3 After stable air content has been established, frequency of tests will be determined by Consultant.
    - .4 For other Classes of exposure, test at time of obtaining strength test specimens.
- .3 Inspection for Tolerances:
  - .1 Confirm that concrete work meets specified tolerance requirements.
  - .2 Use the elevation survey records of elevations of finished concrete surfaces specified in Section 03 10 00 and this section as basis for judging compliance.
  - .3 Use approved aluminum straightedge to judge compliance with specified slab tolerances, except use dipstick equipment where F-number tolerance is specified.
- .4 Slabs-on-Grade:
    - .1 Observe application of curing compound to sample slab, recording rate of application.
    - .2 Monitor on a random basis acceptable to the Consultant, that slab is being saw cut before slab temperature starts to fall.

.3 Qualifications: Floor finishing shall be undertaken only by contractors with at least 10 years of experience.

.4 Sample of Finish Flooring:

.1 Finish an area of floor slab where directed by Consultant to provide sample of finish for approval.

.2 Protect new sample area until finish is approved.

.3 If liquid membrane curing compound is to be used on Project, determine and apply correct quantity required to meet rate of coverage recommended by manufacturer for measured test area.

.4 Approved sample will provide standard by which subsequent finishing will be judged and will be incorporated into Work.

1.6 Tolerances

.1 In accordance with ACI 117 and CSA A23.1.

.2 Concrete tolerance to CSA A23.1

.1 Thick Finishes:

.1 FF = 20/FL = 18

.2 Thin Finishes:

.1 FF = 25/FL = 18

.3 Elevated Slabs:

.1 FF20/FLna

.3 Floor tolerances must be measured within 72 hours following construction.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

1.8 Job Conditions

.1 Protect floor slabs, and concrete surfaces exposed to view or on which finishes are to be applied, from grease, oil, and other soil which will affect the appearance of the concrete, or impair the bond of finish material.

.2 Environmental Conditions: In addition to Cold Weather and Hot Weather Requirements of CSA A23.1, the following shall apply to Work of this Section:

.1 Provide protection or heat, or both, so that temperature of concrete at surfaces is maintained at not less than 21 ° C for three days after placing, not less than 10 ° C for the next two days and above freezing for the next two days.

.2 Do not permit alternate freezing and thawing for fourteen days after placing.

.3 Vent exhaust gases from combustion type heaters to atmosphere outside protection enclosures.

.4 Provide protection to maintain concrete continuously moist during curing period.

.5 For field cured cylinders representing strength development of in-situ concrete, provide same specified hot and cold weather protection for storage of each concrete compression specimen as for concrete from which it was taken, until it is sent to testing laboratory.

.6 Do not place concrete during rain. Should rain commence during placing, cover freshly placed concrete.

.7 Do not place bonded toppings on rough slabs that are less than 15 °C.

.8 Do not grout at ambient air temperatures or concrete surface temperatures less than 5 ° C, or when temperature is forecast to fall to less than 5 ° C within 24 hours of grouting.
.9 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5 ° C.

1.9 Project Records

.1 Maintain record of all concrete pour related to time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep records on site until project is completed.

.2 Delivery Records: File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, contractor, Project, Class of exposure, cementing materials content, air content, volume in load, and time of first mixing of aggregate, cementing materials and water.

.3 Record Drawings:
.1 Record on a set of Drawings:
.1 founding elevations of all footings
.2 variations of foundation Work from that indicated on Drawings.
.2 Make record drawings available for Consultant's inspection at all times.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 To meet specified requirements of referenced Standards.

.2 Cement:
.1 Portland Cement: to CSA A3000.
.2 Cementitious Hydraulic Slag: to ACI 232.1R

.3 Fine Aggregate: For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.

.4 Coarse Aggregates:
.1 20 mm to 5 mm (No. 4 sieve) except as specified below.
.2 For slabs-on-grade 125 mm and thicker: 40 mm to 5 mm (No. 4 sieve); combine at least two of the single sizes specified in Table 5 Group II of CSA A23.1, one of which is to be 40 mm, to obtain maximum bulk density (unit weight) and optimum grading, in accordance with an approved procedure.
.3 For slabs-on-grade: Abrasion loss not to exceed 35%. Petrographic number of aggregate not to exceed 125 when tested in accordance with ASTM C295.
.4 For toppings 50 mm thick and less and for slabs over open web steel joists: 12 mm to 5 mm (No. 4 sieve).

.5 Bonding Agent: To ASTM C881, 100% reactive, 2 component, low viscosity, high modulus bonding adhesive.

.6 Saw Cut Filler: Semi-rigid epoxy or polyurea in accordance with ACI 302.1R for joint fillers used in control and construction joints.
.1 Basis of Design Euco 700 or Euco QWIKjoint UVR by Euclid Chemical.

.7 Premoulded Joint Fillers: Bituminous impregnated fiber board: to ASTM D1751.

.8 Sealant: Refer to Section 07 92 00 – Joint Sealants

.9 Mechanical Anchors: 'Kwik' Bolts, 'Cinch' Anchors or Parabolts.

.10 Dovetail anchor slots: minimum 0.6 mm thick galvanized steel with insulation filled slots.

.11 Stair Tread Inserts: Abrasive stair tread inserts as specified in Section 10 80 00.

2.2 Concrete Mixes

.1 Ready Mix, with 28 day compressive strength as indicated on Drawings.

.2 Design concrete mix in conformance with CSA A23.1, Tables 1, 2, 5 (Alternative 1) and 17, and as follows. Provide concrete meeting water/cementing materials ratio and air content of Table 14 in accordance with Class of exposure specified in following sub-paragraphs, and minimum strength specified on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Table 14 may yield strength exceeding minimum strength specified on Drawings.
.1 Class of exposure C-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for pavements, sidewalks, curbs and gutters.
.2 Class of exposure F-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for grade beams, and for exposed exterior beams, columns, walls and slabs.
.3 Slabs-on-Grade:
.1 Use type 20 Portland cement, or replace 35 percent Portland cement with cementitious hydraulic slag.
.2 When mean daily temperature exceeds 25 ° C at time of placement, replace 25 percent of type 20 cement, or 50 percent of type 10 cement, with cementitious hydraulic slag.
.3 Use water/cementing materials ratio 0.45 maximum.
.4 Use aggregates specified in paragraphs 2.1.3.
.5 Cementing materials content 325 kg/m.
.6 Modulus of rupture 3.5 MPa average, 3.0 MPa minimum.
.7 Slump at delivery, before addition of superplasticizer, 50 mm; add superplasticizer, not water, to bring slump to level acceptable to floor finisher for placement.
.4 Interior Concrete, other than specified above, and not exposed to freezing and thawing or the application of deicing chemicals: select water/cementing materials ratio and cementing materials content on basis of strength, workability, and finishing requirements.

.3 Submit evidence, and material samples, if requested, acceptable to the Inspection and Testing Company, to verify that the proposed concrete mix design will produce specified quality of concrete.

.4 List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Consultants approval.

.5 Concrete Weight: Air dry unit weight: minimum 2,300 kg/m; adjusted proportionally for maximum air content listed in CSA A23.1, Clause 15, Table 10.

.6 Concrete supplier to provide documentation indicating the requirements of TBS Standard on Embodied Carbon in Construction have been met.

2.3 Admixtures

.1 Chemical Admixture: To ASTM C494. Incorporate water-reducing admixture, type WN, in all concrete.

.2 Air Entraining Agent: To ASTM C260. Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1, Clause 15, Table 10.

.3 Chloride: Do not use calcium chloride or admixtures containing chloride in concrete.

2.4 Concrete Toppings

.1 Provide topping with minimum 28 day compressive strength of 32 MPa.

2.5 Premixed Grout

.1 Non-Shrink Metallic: Non-catalyzed metallic grout to ASTM C1107, Compressive strength at 28 days: 48 MPa.

.2 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107. Compressive strength at 28 days: 59 MPa.

.3 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM C1107. Compressive strength at 28 days: 59 MPa.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which effects this work.

.2 Notify Consultant of any condition which would prejudice proper completion of this work.

.3 Confirm that surfaces on which concrete is to be placed are free of frost and water before placing.

.4 Confirm that reinforcement, dowels, control joints, inserts and all other built in work are in place and secured.

.5 Commencement of work implies acceptance of existing conditions.

3.2 Treatment of Formed Surfaces

.1 Conform to the requirements of CSA A23.1, and as additionally specified herein.

.2 Treat concrete surfaces which will be exposed or painted in the completed building to provide a "Smooth Rubbed Finish" in accordance with CSA A23.1, uniform in colour and texture.

.3 Plugs at Recessed Ties:
.1 Clean tie holes to remove all foreign matter.
.2 Coat plugs by dipping in adhesive and insert in hole.

.3 Remove excess adhesive immediately with thinner which will not stain concrete, as recommended by manufacturer.

.4 Obtain Consultant's approval of finished exposed concrete and grind or otherwise correct to the satisfaction of the Consultant.

3.3 Placing Concrete

.1 Place concrete in accordance with requirements CSA A23.1/A23.2.

.2 Notify Consultant and inspection and testing firm at least 24 hours prior to commencement of concrete placing operation and 24 hours before wall forms are closed in.

.3 Obtain Geotechnical Engineer’s confirmation that thickness, elevation and compaction of sub-grade meets specifications before placing concrete.

.4 Do not place concrete in water or open frozen surfaces.

.5 Remove contaminants which lessen concrete bond to reinforcement before concrete is placed.

.6 Maintain accurate records of cast in place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

.7 Ensure that reinforcement, inserts, embedded items, formed expansion joints and the like, are not disturbed during concrete placement.

.8 Joint fillers:
.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant.
.2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
.3 Locate and form isolation, construction and expansion joints as indicated.
.4 Install joint filler.
.5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.9 Provide construction joint as indicated on the drawings. Ensure dowels are adequately anchored and placed at right angles to the joint before placing concrete.

.10 Place floor slabs to depth indicated on the drawings with 25 MPa minimum concrete unless otherwise noted on drawings but consistent with minimum cement content specified for exposed floors in this specification.

.11 Sloping Surfaces and Slabs: commence concrete placement at bottom of sloping surfaces.

3.4 Finishing Concrete

.1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1, and as specified herein.

.2 Refer to the drawings for floor finishes and coverings.

.3 Screed the top of rough floor slabs to an even level or sloping surface at the proper elevation to receive the finish or topping specified on the drawings and in finish schedule.

.4 Provide a smooth steel trowel finish on all areas scheduled to receive a covering, or painted finish.

.5 Exposed Floor Surfaces: Provide hard, smooth, dense, steel troweled surface, free from blemishes, and of uniform appearance.

.6 Non-slip Surfaces: Provide swirl trowel or broom finish of texture acceptable to Consultant.

.7 Curb Edging: Finish external corners of curbs rounded and smooth.

.8 Drains:
- .1 In areas where floor drains are installed, grade the entire floor surface (or as indicated) toward the drains.
- .2 Floors to be level around walls and have a minimum 5mm/m uniform pitch to drains unless indicated otherwise.
- .3 The slope shall be such that water on all areas of the floor will drain by gravity without leaving pools or puddles on the floor surface.

.9 Stair Tread Non-Slip Inserts:
- .1 Install one non-slip insert specified in Section 10 80 00 at each tread and landing; place 40 mm from edge of nosings and extend for full width of nosings except for 80 mm at each end.
- .2 Install in accordance with manufacturer’s instructions.

3.5 Curing

.1 Cure concrete in accordance with CSA A23.1 and as specified herein.

3.6 Grouting

.1 Mix prepackaged grout with water in accordance with manufacturer's printed instructions.

.2 Dampen concrete surfaces immediately before installing grout.

.3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration.

.4 Slope grout beyond edge of plate at 45 degrees.

.5 Provide same environmental protection and curing as specified for concrete.

3.7 Joint Sealant

.1 Apply sealant specified in Section 07 92 00 to thoroughly dry surfaces only, at ambient air temperatures above 5 ° C.

.2 Provide sealant on top of joint filler with a polyethylene bond breaker between joint filler and joint sealant applied in accordance with manufacturer's direction.

.3 Confirm that preformed joint filler and backer rod are compatible with sealant.

.4 Caulk joints in accordance with the following:
.1 Do not commence joint preparation until concrete is at least 28 days old.
.2 Thoroughly clean sides of joints with mason's router, or power saw, equipped with double blade where necessary to suit joint width.
.3 Blow clean with compressed air with oil trap on line, or vacuum clean.
.4 Install backer rod of diameter 25 percent greater than joint width, and type recommended by sealant manufacturer to be compatible with sealant. Locate backer rod to provide for sealant depth of one-half joint width, but not less than 12 mm.
.5 Prime joint if required, as recommended by sealant manufacturer.

3.8 Defective Work

.1 Variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by approved methods will be considered defective work.

.2 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.

.3 Replace or repair defectively placed or finished concrete as directed by the Consultant.

.4 Testing and Replacement of Deficient Concrete in Place:
.1 Pay for additional testing and related expenses if concrete has proven to be deficient.
.2 Replace or strengthen deficient concrete work as directed by the Consultant, and pay for all testing and related expenses for replaced work until approved by the Consultant.

3.9 Cleaning

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

.2 Clear away from the building site excess and waste materials and debris resulting from Work of this Section.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 20 00 Concrete Reinforcing
.3 Section 03 30 00 Cast-in-Place Concrete
.4 Section 03 41 23 Precast Concrete Stairs
.5 Section 05 12 23 Structural Steel
.6 Section 07 84 00 Firestopping
.7 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A1064/A1064M-24 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
  .2 ASTM C881/C881M-20a Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
  .3 ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
  .4 ASTM D2240-15(2021) Standard Test Method for Rubber Property—Durometer Hardness
  .5 ASTM F3125/F3125M-26 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
.2 Canadian General Standards Board
  .1 CAN/CGSB-1.40 Primer, Structural Steel, Oil Alkyd Type
  .2 CAN/CGSB-1.181 Ready Mixed Organic Zinc-Rich Coating
  .3 CAN/CGSB-51.20 Thermal Insulation, Polystyrene, Boards and Pipe Covering
.3 CSA Group (CSA)
  .1 CSA-A23.1:19/CSA-A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA A23.3:19 Design of Concrete Structures for Buildings
  .3 CSA A23.4-16 (R2021)Precast Concrete - Materials and Construction
  .4 CSA-A251-00 (R2005) Qualification Code for Manufacturers of Architectural and Structural Precast Concrete
  .5 CAN/CSA-G30.18 -09 (R2004) Billet-Steel Bars for Concrete Reinforcement
  .6 CSA G40.20-13 General Requirements for Rolled or Welded Structural Quality Steel/
  .7 CSA G40.21-13 Structural Quality Steel
  .8 CAN/CSA-G164 –M92 (R2003) Hot Dip Galvanizing of Irregularly Shaped Articles.
  .9 CSA G279-1975 Steel for Prestressed Concrete Tendons
  .10 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding for Steel Structures
  .11 CSA W48.1-M1991 (R1998) Carbon Steel Covered Electrodes for Shielded Metal Arc Welding
  .12 CSA W59 -13 Welded Steel Construction (Metal Arc Welding)
  .13 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction

1.4 Submittals

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

.2 Submit concrete mix designs for concrete.

.3 Submit shop and erection drawings in accordance with CAN3-A23.3 and CAN 3-A23.4-M.
.1 Include the following items on shop drawings:
.1 Design calculations for items designed by manufacturer.
.2 Details of prestressed and non-prestressed members, reinforcement and their connections.
.3 Camber.
.4 Finishing schedules.
.5 Methods of handling and erection.
.6 Openings, sleeves, inserts and related reinforcement.
.2 Each drawing submitted shall bear stamp and signature of qualified professional engineer registered or licensed in the Province of Ontario.

.4 Submit for Consultant's review, three copies of design calculations for reinforcing, hoisting and connection and anchorage devices.

.5 Clearly indicate product locations, fabrication details, unit identification marks, reinforcement, connection details, dimensions, erection support points, anchors and relationship to adjacent materials in sufficient detail to cover manufacture, handling and erection.

.6 Do not proceed with fabrication until shop drawings and design calculations have been reviewed by Consultant.

.7 Submit to the Consultant and to the Ontario Ministry of Labour, sequential erection drawings indicating necessary falsework, construction bracing details and methods for hoisting of precast slabs. Drawings will be prepared by and shall bear the stamp of a Professional Engineer licensed to practice in Ontario.

1.5 Design Requirements

.1 Design of precast concrete members and connections shall conform to CSA A23.3, CSA A23.4 and Precast Concrete Institute Design Handbook and shall be completed under the direct supervision of a registered Professional Engineer, licensed to practice in Ontario, fully experienced in design of precast concrete structural units.

.2 Design precast elements to carry handling stresses.

.3 Design precast elements to carry loads indicated, in accordance with the National Building Code and all other applicable references.

.4 Design all members and connections to safely support their own weight and all forces and loads to which they may be subjected.

.5 Design connections to provide for building movement. Provide adjustable connections to accommodate misalignment of structure.

.6 Design floor deck for a maximum deflection of 1/360th of the span under superimposed load.

.7 Design prestressed units to meet 1 hour fire resistance rating requirements.

1.6 Source Quality Control

.1 Upon request, provide Consultant with certified copies of quality control tests and inspection related to project as specified in CSA A23.4 and CSA G279.

.2 Inspection of prestressed concrete tendons is required in accordance with CSA G279.

.3 Upon request, provide Consultant with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis

1.7 Quality Assurance

.1 Fabricate and install precast concrete deck in accordance with requirements of CSA A23.4.

.2 Maximum allowable manufacturing and erection tolerances, including final camber of slabs, are not to exceed those given in CSA A23.4.

.3 Do welding in accordance with CSA W59 for welding to steel structures and CSA W186 for welding reinforcement.

1.8 Qualifications

.1 Precast concrete elements to be fabricated and erected by a manufacturing plant certified by Canadian Standards Association on appropriate categories according to CSA A251.

.2 Precast concrete manufacturer to be certified in accordance with CSA certification procedures for precast concrete plants prior to submitting tender.

.3 The precast concrete manufacturer shall be a member in good standing with the Canadian Precast/Prestressed Concrete Institute (CPCI) and have a proven record and satisfactory experience in the design; manufacture and erection of precast concrete facing units of the type specified. The company shall have adequate financing, equipment, plant and skilled personnel to detail, fabricate and erect the work of this Section as required by the Specification and Drawings. The size of the plant shall be adequate to maintain the required delivery schedule.

.4 Welding companies shall be certified to CSA-W47.1.

1.9 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Handle all precast members in a position consistent with their shape and design. Do all lifting and supporting only from support points indicated on shop and erection drawings.

.4 Embedded lifting or handling devices are to be capable of supporting members in all positions anticipated during manufacture, storage, transportation and erection. Maintain capacity of lifting devices sufficient to resist forces of minimum 2.5 times weight of member.

.5 Deliver members to site completely finished. Clearly mark members as indicated on shop drawings, with date of production and final position on structure.

.6 Block and laterally brace members during transport and while stored on site. Provide lateral bracing sufficient to prevent bowing and warping. Blocking and bracing to be clean, non-staining and not prevent uniform curing of exposed surfaces.

.7 Provide edges of members with adequate protection to prevent staining, chipping or spalling of concrete.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Defects include but are not limited to, spalling, corrosion of embedded steel, and cracking, except for normal hairline shrinkage cracks.

PART 2 PRODUCTS

2.1 Concrete Materials

.1 Cement, aggregates, water, admixtures: to CSA A23.1 and CSA A23.4.

.2 Grout: One part type 10 Portland cement, 2½ parts sand, sufficient water for placement and hydration.

.3 Chemical Admixtures: to CSA A266.2.

.4 Air Entrainment Admixtures: to CSA A266.1

2.2 Reinforcement

.1 Reinforcing steel shall be new deformed bars conforming to CSA G30.18.

.2 Welded Steel Wire Fabric: Deformed type to ASTM A1064, galvanized finish.

.3 Prestressing steel tendons and bars: to CSA S6 and CSA G279, uncoated 7 wire cable

2.3 Hardware

.1 Hardware and Miscellaneous Materials: to CAN/CSA A23.1.

.2 Connections, Supporting Devices and Embedded Steel: to CSA G40.21, Type 300W all galvanized to CSA-G164, 610 g/m2 minimum zinc coating after fabrication.

.3 Bolts, Nuts and Washers: Conforming to ASTM F3215.

.4 Anchors, Inserts and Couplings: Patented, load-tested galvanized steel, to CSA A23.1.

.5 Welding Materials: to CSA W48.1

.6 Welding Electrodes: to CSA W48.1 and certified by Canadian Welding Bureau.

2.4 Prime Paint

.1 Steel Primer: to CAN/CGSB-1.40.

.2 Zinc Rich Primer: to CAN/CGSB-1.181.

2.5 Bearing Pads

.1 3.0 mm masonite, smooth one side.

2.6 Concrete Mixes

.1 Use concrete mix designed to produce 41 MPa (6000 psi) compressive strength at 28 days with a maximum water/cement ratio to CSA A23.1, Table 7 for Class D exposure.

.2 Air entrainment of concrete mix: to CSA A266.4.

.3 Admixtures: to CSA A266.4, CSA A266.5.

.4 Do not use calcium chloride or products containing calcium chloride.

PART 3 EXECUTION

3.1 Fabrication

.1 Maintain plant records and quality control program during the production of precast structural concrete, as required by CSA-A251, Appendix D. Make records available to Consultant upon request.

.2 Use forms and beds which are rigid, adequate to withstand pre-stressing forces and constructed of materials that will result in finished products conforming to requirements stated herein and on drawings.

.3 Establish concrete mix design by tests on trial batches to achieve required strengths. Maintain water content as constant as possible during manufacture.

.4 Place and compact cement in accordance with the requirements of CSA A23.1.

.5 Moist cure precast units in accordance with CSA A23.1.

.6 Provide concrete protection of reinforcement in accordance with CSA A23.4.

.7 Fabricate all required connecting devices, plates, angles, inserts, bolts and accessories.

.8 Perform shop welding of connecting and supporting devices in accordance with requirements of CSA W59.

.9 Ensure anchors, inserts, plates, angles and other cast-in items are accurately located. Maintain in position while concrete is placed and consolidated.

.10 Shop prime anchors and inserts after fabrication and touch-up primers on anchors after welding. Do not apply primer to embedded portion of anchor or inserts.

3.2 Finish

.1 Finish deck slabs to conform to requirements of CSA A23.4.

.2 Surface to receive toppings shall be raked for bonding of topping.

.3 The underside of precast units shall be finished as per CSA A23.4 Standard Finish.

3.3 Erection

.1 Provide temporary bracing for all stresses and induced loads during erection. Maintain temporary bracing in place until final support is provided.

.2 Provide all hoisting equipment and operate in accordance with all applicable safety regulations.

.3 Discontinue work and advise Consultant when members require adjustment beyond design criteria. Perform required modifications at no cost to Owner.

.4 Erect members without damage to shape or finish. Replace or repair damaged members to approval of Consultant, at no cost to the Owner.

.5 Erect all units level, plumb, square and true within allowable tolerances.

.6 Perform welding of connecting and supporting devices in accordance with requirements of CSA W59.

.7 Prime paint field welds and touch up scratched and damaged galvanized surfaces.

.8 Fill all joints and grout keys between hollow core slabs with 1:3 mixture of cement and sand, trowel smooth.

.9 Remove all grout from underside of hollow core slabs and walls and floors immediately after grouting.

3.4 Topping

.1 Provide a suitable concrete top finish to accept direct application of finished flooring as per Room Finish Schedule. Toppings shall be concrete based (gypsum toppings are not acceptable). Concrete materials and mixes shall be in accordance with CSA A23.1 and Section 03 30 00.

.2 Topping shall be self-leveling, with a minimum 28 day compressive strength of 32 MPa. Refer to Section 03 30 00.

.3 Bond topping to precast slabs with bonding agent conforming to ASTM C881 specified in Section 03 30 00.

3.5 Cleaning

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

.2 Upon completion of the work of this Section, all surplus material and debris shall be removed from the site.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 20 00 Concrete Reinforcing
.3 Section 03 30 00 Cast-in-Place Concrete
.4 Section 03 41 16 Precast Concrete Slabs
.5 Section 05 50 00 Metal Fabrications

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA A23.3:19 Design of Concrete Structures
  .3 CSA A23.4-16 Precast Concrete-Materials and Construction
  .4 CSA A3000-18 Cementitious Materials Compendium
  .5 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement
  .6 CSA G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .7 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles
  .8 CSA W48-18 Filler Metals and Allied Materials for Metal Arc Welding
  .9 CSA W59-18 Welded Steel Construction (Metal-Arc Welding)
  .10 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-1.40-97 Anti-corrosive Structural Steel Alkyd Primer
  .2 CAN/CGSB-1.181-99 Ready-Mixed Organic Zinc-Rich Coating
.4 American Concrete Institute (ACI)
  .1 ACI 347 Guide to Formwork for Concrete
  .2 ACI 232.1R-12 Use of Raw or Processed Natural Pozzolans in Concrete

1.4 Submittals

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

.2 Shop Drawings:
  .1 Prepare and submit fully detailed shop and erection drawings to the consultant for review.
  .2 Show all pertinent information in regard to the fabrication and erection of the precast concrete stairs and landings including:
    .1 Location of each unit in the completed structure and identifying marks for each unit
    .2 Size and dimensions of each stair and complete details of connections.
    .3 Reinforcing details, grade of reinforcement, concrete strength and admixtures.
    .4 Locations and details for lifting hooks and handling points.
    .5 Sequence of erection and special instructions that may be required in handling, setting and temporary bracing.

.3 Shop drawings to bear the seal and signature of an Engineer registered to practice in the Province of Ontario, employed by the precast contractor and to include complete design calculations for the stair and landings certifying to the adequacy of the stairs and landings to meet code requirements and to safely support the superimposed loads without failure.

.3 Provide certificates of testing for the period of manufacture. Testing to be performed by a professional testing company based on standard procedures set out in ACI codes.
.1 Provide duplicate copies of reports showing 7 day and 28 day compressive strength for each unit.

1.5 Design Criteria

.1 Design stair units, landings, brackets and anchorage devices to meet requirements of the Ontario Building Code, CSA A23 Series and CSA S16, to withstand handling stresses, live and dead loads

.2 In addition to the gravity loads and forces required by governing codes, design work to include the effects caused by moisture and temperature changes, shrinkage, creep in component materials and handling, within deflection limitations governing structural design.

.3 Design connections and anchorage to transfer forces to structure and in conformity with structural and architectural constraints. Reinforce bearing areas against diagonal tension, splitting, rupture and flexure. Place extra ties, stirrups and reinforcing bars at support points. Do not allow bearing pressure in edges of unreinforced sections.

.4 Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with the Ontario Building Code.

.5 Design connections to provide means of compensating for deviations of the building structure, minimize width of joints and gaps to allow for backing and sealing.

.6 Allow for expansion and contraction in both panels and structure, within fastening system.

.7 Allow for structural deflection of span/360 due to live load and distortion of structure, under design criteria conditions, without imposing load on stair assembly.

.8 Where required, design precast stair units to withstand all stresses from attachment of guardrails. Note OBC requirements for design loading on guardrails and make adequate provision.

1.6 Qualifications

.1 Fabricate and erect precast concrete elements using manufacturing plant certified by CSA Group in appropriate categories to CSA A23.4.

.2 Precast concrete manufacturer to be certified in accordance with CSA's certification procedures for precast concrete plants.

.3 Only precast elements fabricated in such certified plants to be acceptable, and plant certification to be maintained for duration of fabrication, erection until warranty expires.

1.7 Quality Assurance

.1 Fabricate work in accordance with CSA A23.4, and CPCI Architectural Precast Concrete Manual.

.2 Design all precast concrete members and connectors not already designed by the Consultant, under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Ontario

.3 Welding: to CSA W59 and CSA W186.

.4 Welders: Certified to CSA W47.1. Submit certificates for each welder.

.5 In addition to quality control test requirements of CSA A23.4, an independent inspection and testing company may be appointed by the Owner to verify compliance with this specification. Cooperate with Inspector to facilitate his work.

.6 Coordination: Provide other Sections with detailed drawings and setting information so that connection material can be readily erected in its required location, special precautions to be taken by other Sections affecting work of this Section

1.8 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Design lifting devices for the stair units to ensure that they will be safely and efficiently handled and not produce distortion, cracking or deflection nor strain or adversely affect the unit.

.4 Support precast stair unit uniformly while curing. Keep a daily check to discover development of warpage or other distortion. Rearrange supports as required to compensate for warpage or distortion, if required.

.5 Precast stair units to be handled and adequately protected during fabrication, curing, storage and transport by methods that will prevent damage, warping, cracking, breakage, chipping, staining or other disfigurement. Units shall not be permitted to contact the earth or be stored so as to be exposed to splashing of earth, mud, and the like.

.6 Precast stair units are to be delivered to the site clearly marked in an acceptable manner as indicated on the shop drawings, showing final position on the building. The sequence of delivery to the site to conform to an erection schedule. The timing of the delivery to be scheduled to suit the storage space available and the handling and erection operations.

.7 Allow for storage and protection of fabricated stair units in the plant at no extra cost to Contractor, until units are required at the job site to meet construction schedule.

1.9 Project Conditions

.1 Maintain ambient and surface temperatures at minimum 5 degree C during grouting and until grout has cured.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Warranty

.1 Warrant that the precast elements will not spall or show visible evidence of cracking, for a period of five years from the date of Substantial Performance.

PART 2 PRODUCTS

2.1 Manufacturer

.1 The precast concrete manufacturer shall be certified in accordance with CSA A251, Qualification Code for Manufacturers of Architectural and Structural Precast Concrete, certification procedures for precast concrete plants prior to submitting his bid and shall specifically verify as part of his bid that his plant is currently certified in the appropriate categories. Only precast elements fabricated in such certified plants shall be acceptable to the Owner. Precast plant certification shall be maintained for the duration of the fabrication and erection for this project. Provide evidence of certification to Consultant for review within five (5) days of Consultant's request.

2.2 Materials

.1 Supply materials meeting or exceeding the requirements of CSA A23.4 and as follows:
.1 Cement: grey Portland, Type 10, to CSA A3000
.2 Aggregates: to requirements of CSA A23.1.
.3 Reinforcement: to requirements of CSA A23.1, galvanized if less than 25 mm cover.
.4 Steel inserts, anchors, plates and rods: to CSA A23.1.
.5 Non-slip inserts: Extruded aluminum base with aluminum oxide abrasive, complete with cast in anchors, Type 610 by Wooster Stair Products, or acceptable equivalent. Standard colour.
.6 Non-shrink grout: non-metallic material aggregate grout non-shrinking, damp-pack application to ASTM C1107.

2.3 Concrete Mix Design

.1 Design concrete mix for normal weight concreter having a minimum 35 MPa at 28 days to CSA A23.4, and as required to meet design criteria.

2.4 Finishes

.1 Ensure exposed-to-view finish surfaces of precast concrete members are uniform in colour and appearance.

.2 Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as uniformity, staining, or surface cracking.

.3 Smooth finish: as cast using smooth steel form liners

.4 Finish members to:
.1 CSA A23.4 Clause 26 Finish Grade A; Remove fins and protrusions, grind edges and ends, flat face surfaces.
.2 Ensure exposed-to-view finish surfaces are uniform in colour and appearance.

2.5 Fabrication

.1 Make thorough examination of drawings details, check interfacing with work of other Sections and other factors influencing the design and performance of the work and be fully cognizant of the

requirements.

.2 Match details of stair bearing on landings shown on Architectural Drawings without compromising the structural integrity of the connection.

.3 Consult reviewed shop drawings relating to interface elements and confirm exact location of inserts and anchors required to be cast in precast units to receive such items.

.4 Fabricate precast concrete stairs to the requirements specified in CSA A23.4 and to riser and tread dimensions for the various stairs as called for on the Drawings.

.5 Cast in non-slip inserts in accordance with manufacturer's instructions.

.6 All forms to be steel, accurately constructed, well braced and stiffened to avoid deformations under pressure of wet concrete and vibrators. All surfaces to have smooth finish without pinholes, form marks or rough edges. The quality of forms to be such that all dimensional tolerances and exposed concrete quality can be consistently maintained.

.7 Aluminum forms to be manufactured to produce raised non-slip continuous parallel ridges near the tread nosing. Nosing to be rounded and junction of tread and riser coved.

.8 Accurately set reinforcing steel and weld at intersections. Weld lifting hooks and inserts to reinforcement. Vibrate continuously during casting of concrete.

.9 Bearing areas to be reinforced against diagonal tension, splitting, rupture and flexure. Extra ties, stirrups and reinforcing bars to be placed at support points.

.10 Design reinforcing to permit all necessary drilling for the installation of hand rail pickets without spalling, cracking or damage to the stair finish.

.11 Provide minimum 19 mm concrete cover over reinforcing steel.

.12 Provide hardware or sleeves as s indicated for supporting guardrails supplied by Section 05 50 00.

.13 Cast in lifting devices required for erection of the precast concrete stair units. Ensure that lifting devices used externally or cast into units are capable of supporting the precast units in all positions that the units may be in during course of manufacture, transportation and installation. Ultimate capacity of lifting devices to be sufficient to resist forces obtained by applying load factor of 2.5 to weight of precast concrete work.

.14 The underside of all precast stairs to have a smooth trowel finish (no type of screed finish is acceptable).

.15 Apply coat of sealer specified in Section 09 67 72 to finished stair units to assist in easy cleanup of stairs at completion of project.

.16 Mark each precast unit to correspond to identification mark on shop drawings for location.

.17 Mark each precast unit with date cast.

.18 Markings shall be on part of unit which will not be exposed.

PART 3 EXECUTION

3.1 General

.1 Do precast concrete work in accordance with CSA A23.4 and CSA A23.3.

3.2 Examination

.1 Prior to start of installation on site, examine location, spacing and level of inserts installed.

.2 Ensure bearing surfaces are clean, smooth and level, and provision has been made for proper anchorage.

.3 Report unsatisfactory conditions prior to installation.

.4 Commencement of work shall imply acceptance of prepared surfaces.

3.3 Preparation

.1 Provide and install sufficient temporary bracing to brace precast components adequately, at all stages of construction, so that precast components will safely withstand loads to which they may be subjected. This temporary bracing shall remain in position until required connections have been completed.

.2 Supply anchors for precast components required to be cast into the concrete for installation. Provide such items in ample time to meet construction program. Supply layout drawings locating all cast-in items to be installed by other Sections.

3.4 Installation

.1 Non-cumulative erection tolerances in accordance with CSA A23.4.

.2 Before final connection is made, set elevations between units to within allowable tolerances before connecting units.

.3 All stair and landing units shall be set plumb, true and square, with joints parallel and uniform, all in accordance with approved Erection Drawings.

.4 Shim as required using acceptable materials and methods.

.5 Units shall be anchored securely and rigidly to supporting work as indicated on reviewed shop drawings.

.6 Grout joints at supports with non-shrink grout.

.7 Do not weld or secure bearing details at sliding joints.

.8 Clean field welds with wire brush and touch-up (shop primer with primer) (galvanized finish with zinc-rich primer).

.9 Fill joints between ends of stairs and cast in place landings with non-shrink grout flush to top and underside.

.10 Allow minimum 13 mm space between walls and stairs for caulking by others.

.11 Patch holes at lifting hook locations, to match adjacent surfaces.

3.5 Protection

.1 Protect components from damage caused by field welding or erection operations performed by work of this trade.

.2 Provide non-combustible shields during welding operations.

.3 Protect cast in stair tread inserts from damage caused by foot traffic during construction. Provide plywood or other acceptable covers on each stair tread, securely fastened in place.

3.6 Cleaning

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

.2 Clean surfaces exposed to view after joint treatment is complete and grout has cured.

.3 Use fibre brushes, water and mild cleaning agents as recommended by manufacturer of the precast concrete units.

.4 Remove deposit of foreign material, dirt, soil and stains. Do not use materials, tools or methods which will damage the units. Rinse thoroughly with clean water after cleaning.

.5 Protect adjoining work from damage during cleaning.

3.7 Defective Work

.1 Repair damaged units, where permitted by Consultant, in accordance with the recommendations of the manufacturer using a mix design to match the adjacent area and applied with an approved bonding agent.

.2 Replace any damaged or deteriorated stair tread inserts which are damaged due to lack of adequate protection, during construction.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 03 41 16 Precast Concrete Slabs
.3 Section 06 10 00 Rough Carpentry

1.3 References

.1 ASTM International (ASTM)
.1 ASTM C109/C109M-24 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens)
.2 ASTM C150/C150M-24 Standard Specification for Portland Cement
.3 ASTM C219-25 Standard Terminology Relating to Hydraulic and Other Inorganic Cements
.4 ASTM E90-23 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
.5 ASTM E119-26 Standard Test Methods for Fire Tests of Building Construction and Materials
.6 ASTM E492-25 Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine

1.4 Submittals

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

.2 Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer’s Safety Data Sheets.

1.5 Quality Assurance

.1 Manufacturer Experience: Provide products of this Section by companies which have successfully specialized in production of this type of products for not less than 5 years.

.2 Applicators shall be licensed or approved by material manufacturer and shall use equipment and tools as recommended by manufacturer.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

.3 Handle products in accordance with manufacturer's printed recommendations.

1.7 Project Conditions

.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental

conditions outside manufacturer's recommended limits.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Acceptable Manufacturer: MAPEI Americas, 2900 Francis-Hughes Laval, PQ, Canada H7L 3J5; Tel: 450-662-1212; Fax: 450-662-0444; Email: request info (techservicerequests@mapei.com/CA-EN); Web: www.mapei.com/CA-EN

.2 Equivalent products as manufactured by the following are acceptable:
.1 Sika Canada
.2 Ardex

2.2 Performance Requirements

.1 Fire Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
.1 Refer to drawings for ULC assemblies required.

.2 STC Rated Assemblies: For STC rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.3 Hydraulic Cement Self-Levelling Underlayment

.1 Underlayment shall meet the following requirements:
.1 Self levelling.
.2 Free of shrinkage cracks and spalling.
.3 Cementitious based (gypsum based products are not acceptable)

.2 Quick -Setting, Water-Resistant, High-Compressive-Strength, Self-Leveling Underlayment: Advanced hydraulic, specially formulated for the resurfacing of interior horizontal surfaces where environmental controls are not in place, that can be applied in minimum uniform thickness of 6 mm to 25 mm.

.3 Fast Setting, Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied from feather edge to 38 mm.
.1 Product: Subject to compliance with requirements, provide MAPEI Corporation; Ultraplan 1 Plus.

.4 Performance Requirements:
.1 Cement Binder: ASTM C150, Portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C219.
.2 Compressive Strength: Not less than 27.6 MPa at 28 days when tested according to ASTM C109.

.5 Aggregate: Well-graded, washed gravel, 3 to 6 mm; or coarse sand as recommended by underlayment manufacturer.

.1 Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

.6 Water: Potable and at a temperature of not more than 21° C.

.7 Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

.8 Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
.1 All-Purpose Primer for Self-Leveling Underlayments:
.1 Product: Subject to compliance with requirements, provide MAPEI Corporation: Primer T
.2 VOC Content: Provide primer with VOC content of 200 g/L.

2.4 Accessories

.1 Sound Mat:
.1 Product: Subject to compliance with requirements, provide MAPEI Corporation: Mapesonic 2 Sound Control Membrane and Primer; MAPEI SM Prime.

PART 3 EXECUTION

3.1 Examination

.1 Examine substrates, with Installer present, for conditions affecting performance of the Work.

.2 Proceed with application only after unsatisfactory conditions have been corrected.

3.2 Preparation

.1 General: Prepare and clean substrate according to manufacturer's written instructions.
.1 Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
.2 Fill substrate voids to prevent underlayment from leaking.

.2 Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.
.1 Install underlayment reinforcement recommended in writing by manufacturer.

.3 Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

.4 Sound Control Mat and Board: Install sound control materials according to manufacturer's written instructions.
.1 Do not install mechanical fasteners that penetrate through the sound control materials.

3.3 Installation

.1 General:
.1 Mix and apply underlayment components according to manufacturer's written instructions.
.2 Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

.3 Coordinate application of components to provide optimum adhesion to substrate and between coats.
.4 At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

.2 Apply primer over prepared substrate at manufacturer's recommended spreading rate.

.3 Apply underlayment to produce uniform, level surface.

.4 Apply a final layer without aggregate to product surface.

.5 Feather edges to match adjacent floor elevations.

.6 Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

.7 Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

.8 Apply surface sealer at rate recommended by manufacturer.

.9 Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 Protection

.1 Provide protection to allow underlayment to cure for length of time recommended by manufacturer before allowing installation of finish flooring.

.2 Protect underlayment from concentrated and rolling loads for remainder of construction period.

3.5 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 22 00 Concrete Unit Masonry
.2 Section 04 43 00 Stone Unit Masonry
.3 Section 06 10 00 Rough Carpentry

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
  .2 CSA S304-14 (R2019) Design of Masonry Structures
  .3 CSA A370-14 (R2018) Connectors for Masonry
  .4 CAN/CSA A371-14 (R2019) Masonry Construction for Buildings
  .5 CSA G30.3-M1983 (R1998) Cold-Drawn Steel Wire for Concrete Reinforcement
  .6 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement
  .7 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction
.3 American Concrete Institute (ACI)
  .1 Detailing Manual
.4 Reinforcing Steel Institute of Canada (RSIC)
  .1 Reinforcing Steel Manual of Standard Practice

1.4 Submittals

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

.2 Submit the following samples:
  .1 Two of each type of masonry reinforcing and connector specified.

.3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.4 Shop Drawings:
  .1 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
  .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
  .3 Prepare placing drawings to minimum scale of 1:50.
  .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.

.6 Show cover to reinforcement
.7 Show location of construction joints.

1.5 Design Criteria

.1 Non-conventional Masonry Connectors
.1 Deflection: maximum 2.0 mm, including free play when acted upon by 0.45 kN lateral load, in all possible positions of adjustment.
.2 Positive restraint at position of maximum adjustment.

.2 Multi-component Ties - Free Play: Maximum 1.2 mm, when assembled in any possible configuration.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 All metal components: hot dipped zinc galvanized to CSA S304 unless otherwise indicated.

.2 Bar Reinforcement: To CSA A371 and CSA G30.18, grade 400R, deformed billet steel bars.

.3 Connectors: to CSA A370 and CSA S304.
.1 Finish: Steel components, hot dip galvanized to Minimum 460 g/m2/side ASTM A123, ASTM A153 Class B
.2 For wood stud/masonry veneer application; length to suit wall thickness; with polyethylene insulation support.
.3 Thermal Brick Ties:
.1 Thermal Flat-Plate: Length to suit steel stud width and thickness of gypsum sheathing, membrane and insulation. Carbon Steel (16 Gauge) ASTM A1011 CS Type B
.2 V-Tie: Length to provide placement of legs at centerline of solid unit veneer. Carbon Steel (ø3/16") ASTM A82
.3 Insulation support: 100% Recycled Polyethylene
.4 Basis of Design: FERO Thermal Tie – Slotted Rap-Tie Masonry Connector or approved equivalent.
.4 Strip Ties: Prescriptive corrugated strip tie. 100 mm x 22 mm x 0.91 mm thick corrugated tie conforming to CSA A370.

.4 Dovetail Anchors: Blok-Lok BL-305 Dovetail Anchor Slot and BL-303 Dovetail Masonry Anchor, 16 gauge, length to suit.

.5 Wire Reinforcement: To CSA A371 and CSA G30.3.
.1 Interior walls: hot dipped galvanized to CSA S304

.1 4.76 mm wire diameter hot dipped galvanized to CSA S304 for interior bearing walls.
.2 3.66 mm wire diameter bright wire finish, standard duty for interior non-bearing walls and partitions
.3 Truss Type: Blok-Trus BL-30 by Blok-Lok Ltd. for non-vertically reinforced walls
.4 Ladder Type: Blok-Trus BL-10 by Blok-Lok Ltd. for vertically reinforced walls

.6 Equivalent products as manufactured by the following manufacturer's may be used subject to submission and acceptance by the Consultant of technical data:
.1 Hohmann and Barnard Inc.

.7 Epoxy Adhesive: Hilti HIT-HY 2270 Adhesive anchor.

2.2 Fabrication

.1 Fabricate reinforcing in accordance with CSA A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.

.2 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.

.3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.

.4 Ship reinforcement clearly identified in accordance with drawings.

PART 3 EXECUTION

3.1 Installation

.1 Install masonry reinforcement, connectors and anchors in accordance with CSA A370, CSA A371, CSA A23.1 and CSA S304 unless indicated otherwise.

.2 Supply dovetail anchor slots for forming into concrete walls. Anchors shall be placed vertically at 600 mm centres for full height of walls.

3.2 Reinforcement

.1 Unless otherwise noted, all masonry walls shall be reinforced with joint reinforcement.

.2 Reinforcement shall be installed in the first and second bed joints, 200 mm apart immediately above lintels and below sill at openings, and in bed joints at 400 mm vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 600 mm beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints. Side rods shall be lapped at least 150 mm at splices.

.3 Use prefabricated corner and tee sections for continuous reinforcement at corners and intersecting walls.

.4 Vertical reinforcement shall have a minimum clearance of 13 mm from the masonry and not less than one bar diameter between bars.

.5 All block cores containing vertical reinforcing and/or anchor bolts shall be solidly filled with non-shrink grout.

.6 Place reinforcement and ties in grout spaces prior to grouting.

.7 Cleanouts: Provide cleanouts in the bottom course of masonry for each grout pour when the grout pour height exceeds 1.5 m.

.8 Construct cleanouts so that the space to be grouted can be cleaned and inspected. In solid grouted masonry, space cleanouts horizontally a maximum of 800 mm on center.

.9 Construct cleanouts with an opening of sufficient size to permit removal of debris. The minimum opening dimension shall be 76 mm.

.10 After cleaning, close cleanouts with closures braced to resist grout pressure.

3.3 Bonding and Tying

.1 Tie masonry veneer to backing in accordance with CSA S304, CSA A371 and as indicated.

.2 Masonry ties shall be installed as per the requirements of CSA A371 with maximum spacing of 400 mm vertically and 400 mm horizontally.

3.4 Reinforced Lintels and Bond Beams

.1 Reinforce masonry lintels and bond beams as indicated.

.2 Place and grout reinforcement in accordance with CSA S304.

3.5 Metal Anchors

.1 Do metal anchors as indicated.

3.6 Lateral Support and Anchorage

.1 Do lateral support and anchorage in accordance with CSA S304 and as indicated.

.2 Anchor new masonry to existing with steel dowels as indicated. Drill into existing masonry and set reinforcing bars in epoxy adhesive in accordance with manufacturer’s instructions.

3.7 Control Joints

.1 Terminate reinforcement 25 mm short of each side of control joints unless otherwise indicated.

.2 Control joints shall be stepped to avoid cutting lintel beams. Under no circumstance shall the control joints be placed to compromise the bearing for the lintel.

3.8 Field Bending

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars and connectors which develop cracks or splits.

3.9 Field Touch Up

.1 Touch up damaged and cut ends of galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.10 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 03 10 00	Concrete Forming and Accessories
.2	Section 03 20 00	Concrete Reinforcing
.3	Section 03 30 00	Cast-in-Place Concrete
.4	Section 04 05 19	Masonry Anchorage and Reinforcing
.5	Section 04 21 13	Brick Masonry
.6	Section 05 12 23	Structural Steel
.7	Section 05 50 00	Metal Fabrications
.8	Section 06 10 00	Rough Carpentry
.9	Section 07 84 00	Firestopping
.10	Section 07 92 00	Joint Sealants
.11	Section 08 11 00	Metal Doors and Frames
.12	Section 09 21 16	Gypsum Board
.13	Section 09 91 23	Interior Painting

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM C90-24a Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units
- .2 ASTM C129-25 Standard Specification for Dry-Cast Nonloadbearing Concrete Masonry Units
- .3 ASTM C150/C150M-24 Standard Specification for Portland Cement
- .4 ASTM C207-24 Standard Specification for Hydrated Lime for Masonry Purposes
- .5 ASTM D2240-15(2021) Standard Test Method for Rubber Property-Durometer Hardness.
- .6 ASTM D5249-10(2021) Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.

.2 CSA Group (CSA)
- .1 CSA A23.1-14/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
- .2 CSA A165 Series-14 (R2019) CSA Standards on Concrete Masonry Units.
- .3 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
- .4 CSA A370-14 (R2018) Connectors for Masonry.
- .5 CSA A371-14 (R2019) Masonry Construction for Buildings.
- .6 CSA S304-14 (R2019) Design of Masonry Structures.

.3 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.

1.4 Submittals

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

.2 Data: Submit manufacturer's printed product literature, specifications and data sheets

.3 Submit the following samples:
- .1 Two (2) of each type of concrete masonry units specified.
- .2 Two (2) of each type of masonry accessory specified.

.4 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.

.5 Submit engineered temporary bracing design drawings for temporary support of masonry walls. Drawings shall be prepared by, and bear the seal of a Professional Engineer, licensed in the Province of Ontario.

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

.7 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.
- .1 Distribute inspection reports as follows:
  - .1 Consultant.
  - .2 Structural Engineer
  - .3 Contractor.

1.5 Quality Assurance

.1 The masonry sub-contractor shall have a minimum of five years of continuous documented Canadian experience in work of the type and quality shown and specified. Proof of experience shall be submitted when requested by the Consultant and shall be subject to the approval of the Consultant.

.2 Pre-installation meeting: conduct pre-installation meeting to verify project requirements manufacturer's instructions and manufacturer's warranty requirements.

.3 Field Quality Control:
- .1 Inspection and testing will be carried out by Testing Laboratory designated by Owner.
- .2 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
- .3 Inspection and Testing Company shall perform sampling, inspection and testing of masonry work at site, in accordance with referenced standards, including but not limited to the following:
  - .1 Masonry Placement Inspection
  - .2 Reinforcing Steel Placement
  - .3 Grout and Mortar Testing
  - .4 CMU Testing
- .4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .5 Provide access to Work for inspectors.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Materials shall be kept clean and dry.

.4 Deliver cement, lime and mortar ingredients with manufacturer's seal and labels intact.

.5 Cementitious material and aggregates shall be stored in accordance with the requirements of CSA A23.1.

.6 Exposed units which become stained or chipped, surface marked or scratched, and materials which are affected by inadequate protection shall be replaced, at no additional expense to the Owner.

1.7 Project Conditions

.1 Provide heat enclosures and heat as required.

.2 Work to be undertaken shall be carried out according to CAN3-A371, Clause 5.15.2.

.3 Maintain temperature of mortar between 5 ° C and 50 ° C until batch is used.

.4 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.

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

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Masonry Units: Concrete Block: Modular, conforming to CCMPA requirements and CSA A165.1.
  .1 H/20/A/M concrete masonry units to be used at all load bearing masonry walls.
  .2 H/15/A/M concrete, masonry units, at all other locations unless noted otherwise.
  .3 Refer to drawings for Fire Resistance Ratings. Type of concrete and block to conform to Table 5.0, Fire Resistance Rating of Concrete Block in Hours, of the Canadian Concrete Masonry Producers Association Handbook.
  .4 Special shapes: provide special shapes indicated or required including bullnose and corner blocks, base blocks, fillers, and the like as may be required. Provide purpose made shapes for lintels and bond beams.
  .5 Exposed block shall all be made by one manufacturer and shall be uniform in colour, shade and texture.

.2 Bar Reinforcement, wire reinforcement, connectors and ties: as specified in Section 04 05 19 - Masonry Anchorage and Reinforcing.

.3 Control Joint Filler: to ASTM D5249-10, Type 1, Round, flexible, continuous-length, nonabsorbent, nongassing, nonstaining, and nonshrinking. Extruded from a cross-linked polyethylene. Flexibile foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall.

.4 Pre-manufactured Masonry Control Joint: Pre-manufactured polyvinylchloride control joints may be used in lieu of the specified built-up type of joint.

.5 Mortar: Conforming to CSA A179.
.1 Use same brand of material and source of aggregate for entire project.
.2 Aggregate: CSA A179, fine grain aggregates.
.3 Cement: normal Portland to ASTM C150, Type 10.
.4 Water shall be clean, potable and free of deleterious amounts of acid, alkalies, or organic materials.
.5 Hydrated Lime: Type ‘S’ to ASTM C207.
.6 Type 'S' mortar shall be used for all concrete block masonry work.
.7 Proprietary Mortar Mixes: conform to mix requirements specified
.8 Mortar colour for concrete unit masonry work shall be grey.
.9 Admixtures of any kind are not allowed.

.6 Grout: to CSA A179, Table 3: Premixed, non-shrink non-metallic grout.

.7 Other materials not specifically described but required for a complete and proper installation of masonry, shall be as selected by the Contractor subject to approval by the Consultant

2.2 Mixes

.1 Mixing: Prepare and mix mortar materials under strict supervision, and in small batches only for immediate use.

.2 Mix proprietary mortars in strict accordance with manufacturer's instructions to produce the specified mortar types in accordance with CSA A179. Do not use re-tempered mortars.

.3 Take representative samples for testing consistency of strength and colour according to CSA A179.

2.3 Damp Course and Flashings

.1 Peel and stick modified SBS bitumen membrane reinforced with proprietary glass screen, minimum thickness of 1.0 mm.

.2 Lap Sealant: recommended by flashing manufacturer.

2.4 Accessories

.1 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.

PART 3 EXECUTION

3.1 Examination

.1 Examine work of other trades for defects or discrepancies and report same in writing to Consultant.

.2 Installation of any part of this work shall constitute acceptance of such surfaces as being satisfactory.

3.2 General

.1 Do masonry work in accordance with CSA A371 except where specified otherwise.

.2 A competent masonry foreman shall supervise and direct the work and only skilled masons shall execute the work of this Section.

.3 Coordinate work of this Section with others such as, field welding of anchors to steel work, insulation application, and the like. Prepare all items for built-in as the work proceeds, either supplied and installed by other trades or installed under this Section.

.4 Unless otherwise indicated on the drawings, all interior masonry partitions shall extend from floor level to the underside of floor or roof structures above.

3.3 Installation

.1 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.2 Lay out coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

.3 Lay block with webs to align plumb over each other with thick ends of webs up. The top course of all partitions which do not pass through a ceiling or up to the underside of a roof deck shall have the open cells filled solid.

.4 Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel for flush mounted electrical outlets, grilles, pipes, conduits, leaving 3 mm maximum clearance.

.5 Fill all vertical and bed joints, including plain end faces, through the entire wall thickness solidly with mortar.

.6 Do not break bond of exposed walls where partitions intersect and if bond would show through on exposed face of walls. Bond these partitions to walls they intersect with prefabricated intersection masonry reinforcement in each course.

.7 Bond intersecting block walls in alternate courses.

.8 Terminate non load bearing walls within 20 mm of structure above unless indicated otherwise.

.9 Where walls are pierced by structural members, ducts, pipes, fill voids with mortar to within 20 mm of such members.

.10 Buttering corners of units, throwing mortar droppings into joints, deep or excessive furrowing of bed joints, is not permitted. Do not shift or tap units after mortar has taken initial set. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply.

.11 Do not wet concrete masonry before or during laying in wall.

.12 Bed and vertical joints shall be evenly and solidly filled with mortar.

.13 Provide reinforced bond beams where indicated on structural drawings.

.14 Provide vertical reinforcement as indicated on structural drawings. Fill all reinforced cores solid with grout as indicated. Provide cleanout port at bottom of each grouted core when required by Consultant.

3.4 Exposed Masonry

.1 Do not use chipped, cracked or stained, and otherwise damaged units or unsatisfactory material in exposed and load bearing masonry walls.

.2 Lay all joints 10 mm thick (uniform). All joints shall be full of mortar except where specifically designated to be left open.

.3 All joints shall be slightly concave. Use sufficient force to press mortar tight against masonry units on both sides of joints. Remove excess material or burrs left after jointing by means of a trowel or rubbing with burlap bag.

.4 Provide bullnose block at all exposed masonry corners.

3.5 Tolerances

.1 Tolerances in notes to Clause 5.3 of CSA A371 apply.

3.6 Reinforcement and Connectors

.1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.7 Concrete Masonry Lintels

.1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

.2 Lintels in non-load-bearing walls shall be constructed with special bond or lintel block units unless shown otherwise on plans. Lintels shall bear 200 mm minimum and bearing shall be isolated with two layers of heavy asphalt coated paper.

.3 Reinforcing steel in lintels shall be 2 x 20 M bars minimum specified under Section 04 05 19 - Masonry Anchorage and Reinforcing, or as noted on drawings.

.4 Concrete fill for lintels shall be 25 MPa or as noted on the drawings. Concrete shall be as specified in Section 03 30 00.

3.8 Loose Steel Lintels

.1 Install loose steel lintels. Centre over opening width.

.2 Lintels supplied under Section 05 50 00 – Metal Fabrications.

3.9 Control Joints

.1 Provide continuous joints as indicted and at spacing not to exceed 6000 mm c/c unless noted otherwise on drawings.

.2 Break vertical mortar bond with extruded neoprene gasket or building paper.

.3 Prime control joint to prevent drying out of caulking material.

3.10 Support of Loads

.1 Use 25 MPa concrete unless specified otherwise on the Drawings, where concrete fill is used in lieu of solid units.

.2 Use grout to CSA A179 where grout is used in lieu of solid units.

.3 Install building paper below voids to be filled with grout. Keep paper 25 mm back from face of units.

3.11 Lateral Support and Anchorage

.1 Do lateral support and anchorage of masonry in accordance with CSA S304.1 and as indicated.

3.12 Grouting

.1 Grout masonry in accordance with CSA S304.1 and as indicated.

3.13 Temporary Wall Bracing

.1 Design and provide all required temporary engineered wall bracing.

.2 Brace masonry walls to resist wind pressure and other lateral loads during construction period.

.3 Provide temporary bracing of masonry work during and after erection until mortar has cured and permanent lateral support is in place

3.14 Built-ins

.1 Build in items required to be built into masonry and provided by other Sections, including bearing plates, door frames, anchor bolts, sleeves and inserts. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes and other items.

.2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

.3 Brace door jambs to maintain plumb. Fill voids between masonry and metal frames with masonry mortar or insulation, as indicated on drawings or as required to provide a neat, finished appearance.

.4 Set wall plates on masonry in non-shrink grout in accordance with manufacturer's instructions.

.5 Do all cutting, fitting, drilling, patching and making good for other trades in masonry work.

3.15 Protection

.1 Protect masonry units from damage resulting from subsequent construction operations.

.2 Use protection materials and methods which will not stain or damage masonry units.

.3 Remove protection materials upon Substantial Performance, or when risk of damage is no longer present.

3.16 Cleaning

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

.2 Allow mortar droppings on unglazed concrete masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

.3 Remove mortar from concrete floor slabs and leave entire area vacuum clean.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 04 22 00 Concrete Unit Masonry
.3 Section 05 21 00 Steel Joists
.4 Section 05 31 00 Steel Deck
.5 Section 05 41 00 Structural Metal Stud Framing
.6 Section 05 50 00 Metal Fabrications
.7 Section 07 81 00 Spray Applied Fire Resistive Materials
.8 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A108-24 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
  .2 ASTM A123/A123M-24 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  .4 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  .5 ASTM A653/A653M-25a Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .6 ASTM A1011/A1011M-25 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High-Strength
  .7 ASTM F3125/F3125M-25a Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
.2 CSA Group (CSA)
  .1 CSA G40.20/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .3 CSA S16:19 Design of Steel Structures.
  .4 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members
  .5 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
  .6 CSA-W48.1-M1991 (R1998) Carbon Steel Covered Electrodes for Shielded Metal Arc Welding
  .7 CSA-W55.3-08 (R2013) Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  .8 CSA W59-18 Welded Steel Construction (Metal Arc Welding).
  .9 CSA W178.1-18 Certification of Welding Inspection Organizations.
  .10 CSA W178.2-18 Certification of Welding Inspectors.
.3 American Welding Society (AWS)

.1 AWS A2.4:2020 Standard Symbols for Welding, Brazing, and Nondestructive Examination
.4 Structural Steel Painting Council
.1 SSPC-SP 6-91 Commercial Blast Cleaning.
.5 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)
.1 CISC/CPMA 1-73a Quick-Drying, One-Coat Paint for Use on Structural Steel.
.6 American Institute of Steel Construction (AISC)
.1 Code of Standard Practice for Steel Buildings and Bridges, Section 10, Architectural Exposed Structural Steel, latest edition.
.7 The National Building Code of Canada.

1.4 Submittals

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

.2 Submit shop and erection drawings. Submit typical details of connections and any special connections for review before preparation of shop drawings. Assume responsibility for the accuracy of Work. Review of submitted shop drawings is to ensure only that the Contract Documents are being correctly interpreted.

.3 Professional Engineer responsible for connection design shall sign and seal each shop drawing.

.4 Show on shop drawings the size, spacing, and the location of structural steel members; connections; attachments; reinforcing; anchorage and required inserts; and all necessary plans, elevations and details.

.5 Show splice locations and details.

.6 Welded connections shall be designated by welding symbols in compliance with AWS A2.4 and indicate clearly net weld lengths.

.7 Submit design calculations if requested by the Consultant.

.8 Submit diagrams showing methods of erection.

.9 Field Work Drawings shall be submitted as shop drawings.

.10 Notify Consultant in writing of any deviations in shop drawings from the requirements of the Contract Documents.

.11 Submit a schedule of fabrication to the Consultant and the Testing Agency, prior to commencement of fabrication.

1.5 Qualifications

.1 Undertake welding and/or welding inspection by welders fully approved to one or more of the reference codes and standards where applicable.

1.6 Quality Assurance

.1 Connections:

.1 Connections designed by Engineer: Submission of shop drawings for connection which have been detailed on Drawings shall represent acceptance by Contractor that connection can be executed successfully.
.2 Design of other connections which cannot be selected from standard designs tabulated in CISC Handbook of Steel Construction shall be by a Professional Engineer, licensed in the Province of Ontario, experienced in structural steel connection design.
.3 Consultant will review connection arrangement to verify general conformance with overall design concept of structure.
.4 Connection design engineer shall be insured for professional liability in accordance with section 74 subsection (1) of Regulation 941 of the Ontario Professional Engineers Act. The alternative of compliance with subsection (2) is not acceptable.
.5 Provide connections adequate to resist reaction of beam, when beam is loaded to maximum flexural capacity under uniformly distributed load, unless reaction or connection detail is shown on Drawings.
.1 Provide flexible beam connections for unrestrained members in accordance with CSA S16.1, unless shown otherwise on Drawings.
.2 Select connections, wherever possible, from standard designs tabulated in current edition of CISC Handbook of Steel Construction, except that length of beam web angles shall not be less than half the depth of beam, and single angles shall not be used.
.3 Provide direct connections to flanges of spandrel beams (exterior perimeter beams) to restrain twisting.

.2 Design:
.1 Connections:
.1 Provide bolted or welded connections, unless shown otherwise on Drawings.
.2 Use high strength bolts to ASTM F3125 for all connections.
.3 Use slip resistant (friction-type) connections for bolted joints designed to resist reversible forces.
.4 Provide tension adjustment hardware at rod type bracing and at flat bar type bracing.
.5 Do not permit connections to encroach on clearance lines required for installation of Work of other Sections.

.3 Random Splicing: Obtain in writing from Consultant, prior to commencement of shop drawings, special requirements that will be imposed as a necessary condition of acceptance of members with randomly located butt welded splices.

.4 All edge perimeter angles and bent plates installed at roof framing level shall be joined by butt weld splices designed for full tension capacity of members being joined.

1.7 Tolerances

.1 In addition to tolerances specified in CSA S16, erect shelf angles and sash angles attached to steel frame within a tolerance of 3 mm plus or minus, with abutting ends of members at the same level.

1.8 Inspection and Testing

.1 Inspection and testing of materials and shop fabrication of Work of this Section, and field quality control, will be performed by an independent Inspection and Testing Company.

.2 The Inspection and Testing Company shall meet qualification requirements of CSA W178.1 and shall be certified by the Canadian Welding Bureau in Category 1 Buildings.

.3 Welding Inspectors and supervisors shall be certified by Canadian Welding Bureau to CSA W178.2, to minimum level 2 certification.

.4 Provide free access for inspectors to all places work is being performed, whether on site or off.

.5 Mill inspection shall ensure that materials conform to specified requirements. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests.

.6 Shop inspection shall ensure that structural steel is fabricated in accordance with the shop drawings, and the specified fabrication and welding procedures.

.7 The cost of inspection and testing of splices introduced by the fabricator and not required on the Contract Documents will be paid by the Contractor.

.8 Inspection and Testing Company when appointed shall carry out shop inspection to verify:
- .1 Structural materials and paint conform to Specifications. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests of structural materials.
- .2 Fabrication and welding conforms to Specifications and dimensioned shop drawings.
- .3 Shop cleaning and preparation and prime painting to conform to specified requirements.
- .4 Surfaces inaccessible for cleaning and painting after assembly are treated before assembly.
- .5 For surfaces painted with zinc rich paint or zinc primer, specified surface preparation is followed and specified paint thickness is applied.

.9 Non-destructive Testing of Welded Connections: Carry out non-destructive testing of welded connections chosen at random as follows:
- .1 Check and record steel member sizes for 20% of beams.
- .2 Check 5% of all welds by magnetic particle inspection.
- .3 Check 25% of moment connections and all connections subject to direct tension involving use of full penetration groove welds by ultrasonic testing.
- .4 Check 10% (minimum 2 per connection) in accordance with Section 23 of CSA S16 of pretensioned connections including main building bracing connections.

.10 More frequent testing and inspection shall be completed if random tests described above are not satisfactory. These costs are to be paid by the Contractor.

1.9 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver products that are only supplied under work of this Section to those who are responsible for their installation, to the work site as directed and to meet construction schedule.

.3 Handle and store structural steel in such a manner that no damage, including corrosion, is caused to the stored or erected work, or to other property.

.4 Store structural steel off of ground on timber supports.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Rolled shapes, hollow structural sections, plates and rods: new steel, in compliance with CSA and/or ASTM Standards indicated on Structural Drawings.

.2 Welding Electrodes: to meet the requirements set forth in the applicable standard of the CSA W48 Series on welding electrodes. (Any process which produces deposited weld metal meeting the requirements of the applicable W48 Series Standard for any grade of arc welding electrodes shall be accepted as equivalent to the use of such electrodes.)

.3 High Strength Bolts: to meet specified requirements of ASTM F3125

.4 Machine Bolts: to meet specified requirements of ASTM A307.

.5 Anchor Bolts: To CSA-G40.20/G40.21, Grade 300W.

.6 Shop Coat Paint:
- .1 Interior structural steel: To meet specified requirements of CISC/CPMA 1-73a and compatible with Master Painters Institute INT 5.1S or 5.1X Institutional low odour/low VOC semi-gloss finish. Colour to be grey.

.7 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A153.

PART 3 EXECUTION

3.1 Fabrication

.1 Fabricate work of this Section in compliance with CSA S16, and as specified following.

.2 Connections:
- .1 Make bolted or welded connections.
- .2 Use high strength bolts unless otherwise noted on Drawings.
- .3 Use friction type high strength bolts for the connections of bracing members (diagonal kickers) resisting the effects of applied lateral loads. Provide tension adjustment at flat bar and rod type lateral bracing.
- .4 Do not permit connections to encroach on the clearance lines required for the installation of work of this Section.

.3 Beam Connections:
- .1 Provide beam connections adequate to resist the reactions produced by the framing or load conditions.
- .2 Provide beam to column connections that apply vertical reaction with negligible eccentricity at the connecting face of the column, such as single or double beam web connections, end plate connections or un-stiffened seats, unless otherwise shown on Drawings. Submit for review, in advance of the preparation of shop drawings, connections which do not meet these requirements.
- .3 Provide connections complying with the requirements of the CISC Handbook of Steel Construction, except that the length of beam web angles shall not be less than half the depth of the beam and single angles shall not be used.
- .4 Provide direct connections to flanges of spandrel beams to restrain twisting.

.4 Holes in Structural Members:
.1 Punch holes 11 mm to 27 mm in diameter as required for attaching the work of other Sections to structural steel members. Locate holes so that no appreciable reduction of the strength of members is caused.
.2 Provide holes for pipes and ducts, and reinforce openings as indicated on drawings. Cutting of holes in structural members in the field will not be permitted except with written approval of the Consultant.
.3 Provide effective drainage holes to prevent the accumulation of water in tubular members.

.5 Member Separators: Provide separators at approximate spacing of 1200 mm o.c. for double beams and channels as follows:
.1 For beams and channels 225 mm or less in depth: one or two rows of pipe separators.
.2 For beams and channels over 225 mm in depth: channel separators, unless otherwise detailed on Drawings.

.6 Built up Compression Members General Requirements: Comply with the requirements of CSA-S16, for all built up compression members.

.7 Column Bearing Plates: Mill column bearing plates under column bearing unless plate is sufficiently flat to give adequate contact bearing between column and plate.

.8 Structural Steel Painting: All prime painting shall be shop applied and the responsibility of the steel fabricator. Refer to specific priming requirements specified in Section 09 91 23 - Interior Painting.
.1 Paint in accordance with manufacturer's published directions. Paint steel in the shop under cover. Keep painted members under cover until the paint has dried.
.2 Clean and prepare surfaces, as appropriate for paint specified, in accordance with Commercial Blast Cleaning is only required where zinc rich paint is to be applied. All other steel to be or clean steel in compliance with SSPC SP6 where zinc rich paint is shop applied.
.3 Where paint is applied adjacent to welded joints, remove it to bare metal for a distance of at least 50 mm beyond sides of joints.
.4 Do not paint surfaces and edges to be field welded, contact surfaces of friction type connections assembled by high strength bolts, surfaces encased in or in contact with concrete.
.5 Do not paint surfaces to receive cementitious fireproofing.
.6 Prime steel members to receive Intumescent Fireproofing in accordance with fireproofing manufacturer's recommendations. Refer to Section 07 81 23.

.9 Galvanizing: Galvanize members as indicated and in accordance with reference standards, after shop welding is complete.
.1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.
.2 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
.3 Coating Requirements:
.1 Weight: the weight of the galvanized coating shall conform with Table 1 of CSA G164 or paragraph 6.1 of ASTM A123 and Table 1 of ASTM A153 (as appropriate).
.2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article.

.4 The integrity of the coating shall be determined by visual inspection and coating thickness measurements.
.5 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.2 Examination

.1 Verify, before delivery of structural steel, that work of other Sections on which work of this Section is dependent is correctly installed and located.

3.3 Preparation

.1 Supply anchor bolts, base and bearing plates and other members to be built in under work of other Sections as the work progresses. Cooperate with installers of this work and provide instructions for setting items to be built in.

3.4 Erection

.1 Comply with CSA S16 and work site safety plans in erection of work of this Section.

.2 Make adequate provision for horizontal and vertical erection loads and for sufficient temporary bracing to keep structural frame plumb and in true alignment until the completion of erection, and the installation of masonry, concrete work, and floor and roof decks which provide the necessary permanent bracing.

.3 Provide temporary steel members as may be required for erection purposes and remove them when no longer required.

.4 Installation of Bearing and Column Base Plates: Install bearing plates and standard wall anchors for beams bearing on masonry or concrete.
.1 Set loose beam bearing plates and column base plates, at proper elevation, true and level, with steel shims, ready for grouting as specified under work of other Sections.
.2 Set loose bearing plates and/or levelling plates to be cast into concrete.

3.5 Coating Touch-Up

.1 Clean welds with wire brushes and wash down with clean water to ensure no residue from electrodes is present.

.2 After erection, give one coat of prime coat or zinc rich paint as applicable and specified for shop coat to field bolts, field connections, burnt areas, and abrasions or damage to shop coats.

.3 Touch up all areas with a specified paint film thickness.

.4 Give areas of bare metal on galvanized members two coats of zinc-rich paint. Repair coating on architecturally exposed galvanized metals in accordance with reference standards and as directed by the Consultant. Replace any materials where damage cannot be repaired to the satisfaction of the Consultant.

3.6 Field Quality Control

.1 Inspection and Testing Company, when appointed as specified in Source Quality Control elsewhere in this Section, shall perform:

.1 Inspection of erection and fit-up, including placing, plumbing, levelling and temporary bracing and conformance with specified tolerances.
.2 Inspection of bolted connections, including verification that ASTM A307, ASTM F3125 snug tight only bolts, and ASTM F3125 pre-tensioned bolts have been installed and used appropriately, and that threads are excluded from shear plane where required.
.3 Inspection of welded joints, including slag removal.
.4 General inspection of field cutting and alterations; report immediately to Consultant, any alterations or cutting not shown on reviewed shop drawings.
.5 General inspection of shop coating touch-up.
.6 Inspection of zinc primer and zinc-rich paint, including surface preparation and coating thickness.

3.7 Defective Work

.1 Variations in excess of specified tolerances, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective Work performed by this Section.

.2 Replace defective Work, as directed by Consultant.

.3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses if Work has proven to be deficient.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 20 00 Concrete Reinforcing
.2 Section 03 30 00 Cast-in-Place Concrete
.3 Section 05 12 23 Structural Steel
.4 Section 05 31 00 Steel Deck
.5 Section 07 81 00 Spray Applied Fire Resistive Materials

1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A108-24 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
  .2 ASTM A1011/A1011M-25 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High-Strength
.2 CSA Group (CSA)
  .1 CSA S16:19 Design of Steel Structures
  .2 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members
  .3 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel
  .4 CSA-W48.1-M1991 (R1998) Carbon Steel Covered Electrodes for Shielded Metal Arc Welding
  .5 CSA W59-18 Welded Steel Construction (Metal Arc Welding)
  .6 CSA W55.3-08 (R2018) Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings
  .7 CSA W178.1-18 Certification of Welding Inspection Organizations
  .8 CSA W178.2-18 Certification of Welding Inspectors
.3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)
  .1 CISC/CPMA 2-75 Quick-Drying, Primer for Use on Structural Steel
  .2 CISC/CPMA 1-73a Quick-Drying, One-Coat Paint for Use on Structural Steel
.4 The National Building Code of Canada.

1.4 Submittals

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

.2 Shop Drawings:
  .1 Submit steel joist shop drawings as defined in reference standards. Shop drawings shall be stamped by a Professional Engineer registered in the Province of Ontario. Each submission of the shop drawings shall bear the seal of the Engineer.
  .2 Indicate, in addition, dimensioned intersections of members, critical bending moments due to eccentricities, joist spacing, framing for openings, and slopes.
  .3 Detail welded connections using standard symbols for welding joints as published in the current CISC Handbook of Steel Construction.

.4 Indicate on erection drawings, for each type of joist and bearing condition, the centre of bearing assumed in design and the maximum allowable distance from this point to the intersection of the axes of the chord and the end diagonal.
.5 Review all shop drawings prior to submission. By this review, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalogue number and similar data or will do so and that he has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor's review of each shop drawing shall be indicated by stamp, date and signature of a responsible person.
.6 At time of submission, notify the Consultant in writing of any deviations in the shop drawings from the requirements of the Contract Documents.
.7 The Consultant will review and return shop drawings in accordance with any schedule agreed on, or otherwise with reasonable promptness. The Consultant's review will be for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the Contract Documents unless a deviation on the shop drawings has been approved in writing by the Consultant.
.8 Make any changes in shop drawings which the Consultant may require and resubmit unless otherwise directed by Consultant. When resubmitting the Contractor shall notify the Consultant in writing of any revisions other than those requested by the Consultant.

1.5 Quality Assurance

.1 Design Criteria
.1 Design joists to carry loads indicated on structural drawings.
.2 Design joist to ensure that total load deflection does not exceed 1/240 of the span and live load deflection does not exceed 1/360 of the span.
.3 Analyze joists composed wholly or in part of cold formed structural members as rigidly connected linear elastic frame works, including all joint eccentricities. Design cold formed members for combined axial loads and bending moments predicted by analysis. Design hot rolled members for combined axial load and bending moment if eccentricity at one or both ends exceeds limits of reference standards above.
.4 Tie Joists: Where tie joists are used, design tie joist, columns and connections to resist the member forces predicted by a linear elastic analysis.
.5 Design special joist components to allow the passage of mechanical and electrical services through webs of joists, where so indicated on the structural drawings.
.6 Design of joists shall be by a Professional Engineer licensed in the Province of Ontario and experienced in steel joist design.
.7 Design framing members to meet minimum requirements of ULC for listed assemblies

.2 Source Quality Control
.1 Inspection and testing of materials and shop fabrication of work of this Section, and field quality control specified elsewhere in this Section, will be performed by an Inspection and Testing Company appointed by the Consultant.
.2 The Inspection and Testing Company, and welding inspectors and supervisors shall meet qualification requirements of CSA W178, and shall be certified by the Canadian Welding Bureau in Category (1), Buildings.
.3 Provide free access for inspectors to all places work is being performed.
.4 Shop Inspection shall ensure that materials conform to specified requirements. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests. Inspection shall ensure that fit up, fabrication, and shop painting conform to specified requirements and dimensioned shop drawings.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver products that are supplied only under work of this Section to those who are responsible for their installation, to the place they direct and to meet construction schedule.

.3 Handle and store joists in such a manner that no damage, including corrosion, is caused to the stored or erected work, or to other property.

.4 Store all steel joists off of the ground on timber supports.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Steel Joists: Formed of hot rolled or cold formed shapes, hollow structural sections, plates and rods: new steel, in compliance with CSA and/or ASTM Standards indicated on Structural Drawings.

.2 Shop Coat Paint: To meet specified requirements of CISC/CPMA Standard 1-73a and compatible with Master Painters Institute INT 5.1S Institutional low odour/low VOC semi-gloss finish. Colour to be grey

2.2 Fabrication

.1 Fabricate joists with their attachments and accessories in accordance with the reference standards.

.2 Provide top chords of sufficient width and material thickness to permit 20 mm diameter arc spot welds of deck to joist to be formed, in accordance with CSA S136.

.3 Prepare joists for attachment of other work as indicated on drawings and required for construction.

.4 Fabricate bridging not less than 3 mm in thickness.

.5 Extend bottom chords of joists where required to support ceiling or walls as shown on drawings.

.6 Fabricate joists and shoes to accommodate roof slopes shown on drawings.

.7 Fabricate web systems to allow clearances for transverse mechanical and electrical services to pass through where so indicated on structural drawings.

.8 Provide shoe depths to suit elevations of bearings in each location.

.9 Fabricate joists of uniform appearance for erection in areas where they are exposed to view.

2.3 Cleaning and Painting

.1 Coordinate with Section 07 81 00, and apply prime paint to steel joists scheduled to be covered with cementitious fireproofing only if such application does not affect or alter the design criteria for fireproof assemblies.

.2 Painting: All prime painting shall be shop applied and the responsibility of the fabricator. Refer to specific priming requirements specified in Section 09 91 23 - Interior Painting.
- .1 Paint in accordance with manufacturer's published directions. Paint steel in the shop under cover. Keep painted members under cover until the paint has dried.
- .2 Clean and prepare surfaces, as appropriate for paint specified, in accordance with CISC/CPMA 2-75 or clean steel in compliance with SSPC SP6 where zinc rich paint is shop applied.
- .3 Where paint is applied adjacent to welded joints, remove it to bare metal for a distance of at least 50 mm beyond sides of joints.
- .4 Do not paint surfaces and edges to be field welded, surfaces encased in or in contact with concrete or masonry.

.3 Mark joists to indicate erection orientation when they are fabricated to special design or loading requirements.

.4 Identify each joist with mark corresponding to shop drawing designation.

PART 3 EXECUTION

3.1 Examination

.1 Verify, before delivery of joists, that work to receive joists is located correctly and at proper levels.

3.2 Preparation

.1 Provide necessary instructions to other trades for installation of bearings and anchors installed under work of other Sections. Assist in installation if requested.

.2 If steel surfaces are painted where connections are made by welding at the site, remove paint to bare metal for a distance of at least 50 mm beyond sides of joints.

3.3 Erection

.1 Comply with CSA S16 and work site safety plans in erection of work of this Section.

.2 Refer to drawings for the work of other Sections and locate joists to avoid interference with ceiling construction, recessed lights, mechanical and electrical services, and similar work.

.3 Install shims, packing or special shoes to support joists at proper elevation.

.4 Carry joists to centre line of beams, with a tolerance of +0 mm and 25 mm for beams with joists bearing from both sides, and +25 mm and 0 mm for beams with joists bearing from one side only.

.5 Weld each joist at bearings on structural steel members and bearing plates, or as indicated on drawings.

.6 Install framing for openings between joists as indicated on drawings.

.7 Bridging:
.1 Install steel bridging, transverse to joist spans to meet specified requirements of reference standards.
.2 Locate bridging at panel points wherever possible.
.3 Locate bridging to ensure no interference with recessed lights, and mechanical and electrical services.
.4 Top chord load distributing bridging may be used in lieu of normal top chord bridging specified above.

3.4 Field Quality Control

.1 Perform field inspection by Inspection and Testing Company to meet requirements specified under Source Quality Control of this Section, and to include:
.1 Inspection of erection and fit up, including placing joist beaming, plumbing, levelling and temporary and permanent bracing.
.2 Verification for each end of each joist that the distance from the centre of bearing to the end tension web member does not exceed the maximum dimension given on the drawings.
.3 Inspection of welded and bolted connections.
.4 General inspection of shop coating touch up.

.2 Inspection & Testing Company shall:
.1 Submit reports at least weekly when shop and site work is in progress.
.2 Distribute inspection reports as follows:
.1 2 copies to Consultant;
.2 1 copy to Contractor;
.3 2 copies to Fabricator.
.4 Sign report by inspector who performs inspection, and describe progress of Work, deficiencies found and corrective actions taken.
.5 Include deficiency list of outstanding items from previous reports, and comment on status.

3.5 Coating Touch Up

.1 After erection, give one coat of paint specified for shop coat to field bolts, field connections, burnt areas, and abrasions or damage to shop coats.

3.6 Defective Work

.1 Variations in excess of specified tolerances, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective Work performed by this Section.

.2 Replace defective Work, as directed by Consultant.

3.7 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 05 12 23 Structural Steel
.3 Section 05 21 00 Steel Joists
.4 Section 06 10 00 Rough Carpentry
.5 Section 07 81 00 Spray Applied Fire Resistive Materials

1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A653/A653M-25a Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
.2 CSA Group (CSA)
  .1 CSA S16:19 Design of Steel Structures
  .2 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members
  .3 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
  .4 CSA W48:23 Filler Metals and Allied Materials for Metal Arc Welding
  .5 CSA W55.3-08 Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  .6 CSA W59-18 Welded Steel Construction (Metal Arc Welding)
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 1.181-99 Ready-Mixed Organic Zinc-Rich Coating
.4 Canadian Sheet Steel Building Institute (CSSBI)
  .1 CSSBI 10M Standard for Steel Roof Deck
  .2 CSSBI 12M Standard for Composite Steel Deck

1.4 Submittals

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

.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Ontario, Canada. Each submission of the shop drawings shall bear the seal of the Engineer.
  .1 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.
  .2 Indicate details of temporary shoring of steel deck.

.3 Submit design calculations if requested by Consultant.

1.5 Design Requirements

.1 Design steel deck using limit states design in accordance with CSA S136 and CSSBI 10M.

.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, and uplift as indicated.

.3 Deflection under specified live load not to exceed 1/240 of span, except that when gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.

.4 Design composite deck sections in accordance with the National Building Code of Canada for concrete strength indicated on drawings.

.5 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CSA S16.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Sheet Steel: ASTM A653 minimum Grade 230 with a base steel design thickness or 0.76 mm or greater and a minimum zinc-iron alloy coating designation of ZF75.

.2 Closures: in accordance with manufacturer's recommendations.

.3 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm. Metallic coating same as deck material.

.4 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.2 Types of Decking

.1 Deck shall conform to the depths noted on the drawings.

.2 Steel roof deck: to CSSBI 10M non-cellular, interlocking side laps.Base steel thickness, depth & profile as shown on the drawings.

.3 Composite steel floor deck: to CSSBI 12M non-cellular, upright embossed fluted profile, interlocking side lap, base steel thickness, depth & profile as shown on the drawings. Flat sheet for cellular deck, 0.76 mm minimum base steel thickness or as noted on drawings. Composite deck shall meet requirements for fire resistance rating specified in UL Design F816.

PART 3 EXECUTION

3.1 General

.1 Structural steel work: in accordance with CSA S136 and CSSBI 10M.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.2 Erection

.1 Erect steel deck as indicated and in accordance with CSA S136, CSSBI 10M, CSSBI 12M and with reviewed erection drawings.

.2 Lap ends: to 50 mm minimum.

.3 Place and support reinforcing steel as indicated.

.4 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.

.5 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

.6 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.

.7 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.

3.3 Closures

.1 Install closures in accordance with approved details.

3.4 Openings and Areas of Concentrated Loads

.1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer, except as otherwise indicated.

.3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.5 Connections

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

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 03 10 00	Concrete Forming and Accessories
.2	Section 03 30 00	Cast-In-Place Concrete
.3	Section 03 54 16	Cementitious Underlayment
.4	Section 04 22 00	Concrete Unit Masonry
.5	Section 04 21 13	Brick Masonry
.6	Section 06 17 33	Wood I Joists
.7	Section 06 17 53	Shop Fabricated Wood Trusses
.8	Section 06 20 00	Finish Carpentry
.9	Section 07 21 13	Building Insulation
.10	Section 07 26 00	Vapour Retarders
.11	Section 07 54 23	TPO Roofing
.12	Section 08 11 00	Metal Doors and Frames
.13	Section 09 65 19	Resilient Tile Flooring
.14	Section 09 21 16	Gypsum Board
.15	Section 09 81 16	Acoustic Blanket Insulation

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A123/A123M-24 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .2 ASTM A653/A653M-25a Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
  .3 ASTM D2559 - 12a(2018) Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions
  .4 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.2 CSA Group (CSA)
  .1 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
  .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .3 CSA O80 SERIES-15 Wood Preservation
  .4 CSA O86:24 Engineering Design in Wood
  .5 CSA O121-17 Douglas Fir Plywood.
  .6 CSA O141:23 Canadian Standard Lumber.
  .7 CSA O151-17 Canadian Softwood Plywood
  .8 CSA O437 Series-93 (R2011) Standards on OSB and Waferboard
  .9 CSA Z809-08 Sustainable Forest Management
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 71.26-M88 Adhesive for Field Glueing Plywood to Lumber Framing for Floor Systems.
.4 Underwriters Laboratories Canada (ULC)
  .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.5 National Lumber Grading Authority (NGLA)
  .1 Standard Grading Rules for Canadian Lumber 2022
.6 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
.2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
.3 FSC Accredited Certified Bodies.

1.4 Submittals

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

.2 Certified Wood: Submit listing of wood products and materials used, produced from wood obtained from forests certified by FSC Accredited Certification Body in accordance with FSC-STD-01-001.

1.5 Quality Assurance

.1 Regulatory Approvals: Wood products used for sheathing and framing must clearly indicate on the face or edge the manufacturer of material, standard to which it was produced, grade of material including whether grade is visually graded or machine-stress rated, and exterior use where applicable, in accordance with listed reference standard.

.2 Lumber Identification: Identified by grade with a stamp of an agency certified by the Canadian Lumber Standards Accreditation Board.

.3 Plywood Identification: Identified by grade mark in accordance with applicable CSA standards.

.4 Plywood Sheathing Identification: Identified by grade mark in accordance with applicable CSA standards.

.5 Design of wood structural systems shall be in accordance with the Ontario Building Code and CSA 086. Design loads shall be as required by the Ontario Building Code, the National Building Code Supplement and as indicated on the drawings.

1.6 Shipping, Handling and Storage

.1 Protect materials, under cover, both in transit and on the site.

.2 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.

.3 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Timber Material shall be 'Grade Stamped'.

.2 CSA Z809 or FSC Certified.

.3 Construction Lumber: To CSA O141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
- .1 Framing lumber, plates, furring, blocking, No. 1 SPF.
- .2 Nailing strips, furring and strapping: No. 4 S-P-F.
- .3 Fitment framing: No. 1 S-P-F.

.4 Canadian Softwood Plywood: to CSA O151-M, standard construction, good one or both sides as required, thickness as shown or specified.

.5 Douglas Fir Plywood: To CSA O121-M, standard construction, good one side, thickness as shown on the drawings. Floor sheathing shall be tongue and groove.

2.2 Accessories

.1 Nails, Spikes and Staples: To ASTM F1667.

.2 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.

.3 Sill Plate Anchor Bolts: Connection of bottom plate of wood stud walls to the concrete foundation wall with 19mm diameter J bolts, min 400mm embedment into concrete, spaced at 600 o.c.
- .1 Material: ASTM F1554 Grade 36
- .2 Finish: Hot Dipped Galvanized per ASTM A153.

.4 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.5 Driven Fasteners: Steel nails, spikes, brads and staples meeting requirements of ASTM F1667. Ensure length is sufficient to penetrate connecting solid wood materials.
- .1 Exterior Work: Hot-dipped galvanized.
- .2 Interior High Humidity Work: Hot-dipped galvanized.
- .3 Interior Work: Electroplated zinc plated, or cadmium plated.
- .4 Pressure Treated Materials: Refer to Section [06 05 73 - Wood Treatment].

.6 Rough Hardware (Bolts, Nuts and Washers): Provide manufacturer recommended fastening devices and anchors meeting requirements of ASTM A307 and as follows:
- .1 Ground Contact Materials: Stainless steel.
- .2 Exterior Work: Hot-dipped galvanized.
- .3 Interior High Humidity Work: Hot-dipped galvanized.
- .4 Interior Work: Electroplated zinc plated, or cadmium plated.

.7 Wood Screws: Steel screws meeting requirements of ASME B18.6 and as follows:
- .1 Exterior Work: Galvanized, ceramic coated or stainless steel.
- .2 Interior Work: Galvanized.

.8 Prefabricated Metal Anchoring Systems, Framing Connectors and Hangers: Prefabricated hot-dipped zinc coated steel products tested or designed in accordance with CSA O86; types and configurations as indicated on drawings.

.9 Joist Hangers, Connectors and Fasteners: In accordance with reviewed shop drawings, minimum 1 mm thick steel sheet, galvanized to a minimum ZF001 coating designation.

.10 Nailing Discs: flat caps, minimum 25 mm diameter, minimum 0.627 mm thick, sheet metal, formed to prevent dishing.

.11 Wood Preservative to CSA O80 SERIES.

.12 Subfloor Adhesive: CAN/CGSB-71.26, cartridge loaded

.13 General Purpose Adhesive: CSA O112.9.

.14 Sill Plate Gasket: Flexible, self-adhering polyethylene foam gasket that bridges gaps and irregularities between top of concrete foundation and sill components; nominal 10-mm thickness x width of wall.
.1 Basis of Design: Owens Corning ProPink ComfortSeal Sill Gasket.

.15 Galvanizing: to CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.

PART 3 EXECUTION

PART 3 EXECUTION

3.1 Installation

.1 Requirements:
.1 Accurately frame and properly assemble rough carpentry work
.2 Securely attach rough carpentry work to substrate by anchoring and fastening
.3 Include required nails, fastenings and other connectors
.4 Set rough carpentry to required levels and lines with members plumb, true to line, cut, and fitted
.5 Fit rough carpentry to other construction
.6 Scribe and cope as needed for accurate fit
.7 Locate furring, nailers, blocking, grounds, and similar supports as required when attaching to other construction.
.8 Do not use materials with defects that impair the quality of the rough carpentry or use pieces that are too small to use with a minimum number of joints or optimum joint arrangement.

.2 Sill Plate Construction: Install sill gasket material between pressure treated sill plate and concrete foundation wall in accordance with manufacturer's instructions.

.3 Wood Frame Construction: Space framing members at maximum 406 mm on centre using continuous pieces of the longest possible length and as follows:
.1 Fabricate wood frame construction to the requirements of Part 9 of the OBC, except where more stringent requirements are indicated on the drawings.
.2 Make allowance for erection stresses.
.3 Securely brace members in place to maintain plumb and true until permanently fixed and held to structure.
.4 Minimize cutting of framing members for pipes and other penetrations by coordinating with other parts of the Work before starting work of this Section; limit cutting and hole drilling to limitations listed in Part 9 of the NBC.
.5 Install members true to line, levels and elevations. Space framing members and frame all openings as detailed on the drawings.
.6 Construct continuous members from pieces of longest practical length.
.7 Install spanning members with crown edge up.

.8 Anchor wood framing to supporting walls with galvanized metal strap ties.

.4 Wall Sheathing:
.1 Install sheathing in accordance with Part 9 of the NBC and as follows:
.1 Install wall sheathing horizontally to wood framing using minimum 50-mm long coated nails at 150 mm along edges and 305 mm along vertical members in the middle of the sheets; leave 2 mm to 3 mm between sheets to allow for shrinkage of wood framing.
.2 Shear Wall Sheathing: Refer to drawings for nailing patterns and installation details; install blocking behind all shear wall sheathing joints; adhere and nail sheathing to wall framing.

.5 Floor Sheathing
.1 Floor sheathing shall be 19 mm thick tongue and groove Douglas Fir plywood.
.2 Offset joints parallel to the floor joists.
.3 Make panels continuous over two or more supports.
.4 Use a continuous bead of adhesive along each floor framing member and screws fasten at 150 mm along edges and 305 mm along floor framing in middle of sheathing.
.5 Screw size and pattern noted above is a minimum requirement; increase number and decrease spacing, or increase size as required to meet site conditions.
.6 Butt joints tightly together, use only tongue and grooved floor sheathing materials to maintain edge support.

.6 Roof Sheathing:
.1 Roof sheathing shall be 19 mm thick Douglas Fir plywood.
.2 Roof Sheathing: Install roof sheathing with length perpendicular to roof framing using 50-mm coated nails at 150 mm along edges and 305 mm along roof framing in the middle of the sheets and as follows:
.1 Nail size and pattern noted above is a minimum requirement; increase number and decrease spacing, or increase size as required to meet site conditions.
.3 Make panels continuous over two or more supports.

.7 Provide treated wood nailers, blocking, cants, grounds, furring and similar members where shown and where required for screeding or attachment of other work and surface applied items. Attach to substrate as required to support applied loading.

.8 Blocking: Provide solid wood backing to support millwork, cabinetwork, equipment, fixtures, railings and accessories and the like, as required. Coordinate with work of other Sections and install all required backing. Any such equipment mounted on gypsum wallboard assemblies or similar assemblies shall be adequately supported.
.1 Provide solid wood blocking in all partitions where wall stops are specified in the hardware schedule.

.9 Roof Blocking, Curbs and Copings:
.1 Provide and install framing, blocking, curbs and copings as indicated on the drawings. Anchor blocking securely in permanent manner.
.2 Provide minimum 10 mm Douglas Fir plywood copings on all built-up wood copings and curbs as detailed.
.3 All wood curbs shall be filled with fibrous insulation specified in Section 07 21 13.
.4 Provide shims and blocking necessary for levelling of equipment curbs.

.10 Electrical Equipment Backboard: provide backboards for mounting electrical equipment as indicated. Use 19 mm thick fir face veneer fire retardant softwood plywood on 19 x 38 mm furring around perimeter and at maximum of 305 mm intermediate spacing.

.1 Install plywood backboards with countersunk screws.

3.1 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 06 17 53 Shop Fabricated Wood Trusses
.3 Section 09 81 16 Acoustic Blanket Insulation

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D5055-24 Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists
  .2 ASTM D5456-24 Standard Specification for Evaluation of Structural Composite Lumber Products
  .3 ASTM F1667/F1667M-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.2 CSA Group (CSA)
  .1 CSA O86:24 Engineering Design in Wood

1.4 Submittals

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

.2 Product Data:
  .1 Submit manufacturer's installation instructions and special handling criteria, installation sequence, printed product literature, catalogue pages and data sheets clearly identifying products used for the Project.

.3 Shop Drawings: Each shop drawing submission shall bear signature and stamp of professional Engineer registered or licensed in the Province of Ontario.
  .1 Indicate species, sizes, and stress grades of lumber used as truss members. Show span, configuration and spacing of joists. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.
  .2 Indicate applicable dimensions, fasteners, erection details and connection materials and finishes.
  .3 Show lifting points for storage, handling and erection.
  .4 Show location of lateral bracing.
  .5 Indicate temporary bracing required for installation.

.4 Test and Evaluation Reports:
  .1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Source Quality Control Submittals: Submit proof that components and products supplied to the project are obtained from a single manufacturing source, and that accessory connectors are obtained from a manufacturer recommended source.

1.5 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Delivery and Acceptance Requirements: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Unload material in accordance with manufacturer's recommendations.

.3 Storage and Handling Requirements: Handle and store materials in accordance with manufacturer's recommendations.
.1 Protect from exposure to harmful environmental conditions.

1.6 Project Conditions

.1 Site Measurements: Verify dimensions by site measurements before fabrication and indicate measurements on shop drawings where anchorages, connectors and other structural components are indicated to fit between or around other construction or embedded into other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Manufacturer:
.1 TJI - Series wood joists by Truss Joist Canada Ltd, "I" beams by Jager Industries Inc., GNI-Series by Gang-Nail Canada are all acceptable

2.2 Wood I Joists

.1 Prefabricated Wood I-Joists: Structural member fabricated in accordance with ASTM D5055, comprised of sawn or structural composite lumber flanges and structural composite panel webs bonded using manufacturer's proprietary waterproof adhesives to form an I-cross sectional shape.

.2 Ensure components and materials are compatible with specified accessories and adjacent materials.

.3 Standards of engineered wood joists. Provide engineered joists which meet this acceptable standard of quality and/or are reviewed equivalent by the architect/ structural engineer.

.4 All engineered wood joists to be designed for loading as shown on the structural drawings.

.5 Joist manufacturer to supply and install all necessary and Adequate hardware, including any joist hangers and/on nailers to Complete all structural details for transfer of loads to steel beams and columns.

.6 Provide at least 2 rows of "x" bridging at 3rd points of span of Joist for stiffening and load sharing.

.7 Joist manufacturer to supply adequate bearing stiffener at each End of joist for transfer of reactions to beams or columns.

.8 The engineered joist supplier shall specify all erection requirements and provide all necessary, temporary and permanent bracing.

.9 Design Criteria:
- .1 Conform to the requirements of CSA O86.
- .2 Design Live and Dead Loads:
  - .1 As indicated on drawings.
- .3 Deflection: total load (live and dead)
  - .1 Floor joists = l/240
- .4 Deflection: Live load
  - .1 Floor joists = l/360

.10 Coordinate with architectural drawings for additional Information.

.11 Provide maximum joist size and spacing as shown on drawings.

.12 Comply with all manufacturers published instructions/requirements for installation of TJI joists.

.13 Provide engineered hangers to support applied loading as indicated.

.14 Assembly Fire Resistance Rating: 1 hour.

2.3 Accessories

.1 Fasteners: [Galvanized steel] [Stainless steel], sized to suit application.
- .1 Acceptable Manufacturers:
  - .1 Simpson Strong-Tie.
  - .2 USP Structural Connectors.

.2 Sheathing: as specified in Section 06 10 00 - Rough Carpentry.

.3 Wood Framing and Blocking: Provide sawn lumber materials as specified in Section 06 10 00 - Rough Carpentry.

.4 Rim Boards: Structural composite lumber with fire-rated composition and a moisture protection coating, meeting requirements of APA PRR-401 for performance rated rim boards and manufactured in accordance with ASTM D5456.

.5 Ancillary Wood Components: Provide permanent bridging and bracing; headers and support framing at openings, and sheathing supports; blocking panels and other framing accessories required for complete and functional installation in accordance with manufacturer's written installation requirements.

2.4 Fabrication

.1 Fabricate structural wood I joists in accordance with the Drawings and Specifications, and the reviewed shop drawings.

.2 Mark all members for identification; mark top surface of straight beams clearly.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: Verify that conditions of substrates previously installed under other Sections are acceptable for product installation in accordance with manufacturer's instructions prior to installation.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 Installation

.1 Coordinate I-joists with work of other trades for proper time and sequence to avoid construction delays.

.2 Comply with manufacturer's product data, including product technical bulletins, installation instructions and product carton instructions for installation.

.3 Install I-joists plumb, level and as indicated.

.4 Fasten joists to supporting framing as recommended by the I-joist manufacturer and hanger manufacturer.

.5 Provide temporary bracing as recommended by the manufacturer to hold joists in position until permanently secured.

.6 Cut openings in joist webs only as allowed by the manufacturer.

3.3 Site Tolerances

.1 Joists: Not more than 12.7 mm from indicated position.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM E119-26 Standard Test Methods for Fire Tests of Building Construction and Materials
.2 CSA Group (CSA)
  .1 CSA O86:24 Engineering Design in Wood
.3 National Lumber Grades Authority (NLGA)
  .1 Standard Grading Rules for Canadian Lumber 2022

1.4 Submittals

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

.2 Shop Drawings: Each shop drawing submission shall bear signature and stamp of professional Engineer registered or licensed in the Province of Ontario.
  .1 Indicate truss design procedure and CSA O86 Engineering Design in Wood
  .2 Indicate species, sizes, and stress grades of lumber used as truss members. Show span, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.
  .3 Show lifting points for storage, handling and erection.
  .4 Show location of lateral bracing.

1.5 Design Requirements

.1 Design trusses, bracing and bridging in accordance with CSA-O86.1 for loads indicated and minimum uniform and minimum concentrated loadings stipulated in NBC commentary.

.2 Limit live load deflections to 1/360th of span unless otherwise specified or indicated.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

.3 Keep open bundles wrapped until the time of installation to protect them from bad weather.

.4 Do not store open trusses in direct contact with the ground.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

.1 Provide manufacturer's limited lifetime warranty.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Basis of Design Manufacturer:
  .1 Barrette Structural Distribution, a division of Les Entreprises Barrette. 545, rang St-Malo Trois-Rivières Québec (Canada) G8V 0A8 Phone: 1 800 263-7265

2.2 Wood Trusses

.1 Basis of Design Product: Triforce Open Joist:
  .1 Fabricated with 100% uncoated natural solid-sawn wood with a triangulated open configuration.
  .2 Finger-joint technology fastened with structural waterproof resorcinol adhesive.
  .3 Trusses shall be completely free of sharp metal connector plates.
  .4 803 mm OSB panel structural buffer on one end, shall allow the truss to be custom field-trimmed on-site by up to 610 mm.
  .5 Depth: As indicated on Drawings.
  .6 Certified under CCMC 13474-R (Canada) and evaluated under IAPMO UES ER-480 / ER-708 (US) to comply with International Residential Code (IRC) and National Building Code of Canada (NBC) requirements.
  .7 Fire Resistance: Evaluated to meet ASTM E119 and CAN/ULC S101 standards.
    .1 Refer to Intertek Design No. BS/SFWT 120-01 Load Bearing Fire Resistance Rated Roof/Ceiling, Floor/Ceiling Assembly Open Joist TRIFORCE Joist Series ASTM E119 and CAN/ULC S101 Rating: 2 Hour
.2 Spans shall be based on limit states design and comply with NBC and CAN/CSA-O86 requirements.

2.3 Materials

.1 Lumber: Spruce (S-P-F) species, No. 1 grade, softwood, S4S, with maximum moisture content of 19% at time of fabrication and to following standards:
  .1 CSA O141.
  .2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Lateral Support: As required by truss manufacturer.

.3 Rim Boards: As supplied by truss manufacturer.

.4 Connectors and Hangers: As recommended by truss manufacturer. Simpson StrongTie, MiTek USP or equivalent.

2.4 Fabrication

.1 Fabricate wood trusses in accordance with reviewed shop drawings.

.2 Ensure members are accurately cut to length, angle and true to line to ensure tight joints.

PART 3 EXECUTION

3.1 Erection

.1 Erect wood trusses in accordance with reviewed shop and erection drawings.

.2 Exercise care to prevent out-of-plane bending of trusses.

.3 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.

.4 Each truss shall be marked to indicate a bottom flange. In order to achieve maximum shear capacity, the truss shall be installed with proper orientation.

.5 Except for trimming the truss length on the OSB end panel, chords shall never be cut, drilled or notched.

.6 Install truss so that top and bottom flanges are within 12.7 mm of true vertical alignment.

.7 Trusses must be restrained at the ends to prevent rollover.

.8 Apply concentrated loads only on top flanges. Do not suspend concentrated loads from bottom flanges, except for light loads such as ceiling fans or light fixtures.

.9 End bearing must be a minimum of 38 mm.

.10 To transfer a vertical load applied above the truss to a bearing, add a rim board, squash blocks or blocking panels.

.11 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.

.12 Trusses shall not be in direct contact with masonry or concrete.

.13 Do not pile construction materials on truss until they are fully installed, braced and have sheathing installed. Do not walk on trusses until properly braced.

.14 When nailing into the truss flange, nails must be spaced at least 65 mm o.c.

.15 A structural rim board shall be provided when trusses are installed perpendicular to bearing walls.

3.2 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 07 21 13 Building Insulation
.3 Section 07 92 00 Joint Sealants
.4 Section 33 46 13 Foundation Drainage

1.3 Submittals

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

.2 Submit the most current technical data sheets. These documents must describe the physical properties of the material, and explanations about product installation, including installation techniques, restrictions, limitations and other manufacturer recommendations.

1.4 Quality Assurance

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

.2 Waterproofing work shall be performed only by skilled applicators, employed by an installation contractor operating all adequate and necessary equipment to execute such work in accordance with the manufacturer's recommendations and recognized standards.

1.5 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions and safety data sheets.

1.6 Project Conditions

.1 Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

.2 Proceed with installation only when substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Waterproofing Membrane

.1 Description: A self-adhesive waterproofing membrane composed of SBS modified bitumen and a Tri-Laminate Woven Polyethylene facer. The self-adhesive side shall be covered by a silicone release sheet.

.2 Characteristics:
.1 Thickness: 1.5 mm
.2 Ultimate elongation (MD/XD): 40 / 25 %
.3 Static puncture resistance:400 N
.4 Tear resistance (MD/XD):375 / 400 N
.5 Tensile strength (MD/XD):11.3 / 15.4 kN/m

.3 Basis of Design product: COLPHENE 3000 by SOPREMA.

2.2 Primer

.1 Description: A blend of elastomeric bitumen, volatile solvents, and adhesive enhancing resins used to prime porous substrates and non-porous substrates to enhance the adhesion of self-adhesive membranes at temperatures above 10°C.

.2 Basis of Design product: SOPRASEAL STICK PRIMER by SOPREMA

2.3 Drainage Board

.1 Description: Dimpled high-density polyethylene panel.

.2 Characteristics:
.1 Compressive Strength (kPa): 550
.2 Roll dimensions (m): Width: 1.83 m - Length: 15.25 m

.3 Basis of Design product: SOPRADRAIN 10G by SOPREMA.

PART 3 EXECUTION

3.1 Examination

.1 Examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work.

.2 Do not proceed with work until unsatisfactory conditions are corrected.

.3 Surface examination and preparation must be completed in conformance with recommendations in the manufacturer’s Specifications Manual.

.4 Before waterproofing work begins, inspect and approve substrate condition and ensure that related work has been properly executed. The start of the membrane application will mean that substrate conditions are acceptable for work completion.

.5 Before commencing work, all surfaces must be smooth, dry, clean and free of ice and debris as per manufacturer's recommendations.

.6 No materials shall be installed during rain or snowfall.

.7 Concrete must be cured a minimum of fourteen days and an adhesion test is recommended before membrane application.

.8 Verify the compatibility of all membrane components with curing compounds, coatings or other materials which are already installed on the surfaces to be treated.

3.2 Preparation of Substrates

.1 Prepare substrates in accordance with manufacturer's recommendations. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of sheet membrane waterproofing.

.2 Any cracks over 3 mm wide shall be reported to the Consultant. After approval from the qualified authority, the crack should be filled in with waterproofing mastic. A 150 mm wide strip of membrane should be installed, centered over the crack.

3.3 Method of Execution

.1 Work shall be performed on a continuous basis as surface and weather conditions allow.

.2 Adjoining surfaces shall be protected against any damage that could result from the waterproofing installation.

3.4 Primer Application

.1 Surface where membrane is applied shall receive an SBS synthetic rubber primer coating at the rate of: (porous surfaces: 0.3 to 0.5 L/m^2, non-porous surfaces: 0.1 to 0.25 L/m^2). If not covered the same day, primed surfaces must be re-primed.

3.5 Waterproofing Membrane Installation

.1 Apply waterproofing to entire exterior faces of elevator pit foundation walls.

.2 All small protrusions (pipes, etc.) through the waterproofing membrane, shall be pre-stripped with a membrane and sealed with waterproofing mastic.

.3 To begin application, align the first roll of membrane to a previously drawn chalk line.

.4 All edges must be pre-stripped with a 150 mm wide strip of membrane centered on the corner. This membrane must be installed in direct contact with the substrate not leaving any voids under the membrane strip.

.5 Install the membrane onto the primed surface by peeling back the paper backing on the underside and adhering the membrane to the surface.

.6 Subsequent rolls must be installed in the same manner and should be aligned with the preceding roll with a side lap of at least 75 mm. End laps must be overlapped at least 150 mm.

.7 Holes and tears in the membrane must be repaired with the appropriate membrane material. The repair must exceed the affected surface area by at least 75 mm. The membrane piece applied for the repair must be sealed around its edges with mastic.

.8 Use a roller approved by manufacturer to apply pressure over the entire surface of the membrane to ensure perfect adhesion.

.9 Seal all penetrations through walls with sealant and install one additional layer of waterproofing membrane for a minimum of 230 mm along the length of any pipes passing through walls.

.10 Verify meticulously the membrane installation at the end of each day of work and before backfilling.

.11 The uppermost edge of the membrane is to be mechanically fastened to the concrete substrate using applicable fasteners and termination bars.

.12 Apply mastic on the top edge of membrane to prevent water infiltration.

.13 Any waterproofing membrane left exposed after backfilling shall be protected from ultra violet and mechanical damages.

3.6 Drainage Board Installation

.1 Drape the drainage board and secure without fastening through the waterproofing membrane or tape to the waterproofing membrane.

.2 Drainage board must be installed with the fabric towards the backfill.

3.7 Cleaning

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

.2 Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 03 30 00	Cast-in-Place Concrete
.2	Section 04 22 00	Concrete Unit Masonry
.3	Section 04 21 13	Brick Masonry
.4	Section 06 10 00	Rough Carpentry
.5	Section 07 24 26	Continuous Insulation Cladding System
.6	Section 07 26 00	Vapour Retarders
.7	Section 07 27 13	Modified Bituminous Sheet Air Barriers
.8	Section 07 54 23	TPO Roofing
.9	Section 07 92 00	Joint Sealants
.10	Section 08 11 00	Metal Doors and Frames
.11	Section 08 50 00	Aluminum Doors, Windows and Screens
.12	Section 09 81 16	Acoustic Blanket Insulation
.13	Section 31 23 10	Excavating, Trenching and Backfilling

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM C272/C272M-18(2024) Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions
- .2 ASTM C423-23 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- .3 ASTM C518-21 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .4 ASTM C578-22 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- .5 ASTM C612-14(2019) Standard Specification for Mineral Fiber Block and Board Thermal Insulation
- .6 ASTM C665-23 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- .7 ASTM C1289-25 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- .8 ASTM C1620-16(2023) Standard Specification for Aerosol Polyurethane and Aerosol Latex Foam Sealants
- .9 ASTM D1621-16(2023) Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- .10 ASTM D1623-17(2023) Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- .11 ASTM D2842-25 Standard Test Method for Water Absorption of Rigid Cellular Plastics
- .12 ASTM E1677-19 Standard Specification for Air Barrier (AB) Material or System for Low-Rise Framed Building Walls
- .13 ASTM E84-26a Standard Test Method for Surface Burning Characteristics of Building Materials
- .14 ASTM E96/E96M-24a Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials

.2 CSA Group (CSA)
  .1 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples
.3 Underwriters Laboratories Canada (ULC)
  .1 ULC 701.1 Standard for Thermal Insulation, Polystyrene Boards
  .2 ULC 702.1 Standard for Thermal Insulation Mineral Fibre for Buildings
  .3 ULC 704 Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.
.4 Underwriters Laboratories (UL)
  .1 UL 1715 - Fire Test of Interior Finish Material
.5 Canadian General Services Board (CGSB)
  .1 CGSB 71-GP-24M Adhesive, Flexible, for Bonding to Cellular Polystyrene Insulation.
  .2 CAN 2-51.32 Sheathing, Membrane, Breather Type.
.6 Uniform Building Code (UBC)
  .1 UBC 26-3 Room Fire Test Standard for Interior of Foam Plastic Systems

1.4 Submittals

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

.2 Submit insulation manufacturer's product literature including specified physical properties for each type of insulation specified.

.3 Submit installation instructions.

.4 Submit certification that product complies with specification requirements and is suitable for the use indicated.

1.5 Environmental Requirements

.1 Insulation shall not be produced with, or contain, any of the regulated CFC compounds listed in the Montreal Protocol of the United Nations Environmental Program.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Deliver material to the site in the original unbroken packages bearing the name of manufacturer.

.4 Store materials in an approved manner at the site preceding application and protect from damage at all times.

.5 Remove damaged or deteriorated materials from site.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Board Insulation

.1 Rigid insulation at perimeter of ground floor slab and below grade: Extruded expanded polystyrene to ULC S701.1 TYPE 4. HFO blowing agents. Thickness as detailed, 400 x 2440 mm boards with butt edges. Material shall have the following characteristics when tested to the reference standards:
  .1 Minimum Compressive Strength: ASTM D1621: 210 kPa.
  .2 Water Absorption: ASTM D2842: maximum 0.7% by volume.
  .3 Water Absorption: ASTM C272: maximum 0.1% by volume.
  .4 Water Vapour Permeance, ASTM E96: 52 ng/Pa•s•m^2
  .5 Thermal resistance RSI: ASTM C518: 0.88/25 mm
  .1 Basis of Design: Soprema XPS-30

.2 Rigid Insulation in exterior brick veneer wall assemblies above grade: Extruded expanded polystyrene to ULC S701.1 TYPE 4. HFO blowing agents. Thickness as detailed, 400 x 2440 mm boards with butt edges. Material shall have the following characteristics when tested to the reference standards:
  .1 Minimum Compressive Strength: ASTM D1621: 210 kPa.
  .2 Water Absorption: ASTM D2842: maximum 0.7% by volume.
  .3 Water Absorption: ASTM C272: maximum 0.1% by volume.
  .4 Water Vapour Permeance, ASTM E96: 52 ng/Pa•s•m^2
  .5 Thermal resistance RSI: ASTM C518: 0.88/25 mm
  .1 Basis of Design: Soprema XPS-30

.3 High Density Rigid Insulation: to ULC 701.1 Type 4. HFO blowing agents. Thickness shall be 2 layers, 38 mm each; 400 x 2440 mm boards with butt edges. Material shall have the following characteristics when tested to the reference standards:
  .1 Compressive Strength: ASTM D1621: 415 kPa
  .2 Water Absorption: ASTM D2842: less than 0.6% by volume.
  .3 Water Absorption: ASTM C272: maximum 0.1% by volume
  .4 Water Vapour Permeance, ASTM E96: 52 ng/Pa•s•m2
  .5 Thermal resistance RSI: ASTM C518: 0.88/25 mm
    .1 Basis of Design: Soprema HPS-60

2.2 Exterior Wood Stud Wall Insulation

.1 Batt Insulation for exterior stud walls: To CAN/ULC-S702, Type 1.
  .1 Fire performance:
    .1 Non-combustibility: To CAN/ULC S114.
    .2 Surface Burning Characteristics: To CAN/ULC S102.
      .1 Flame spread: 0.
      .2 Smoke developed: 0.
  .2 Thermal resistance: To ASTM C518.
    .1 RSI value/25.4 mm at 24 ºC: 0.71 m^2K/W.
    .2 R22 (RSI 3.87)
  .3 Density: 32 kg/m^3 to ASTM C167.
  .4 Thickness 140 mm
  .5 Recycled content: 40 % minimum.
  .6 Basis of Design Product: Rockwool Comfortbatt for wood studs, unfaced.

2.3 Fibreglass Batt Insulation

.1 Fibreglass friction fit batts or mineral fibre to CAN/ULC 702.1 Type 1 for wall application, width and thickness as shown on details:
.1 Owens Corning ProPink Wall Insulation, unfaced.
.2 Owens Corning Thernmafiber Ultrabatt
.3 Roxul Batt Insulation.

2.4 Acoustic Insulation

.1 Acoustic insulation is specified in Section 09 81 16 - Acoustic Blanket Insulation.

2.5 Sprayed Insulation

.1 As specified in Section 07 21 29.

2.6 Spray Foam Insulation

.1 Spray Foam Insulation: to ASTM C1620, one component expanding polyurethane or polyisocyanurate foam, ULC approved and compatible with rigid insulating materials, with Class 1 fire rating to ASTM E84 for window and door frame application:
.1 Ultra Seal PF-100 Gun Foam by Nuco Inc.
.2 Handi-Foam by Fomo Products Inc.
.3 Pinkseal by Owens Corning.
.4 Hilti CF 812 Window and Door Pro.

2.7 Accessories

.1 Sealing Tape: minimum 65 mm width, polypropylene sheathing tape with acrylic adhesive.

.2 Rough Hardware: Nails and staples as required for installation of insulation and membrane materials, galvanized to CSA B111 and B34.

.3 Mechanical Fastening: galvanized screw type fasteners with 25 mm galvanized plate washers. Screws shall be 13 mm longer than the combined thickness of the insulation and sheathing.

.4 Adhesives: As recommended by material manufacturer, compatible with insulation and substrate membrane, waterproof,

.5 Vapour Retarder: As specified in Section 07 26 00.

PART 3 EXECUTION

3.1 Installation – General

.1 Install insulation of types indicated, or, where not indicated, as appropriate, to provide a continuously un-interrupted building envelope in accordance with the requirements of the reference standards.

.2 Install insulation after building substrate materials are dry.

.3 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.4 Fit insulation tightly around all structural angles, penetrations and other protrusions.

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly; offset vertical joints.

.6 Insulation board materials shall be free from chipped or broken edges.

.7 Sizes of materials shall be consistent with the module of the system.

.8 Do not enclose or conceal insulation until it has been inspected by the Consultant.

3.2 Perimeter Insulation

.1 Do not proceed with installation until concrete surfaces are dry and cured, and water proofing membranes have been inspected and approved.

.2 Install perimeter insulation vertically just prior to backfilling.

.3 Prime porous concrete surfaces.

.4 Apply adhesive in gobs or pads to the back of the insulation board in accordance with manufacturer’s instructions. Joints shall be left dry with joints brought into tight contact. Apply insulation to the wall with a slight sliding motion to ensure good contact.

.5 Protect insulation from damage until time for backfilling.

.6 Following backfilling and prior to placement of underslab vapour barriers, install horizontal insulation. Install rigid insulation at perimeter of all exterior walls and for extent as indicated. Tightly butt joints.

3.3 Underslab Insulation

.1 Under slab application: Following backfilling and prior to placement of underslab vapour barriers, install horizontal insulation. Install rigid insulation for extent as indicated. Lay boards on level compacted fill. Tightly butt joints. Stagger joints in multiple layers as indicated.

.2 Extend boards as indicated on Drawings, and as follows:
  .1 Lay boards on level compacted fill.
  .2 Protect top surface of horizontal insulation from damage during concrete work.

.3 Load Bearing Insulation: Install in accordance with manufacturer's instructions. Install board insulation horizontally having a minimum compressive strength of [275 kPa][410 kPa][690 kPa][on level compacted fill][within driveway ramps][to locations indicated on Drawings]

.4 Tape joints of underslab insulation and fill with 2 lb spray insulation.

3.4 Semi-Rigid Mineral Wool Insulation

.1 Install insulation in accordance with manufacturer’s written recommendations.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Do not compress insulation to fit into spaces.

.4 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of chimneys and vents.

.6 Do not enclose insulation until before inspection and receipt of Consultant's written approval.

3.5 Cavity Wall Insulation

.1 Install polystyrene insulation boards on outer surface of inner wythe of wall cavity on bed of adhesive.

3.6 Polyisocyanurate Foam Board Insulation- General Installation

.1 Install insulation boards in accordance with manufacturer's installation guidelines.

.2 Install insulation board horizontally or vertically. Use boards at full length to minimize number of joints required. Install board with printed side facing outward.

.3 Install first row of insulation board at bottom of wall.

.4 Stagger insulation board joints compared with those of support panels. Butt boards against one another perfectly without applying excessive pressure so as to leave no space between board joints or around penetrations.

.5 Cuts boards as needed at penetrations, openings and to accommodate exterior cladding fasteners.

.6 Ensure insulating board edges overlap at inside wall corners.

.7 Finish to install last row of insulation boards flush with the parapet.

.8 Adhesive Attachment
.1 Apply insulation adhesive on board with spots of 75 mm diameter every 406 mm. Adhere boards on the walls and press firmly into place.

3.7 Fibreglass Batt Insulation

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces. Ensure that insulation is kept dry and not compressed.

.2 Install insulation in spaces as shown on drawings.

.3 Insulation shall be placed in all metal stud and header assemblies that will be inaccessible after their installation into the wall. Refer to Section 05 41 00.

.4 Install batt insulation in built up wood roof curbs where detailed.

.5 Pack loose insulation in crevices between exterior masonry and door and window frames and about lintels, frames, beams around ducts at holes and other places where shown or required to

eliminate air infiltration.

.6 Pack loose insulation into voids around mechanical and electrical pipes and ducts where they pass through walls and slabs.

3.8 Spray Foam Insulation

.1 Completely fill all joints and penetrations in exterior walls, at door and window frames and where indicated, with expanding spray foam insulation, in accordance with manufacturer's instructions.

3.9 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 21 13 Building Insulation
.4 Section 07 27 13 Modified Bituminous Sheet Air Barriers
.5 Section 07 24 26 Continuous Insulation Cladding System
.6 Section 07 92 00 Joint Sealants
.7 Section 09 21 16 Gypsum Board
.8 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM E84-26a Standard Test Method for Surface Burning Characteristics of Building Materials
  .2 ASTM E96/E96M-24a Standard Test Methods for Water Vapor Transmission of Materials
  .3 ASTM E154/E154M-08a(2025) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
  .4 ASTM E1643-18a Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
  .5 ASTM E1745-17(2023) Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
  .6 ASTM F1249-20 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor
.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet, for Use in Building Construction
.3 American Concrete Institute (ACI)
  .1 ACI 302.1R Guide for Concrete Floor and Slab Construction

1.4 Submittals

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

.2 Submit manufacturer's product data including certification that materials meet the requirements of the reference standards, and application instructions.

1.5 Project Conditions

.1 Products specified are not intended for uses subject to abuse or permanent exposure to the elements.

.2 Do not apply membranes on frozen ground.

1.6 Quality Assurance

.1 Use an experienced installer and adequate number of skilled personnel who are thoroughly trained

and experienced in the application of the vapor retarder.

.2 Obtain vapour retarder materials from a single manufacturer regularly engaged in manufacturing the product.

.3 Provide products which comply with all federal, provincial and local regulations controlling use of volatile organic compounds (VOCs).

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

.4 Store materials in a clean dry area in accordance with manufacturer's instructions. Stack membrane on smooth ground or wood platform to eliminate warping.

.5 Protect materials during handling and application to prevent damage or contamination.

.6 Ensure membrane is stamped with manufacturer's name, product name, and membrane thickness at intervals of no more than 220 cm.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Sheet Vapour Barrier

.1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.

.2 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for all lap joints and perimeter seals.

.3 Mastic: as recommended by membrane manufacturer and compatible with substrate.

.4 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer.

.5 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

2.2 Sheet Vapour Barrier for Below Concrete Slabs on Grade

.1 Vapour retarder membrane shall be manufactured from virgin polyolefin resins, and when tested according to all requirements of ASTM E1745, shall meet the following minimum performance requirements:
  .1 Maximum Water Vapour Permeance (ASTM E154 Sections 7, 8, 11, 12, 13, by ASTM E96, Method B or ASTM F1249).

.1 As received: 0.0063 perms.
.2 After Wetting and Drying: 0.0052 perms.
.3 Resistance to Plastic Flow and Temperature: 0.0057 perms.
.4 Effect Low Temperature and Flexibility: 0.0052 perms.
.5 Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0052 perms.

.2 Puncture Resistance (ASTM D1709): >3,200 grams.
.3 Tensile Strength ASTM E154, Section 9: 72 Lb. Force/Inch
.4 Acceptable product:
.1 Perminator 15 mil, as manufactured by W.R. Meadows
.2 Stego Wrap Vapor Barrier by Stego Industries LLC.

.2 Seam Tape:High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 100 mm.
.1 Perminator Tape by W.R. Meadows
.2 Stego Tape by Stego Industries LLC.

.3 Pipe Collars: Construct pipe collars from vapour retarder material and pressure sensitive tape per manufacturer's instructions.

.4 Seam Tape: High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 100 mm.
.1 Perminator Tape by W.R. Meadows
.2 Stego Tape by Stego Industries LLC.

.5 Pipe Collars: Construct pipe collars from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 EXECUTION

3.1 Vapour Retarders in Walls

.1 Ensure services are installed and inspected prior to installation of vapour retarder.

.2 Use sheets of largest practical size to minimize joints. Install horizontally on wall surfaces.

.3 Adhere membrane to metal studs with continuous ribbons of mastic.

.4 Tape all joints.

.5 Seal perimeter of sheet vapour barrier as follows:
.1 Apply continuous bead of sealant to substrate at perimeter of sheets.
.2 Lap sheet over sealant and press into sealant bead.
.3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

.6 Seal lap joints of sheet vapour barrier as follows:
.1 Attach first sheet to substrate using sealant/adhesive.
.2 Apply continuous bead of sealant over solid backing at joint.
.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.5 Install moulded box vapour barrier.

.6 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

.7 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

.8 Refer to building elements schedule on the drawings and details for locations of vapour retarders.

3.2 Vapour Retarders Below Slabs

.1 Install sheet vapour retarder below all concrete slabs on grade.

.2 Prepare surfaces in accordance with manufacturers recommendations.

.3 Level, tamp, or roll earth or granular material beneath the slab base.

.4 Install vapour retarder below floor slab immediately prior to concrete reinforcement placement and in accordance with ASTM E1643

.5 Unroll vapour retarder with the longest dimension parallel with the direction of the pour.

.6 Lap vapour retarder over footings and seal to foundation walls.

.7 Overlap joints 150 mm and seal with manufacturer’s tape.

.8 Seal all penetrations (including pipes and conduits) with manufacturer’s pipe boot.

.9 No penetration of the vapour retarder is allowed except for reinforcing steel and permanent utilities.

.10 Repair damaged areas by cutting patches of vapour retarder, overlapping damaged area 150 mm and taping all four sides with tape.

.11 Restrict traffic over vapour retarder.

.12 Prior to placing concrete inspect vapour retarder and repair all tears and punctures.

3.3 Inspection

.1 Arrange for inspection of vapour retarders immediately prior to covering, by local building department and Consultant.

.2 Make all required repairs identified during inspection.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-In-Place Concrete
.2 Section 07 13 26.13 Self-Adhering Sheet Waterproofing
.3 Section 07 21 13 Building Insulation
.4 Section 33 46 13 Foundation Drainage

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D698-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))
  .2 ASTM D1557-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))
.2 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 805 Construction Specification for Temporary Erosion and Sediment Control Measures
  .2 OPSS 180 General Specification for the Management of Excess Materials
  .3 OPSS 206 Construction Specification for Grading
  .4 OPSS 1010 Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
.3 Ontario Provincial Standard Details (OPSD)
  .1 OPSD 219.130 Heavy Duty Silt Fence Barrier
  .2 OPSD 805 Temporary Erosion and Sediment Control Measures
.4 The Occupational Health and Safety Act.
.5 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

1.4 Submittals

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

.2 Submit shop drawings of shoring and bracing required in connection with excavation. Drawings to show clearly procedural sequence to be followed.

1.5 Definitions

.1 Earth: Site excavated material, including shale, rubble rock, building debris, shrub and tree roots and soil.

.2 Soil: Site excavated material, free from shale, rubble rock, building debris, shrub and tree roots.

.3 Fill: Approved materials, other than earth, clay and unapproved soil. Approved soil may be used only with approval of the Consultant in writing.

.4 Rock: All solid rock in ledges, stratified deposits, unstratified masses, and all conglomerate deposits or any other material so firmly cemented by process of nature as to present all the

characteristics of solid rock, being so hard or firmly cemented that it cannot be excavated and removed with a power shovel except after thorough and continuous drilling and blasting.

.5 Backfilling: The operation of supplying and installing fill and approved soil materials.

.6 Engineered Fill: Approved material used to build-up to design elevations.

1.6 Examination

.1 Examine the building site and determine the nature and extent of the materials to be removed or the additional fill required to provide depths and levels indicated on drawings. Field check the site to review existing conditions. Verify locations of all existing utilities and services that will affect the work.

.2 Refer to drawings for all building and site development details.

1.7 Geotechnical Report

.1 Refer to Hydrogeological and Geotechnical Investigation – Revised Proposed Mixed-Use Development – 510 and 520 Taunton Road East, Oshawa, Ontario dated September 13, 2024 and prepared by GHD.

.2 Information provided in this report is based on field records and is therefore subject to the usual limitations and reservations associated with such work (stated in the conclusion of the report).

.3 The use of this information is entirely at the risk of the Contractor.

.4 During examination of the site, carry out such investigations as necessary to determine subsurface conditions to be encountered in constructing the Works.

.5 Notify the structural engineer and the inspection and testing company when excavation work commences for inspection and verification of soil conditions.

1.8 Setting Out Work

.1 The drawings indicate the building components location and proposed and final grades. Be responsible to construct the work according to levels and locations shown on the drawings. Report any errors or discrepancies to the Consultant before commencing work.

.2 Commencement of any part of the work shall constitute acceptance of drawings as being correct.

.3 Employ a competent instrument man and provide all lines and levels, limit lines and boundary stakes for the execution of the work as required. All benchmarks shall be carefully protected.

.4 Provide and be responsible for, all lines, levels and dimensions which trades require to relate their work to the work of other trades. All trades shall be notified that all such levels and dimensions must be obtained from the Contractor.

1.9 Existing Underground Utilities

.1 Arrange underground locates of all utility assets prior to excavating. Do not commence excavation in a location prior to utility members marking the location of their utilities or indicating that none exist within the outlined excavation limits. Where necessary, employ the services of a private utility

locator to ensure that all utilities are located in a timely manner.

.2 Verify the location and elevation of all existing utilities within the limits of the Work. Observe the locations of the stake outs, prior to commencing the Work. In the event there is a discrepancy between the locations of the stake outs and the locations shown on the Contract Documents, that may affect the Work, immediately notify the Consultant and the affected utility companies, in order to resolve the conflict.

.3 All existing buried utilities located within the excavation zone and any other facilities adjacent to the excavation shall be carefully supported and protected from damage as a result of the Contractor's operations. Be responsible for repairing any damaged underground utilities, as a result of actions during the course of the work at no extra cost to the Owner.

.4 All costs associated with this work shall be considered incidental to all related items of work in the Contract. No separate payment will be made for costs incurred in obtaining utility locates.

1.10 Protection of Existing Services

.1 Notify the Owner, Public Utility or Municipal authorities in advance of planned excavations adjacent to their services.

.2 Take care not to damage or displace encountered known and unknown services.

.3 When such services are encountered during the execution of work, immediately notify the Consultant and protect, brace and support active services. Where repairs to these services become necessary use the following procedure:
.1 Known services, repair at no expense to the Owner.
.2 Unknown services, forward to the Consultant a complete breakdown of the estimated cost of such work. Proceed only upon written authorization.

.4 In the case of damage to, or cutting off of an essential service, notify Consultant, the Owner, and Public Utility or Municipal authorities immediately and repair the service under the Consultant's direction.

1.11 Inspection and Testing

.1 Provide proper and sufficient samples, ample opportunity and access at all times for the Consultant or Testing Agency to inspect materials, operations and completed works carried out under this Section.

.2 Sample and test excavated material prior to shipping to landfill off the site in accordance with the requirements of O. Reg. 406/19. Samples shall be tested for compliance of acceptable material for landfill. Furnish to the Owner the results of all testing and location of landfill site used. This testing will not be undertaken by the Owner's Inspection and Testing Agency.

.3 Provide 24 hours notice to inspection laboratory and request tests as follows:
.1 Sieve Analysis: Proposed fill materials will be tested to confirm stability for intended use and conformity with specifications.
.2 Density Test: Tests will be conducted on compacted fill, to ASTM D698.
.3 Frequency Test: Excavated Surfaces: When existing compacted fill surface is being prepared, make a series of three tests of surface for each 500 m² area.
.4 Fills under Pavement or Slabs on Grade: Make three tests for every two lifts of compacted fill for each 500 m² area.

.5 Backfill Structural Walls: Test each different material for approximately each 30 metres of wall being backfilled at depth increments of 610 mm.

1.12 Standards

.1 Carry out all work in accordance with the applicable OPSS, OPSD and site drawings. The applicable Ontario Provincial Standard Specifications are listed hereafter.

.2 The following shall apply:
.1 OPS 180 Management and Disposal of Excess Material
.2 OPS 206 Grading, Nov. 2005
.3 OPS 314 Untreated Granular Subbase, Base, Surface, Shoulder and Stockpiling
.4 OPS 805 Temporary Erosion and Sediment Control Measures

1.13 Shoring and Bracing

.1 Shoring and trench timbering, in addition to requirements of local authorities, shall be carried out in accordance with the requirements of The Occupational Health and Safety Act, "November 1992 Ontario Regulation 213/91" and Regulations for Construction Projects by Ontario Ministry of Labour and to Construction Safety Association brochure "Trenching Safety April 1994".

.2 Erect necessary shoring for excavations in such a manner that:
.1 Whenever a trench or excavated face is necessary, shore and brace to prevent failure. Engage a registered Professional Engineer fully qualified in this line of work to design, stamp shop drawings and assume responsibility for the shoring and bracing. Submit shop drawings to the Consultant.
.2 It will properly retain the banks of the excavations and prevent caving-in or displacement or damage to surrounding or adjacent buildings or other property.
.3 All other work in connection with this Contract, including the Mechanical and Electrical Trades, may be carried out while it is still in place if necessary.
.4 It will be entirely free of footings, foundation walls or other such work so that it may be removed entirely or in sections when it is no longer required or when directed, without causing any damage or injury to the structural work that has been completed.

1.14 Sedimentation Control

.1 Maintain and/or repair sedimentation control at all watercourses and catch basins to prevent contamination by excavated fill.

.2 Sedimentation control shall be in accordance with the Ontario Provincial Standard Specifications, OPSS 805 and local authorities.

.3 Refer to details and notes on site development drawings.

.4 Install additional sedimentation control as required and obtain Consultant’s approval prior to commencement of site works.

1.15 Dewatering

.1 Keep excavations and backfill dry at all times.

PART 2 PRODUCTS

2.1 Materials

.1 Type A Fill: Class "A" material conforming to OPSS1010, latest edition.

.2 Type B Fill: Class "B" material conforming to OPSS 1010, latest edition.

.3 Sand Fill: Clean, well graded compactable sand to OPSS 1010, Granular “M” fill.

.4 Crushed Stone: Crushed stone shall be composed of clean, hard, durable course gravel, or crushed rock fragments such that 100% of the particles pass the 18 mm sieve and not more than 10% of the particles pass the No. 4 sieve. No clay or other objectionable materials shall be present.

.5 Engineered Fill: fill placed below Type A and Type B fill to bring excavation to the design elevations. To be Type B fill or approved fill, approved in writing by the Consultant.

.6 Silt fence: heavy duty geotextile, Mirafi Envirofence or equivalent.

PART 3 EXECUTION

3.1 Preparation

.1 Clearing: Refer to Section 31 10 00 - Site Clearing.

.2 Lines and Levels: Refer to Section 01 71 00 - Examination and Preparation.

.3 Stock Piles: Materials shall not be stockpiled on the site except with the prior approval of the Consultant. Where permitted, stockpile materials in a manner to prevent segregation and contamination. Piles not to exceed 2000 mm in height. Stockpile materials in a location and manner not interfering with ongoing operation and use of the site and building by the Owner.

.4 Install silt fencing as detailed and in accordance with reference standards.

3.2 Excavation Work

.1 Excavate to elevations and dimensions indicated or required by the work, plus sufficient space to permit erection of forms, shoring and inspection. Excavation shall be made to clean lines to minimize quantity of fill material required.

.2 Remove large rocks, stumps and other obstructions of whatever nature encountered in the course of excavation and haul away off the site. Remove all concrete, masonry, rubble or other construction debris encountered during the work.

.3 Unauthorized Excavation - Excavation to greater than required depth shall be corrected by the Contractor at his own expense in a manner as directed by the Consultant. Fill over-excavated areas under structure bearing surfaces and footings with concrete as specified for foundations.

.4 Keep excavation free of water by bailing, pumping or a system of drainage as required and provide pumps, suction and discharge lines or well points of sufficient capacity and maintain until such time as the permanent drainage system is installed or until the Consultant's approval of removal of equipment is obtained. Take all necessary measures to prevent flow of water into the excavation.

.5 Protect the bottom and sides of excavated pits and trenches from freezing. Protect also from exposure to the sun and wet weather to prevent cave-ins and softening of the bed upon which concrete or drains rest.

.6 Excavations must not interfere with the normal 45 degree plane of bearing from the bottom of any footing.

.7 Keep bottoms of excavations clean and clear of loose materials levelled and stepped at changes of levels with exception of excavations made for drainage purposes and those to slope as required.

.8 If the excavations reveal seepage zones, springs or other unexpected sub-surface conditions which may necessitate revisions or additions to any drainage system, inform the Consultant immediately so that remedial action can be taken.

.9 If removal of earth causes displacement of adjacent earth, the earth so disturbed shall be removed at no additional cost to the Owner.

.10 Conditions of Excavated Surfaces
- .1 Excavate to a depth sufficient to expose firm undisturbed subsoil, free of organic matter and to the Testing Agency's approval.
- .2 Remove soft, wet or unconsolidated ground and organic material encountered in excavating.
- .3 Should the nature of the sub-soil at the depths shown prove to be unsatisfactory to the Consultant for the placing of the concrete work, then upon the Consultant's written order, the Contractor shall excavate to greater depth until a satisfactory bottom is reached.

.11 Tolerances: General excavation shall be to the elevations shown on the drawings, plus or minus 25 mm.

3.3 Hydro Excavation

.1 Utilize hydro excavation services when working near and around known utilities to avoid damage.

3.4 Backfilling

.1 Proceed promptly with backfilling as the building progresses, and as work to be backfilled has been inspected and approved by the Consultant. The backfill in areas where settlement cannot be tolerated, e.g. service and footing trenches under the floor slab, should be compacted to at least 100 per cent of its Standard Proctor Maximum Dry Density. The backfill should be placed in lifts not greater than 200 mm thick in the loose state, each lift being compacted with a suitable compactor to the specified density.

.2 Do not commence backfilling operations until mechanical and electrical services, site drainage systems, perimeter and underslab insulation, and waterproofing has been inspected and approved by Consultant and authorities having jurisdiction. Existing floor subgrade must be proof rolled before backfilling.

.3 Withdraw shoring material during backfill.

.4 Backfill evenly on both sides of foundation walls to avoid unequal fill pressures on walls.

.5 Place fill around foundation walls and footings so that footings will have a minimum of 1200 mm coverage, measured at an angle of 45 degrees from bottom of footing to protect against frost until final grading is complete.

.6 Where fill is placed adjacent to structures or vulnerable building components or in restricted areas, the fill shall be compacted to the same degree as specified by suitable equipment approved by the Consultant. Avoid damage to or displacement of walls, columns, piers, underground services, and process/ production equipment.

.7 Add water in amounts required only to achieve the optimum moisture content, in accordance with ASTM D1557.

.8 Backfill shall be free of snow and ice, topsoil, construction debris and oversized boulders greater than 150 mm.

3.5 Rough Grading

.1 Preparation and Layout
- .1 Establish extent of grading by area and elevation.
- .2 Prior to commencement of grading work, establish location and extent of all underground utilities occurring in work areas. Maintain, reroute or extend as required. Pay all costs for this work, except costs borne by utilities companies.
- .3 Slope grade away from building as indicated on drawings.
- .4 Cut temporary drainage swales and create containment ponds and structures for temporary surface run-offs, until storm sewer system is installed.
- .5 Regrade all areas that retain or pond water.
- .6 Rough grade all areas to tolerance of plus or minus 50 mm.

3.6 Fills Under Concrete Slab

.1 The fill shall be deposited in layers of such thickness that the equipment being used for compacting can produce the specified density but in no cases, more than 200 mm thickness. If lumps are present in the material each layer shall be continuously disced in order to ensure proper compaction.

.2 The exposed subgrade shall be proof rolled to ensure its integrity. If the subgrade consists of engineered fill, the fill shall be compacted to at least 98% of its maximum Standard Proctor Dry Density for native materials or 100% compaction for Granular “A” and “B” materials, using equipment approved by the Consultant. Any loose, wet or deleterious material shall be sub-excavated and replaced by the Contractor with Type B Engineered fill which must be compacted to 98% Standard Proctor Maximum Density.

.3 Immediately after levelling, each layer of fill shall be thoroughly compacted by the use of approved mechanical equipment.

3.7 Compaction Density

.1 Use approved equipment for compaction. Maintain materials at optimum moisture content to obtain required compaction. Special care shall be taken to prevent disturbance of the existing subgrade and adjacent structures and equipment.

.2 Be responsible for damage to the subgrade and installed materials due to improper compaction methods. Make good to approval of the Consultant.

.3 The minimum density of fill in place shall be the following values of Standard proctor densities for corresponding locations in accordance with ASTM D698.
.1 Type A Fill: To 100% Standard Proctor Maximum Density.
.2 Type B Fill: To 100% Standard Proctor Maximum Density.
.3 Engineered Fill: To 98% Standard Proctor Maximum Density.

.4 If during progress of work, tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest at own expense.

.5 Ensure compacted fills are tested and approved before proceeding with placement of surface materials.

3.8 Fill Locations

.1 Type A Fill:
.1 Under all interior and exterior concrete slabs 150 mm minimum thickness.
.2 Below all mechanical or electrical services, from 150 mm below invert, to springline.

.2 Type B Fill:
.1 Around all footings, foundations, grade beams and walls up to the underside of Type A fill.
.2 From top of approved compacted subgrade to underside of concrete slabs (interior or exterior) but not less than 200 mm thickness.
.3 At all areas on the site indicated to be paved with asphalt.

.3 Sand Fill:
.1 Below all mechanical or electrical services, minimum 150 mm deep.
.2 Above all mechanical or electrical pipes and trenches, from springline to 300 mm above pipe obvert.

.4 Crushed Stone: around all foundation drainage piping, minimum 200 mm thick.

.5 Engineered Fill: All fill locations up to the underside of Type B fill and where required to fill up to design elevations.

.6 Site excavated material: as backfill to exterior side of foundation walls only when permitted and approved by the Geotechnical engineer and below all sodded or seeded areas up to underside of topsoil, but not within 600 mm of foundation walls or structures.

3.9 Water on Prepared Surfaces

.1 Promptly remove, by approved methods, water rising from seeping of the soil or resulting from rainfall wherever such water is on the surface of sub-grade soil and compacted fill.

.2 Where proper drainage and pumping is not carried out as specified herein, and any prepared sub-grade soil for under structural work, and any compacted fill for under concrete slabs, is softened or disturbed by water due to improper drainage and pumping, the Contractor shall remove the unsatisfactory soil and fill, and bear all incidental costs in connection with additional excavation and placing and compacting of granular fill under floor slabs.

3.10 Surplus Soil Disposal

.1 Surplus soil and excavated material shall be promptly removed and disposed of off the site at legal dump sites. Conform to local bylaw requirements for trucking and disposal.

.2 Comply with the requirements of Ontario Regulation O. REG 406/19, “On-Site and Excess Soil Management”, for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

3.11 Cleaning

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

.2 As excavation proceeds, keep roads and aisles clean of dirt and excavated material.

.3 Clean up and wash down to remove all dirt and excavated materials caused by the work of this section daily.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 07 13 26.13 Self-Adhering Sheet Waterproofing
.3 Section 07 21 13 Building Insulation
.4 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D1248-25 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
.2 CSA Group (CSA)
  .1 CSA A23.1:19 Concrete Materials and Methods of Concrete Construction
  .2 CSA B182.1 Plastic Drain and Sewer Pipe and Pipe Fittings
.3 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 1840 Material Specification for Non-Pressure Polyethylene (PE) Plastic Pipe Products
.4 Ontario Building Code 2012, Part 7 - Plumbing

1.4 Submittals

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

.2 Submit manufacturer's technical literature and installation instructions.

1.5 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.6 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Perforated plastic pipe and fittings: to CSA 182.1. Nominal pipe size 100 mm diameter. Manufactured from high density polyethylene resin which meets or exceeds the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C as per ASTM D1248.

.2 Joining System: snap, insert or split coupler

.3 Filter Sock: Woven polyester.

.4 Acceptable product: Big 'O' Perforated Corrugated with Polyester Sock Filter as manufactured by Armtec Ltd

.5 Coarse filter aggregate: to CSA-A23.1, Table 2, Group 1, 20-5 mm.

.6 Fine filter aggregate: to CSA-A23.1, Table 1.

PART 3 EXECUTION

3.1 Layout

.1 Establish grades and inverts from appropriate bench marks. Lay out lines as shown on Drawings.

.2 Slope drainage pipes at least 1%. Pipe grade shall not vary more than 10% of internal diameter of pipe withing a given run. Such deviation shall be gradual and over a distance of not less than 9.0 m.

.3 Lay pipe in straight lines; turn corners using 45° bends.

3.2 Installation

.1 Coordinate work of this Section with that of other related Sections.

.2 Do not place pipe in direct contact with rigid materials such as rock, brick, or wood. Do not use grade stakes, stones, masonry or concrete fragments or any type of shim under pipe.

.3 Join pipe sections by means of couplings. Provide end plugs on open ends of pipe runs at high points. Provide fittings such as elbows, bends, tees, adapters, reducers, as required to form a complete drainage system. Carefully tap tapered fittings into pipe; do not overdrive.

.4 Install perforated pipe with holes and coupling slots facing down.

.5 Aggregate materials shall be damp when placed. If necessary, spray with water using fog nozzle to assist hydraulic consolidation.

.6 Place aggregate materials by hand around and above pipe in successive 150 mm lifts.

.7 Consolidate each lift by tamping moderately; prevent damage to pipes.

.8 Do not cover pipes until inspected and approved by Consultant.

.9 Supply rigid non-corrosive sleeves for insertion into foundation walls and other building elements where pipe penetrates such elements. Sleeve diameter shall be 50 mm larger than pipe diameter. Pack joint between pipe and sleeve with moisture resistant compressible pre-moulded filler.

3.3 Perimeter Drainage

.1 Provide perimeter drainage where indicated at base of foundation walls.

.2 Connect to sump pit.

.3 Place filter fabric into prepared excavation. Size filter fabric to completely wrap drainage course, lapping at joints minimum 300 mm.

.4 Place minimum 150 mm coarse filter aggregate on top of filter fabric and consolidate.

.5 Lay drainage pipe to layout shown. Unless other size is indicated, provide 100 mm diameter perforated pipe. Connect to existing outfall as directed by Owner's Representative.

.6 Provide minimum 150 mm thick coarse filter aggregate at sides and top of drainage pipe.

.7 Close filter fabric over top of drainage course and secure lap in place.

.8 Cover filter fabric with 300 mm fine filter aggregate.

3.4 Inspection

.1 Arrange for inspection of foundation drainage systems by Municipal Inspectors and the Consultant prior to placing backfill.

3.5 Cleaning

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

End of Section