Contract No.: 2022-PW-16-1 FAC 02-22

(Prequalification processed under 2022-PW-16)

Title: Pelham Municipal Building Addition and Renovations

Location: 20 Pelham Town Square

The Town of Pelham is requesting the contracting services of a qualified general contractor for the purpose of the construction of the Pelham Municipal Building Addition & Renovations at 20 Pelham Town Square. All works are to include all necessary material and labour to complete each item, unless specified otherwise. In addition to this, the successful contractor will also be responsible for providing all traffic control and providing a minimum of 24-hour notice to residences within the associated construction limits when access will not be available or restricted.

Non Mandatory site meeting Thursday June 16th, 2022. Maximum two (2) company representation.

The start date for the construction will be September 6, 2022 and the date for substantial completion of this project is February 10, 2023.

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1.1 Definitions

1. The following Sections of this Specification are of the abbreviated type and include incomplete sentences. Definite and indefinite articles have often been omitted and sentences are written in the form of direct instructions to the Contractor without using the phrase `the Contractor shall.' Standard specifications and other quality references inserted govern materials and workmanship without using phrases `conform with,' `conformity therewith,' etc. Omitted words and phrases to be supplied in the same manner as they are when a note appears on the Drawings.

2. The Specifications are separated into Sections for reference convenience only. Such separation must in no instance make Owner or his Consultants arbiter to establish subcontract limits between Contractor and Subcontractor.

3. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on Drawings and/or in Specifications, including all labour, materials, equipment, tools, services, and incidentals necessary and required to complete the work. Responsibility for breakdown into and extension of subcontracts, including co-ordination of same, rests entirely with the Contractor.

4. Standard Specifications referred to are editions in force at Tender Closing Date.

1.2 Terminology

1. Consultants are the team of Architects, Engineers and other experts commissioned by the Owner, directly or indirectly, to execute design, contract documents and supervision for the project, including any of their agents or employees.

2. Prime Consultant is the Architect.

3. Contractor is the Firm or Corporation who, having signed the Agreement, has the sole legal responsibility to carry out the work shown or described in the Contract Documents for the Owner, whether contractually assigned to a Subcontractor or supplier, or not.

1.3 Minimum Standards

1. Unless otherwise specified, work and material to conform or exceed the minimum standards set out in the editions of the Canadian Government Specification Board, Canadian Standards Associations, the Ontario Building Code, Underwriters' Laboratories of Canada, the Canadian Electrical Code, the Local Building Code in force, whichever is applicable.

2. Copies of Standard Specifications referred to in this Specification to be kept on the site.

3. The use of the name (or its abbreviation) of any of the following bodies, accompanied by the reference number of a specification of that body to mean that the entire specification of the body to apply as noted:

    AISC: American Institute of Steel Construction;
    ASTM: American Society for Testing Materials;

CEC: Canadian Electric Code;
CGSB: Canadian Government Specification Board;
CISC: Canadian Institute of Steel Construction;
CRCA: Canadian Roofing Contractors' Association;
CSA: Canadian Standards Association;
OBC: Ontario Building Code;
ULC: Underwriters' Laboratories of Canada;
CLA: Canadian Lumbermen's Association.

1.4 Cooperation

1. Each trade to co-operate with the trades of adjacent or affected work. Supply in good time requirements effecting adjacent and underlying work in writing and items to be set or built in. Similarly, heed requirements and build-in items provided by other trades.

2. Take necessary precautions to protect work of other trades from contamination, marring or other damage due to application or installation processes, methods and activities.

3. General Contractor and each trade to co-operate with Contractors which may be assigned or selected by the Owner to perform work under Cash Allowances. Owner reserves the right to assign non-unionized labour to perform work under Cash Allowances, at Owners discretion.

1.5 Coordination

1. Co-ordinate the work of all trades in such a manner that each trade co-operates with the trade of adjacent work.

2. Organize weekly job site meetings and send out notices stating time and place to Consultants, subcontractors, Suppliers and all others whose presence is required at the meetings.

3. Take note of all persons attending these meetings and submit to Consultants and Owner, Minutes of these Meetings showing any major decisions made and instructions or information required. Prime Consultant to receive duplicate copies.

4. Co-ordinate the Work in this Contract with the work of others awarded work under Cash Allowances.

1.6 Building Dimensions and Co-ordination

1. Ensure that all necessary job dimensions are taken and all trades are coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.

2. Verify that all work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by

requirements of the drawings, and ensure that work installed in error is rectified before construction resumes.

3. Check and verify all dimensions referring to the work and the interfacing of all services. Verify all dimensions, with the trade concerned when pertaining to the work of other trades. Be responsible to see that Subcontractors for various trades co-operate for the proper performance of the Work.

4. Avoid scaling directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Be responsible for any change through the disregarding of this clause.

5. All details and measurements of any work which is to fit or to conform to work installed shall be taken at the building.

6. Advise Consultant of discrepancies and if there are omissions on drawings, particularly reflected ceiling plans and jointing patterns for paving, ceramic tile, or carpet tile layouts, which affect aesthetics, or which interfere with services, equipment or surfaces. DO NOT PROCEED without direction from the Consultant.

7. Ensure that each Subcontractor communicates requirements for site conditions and surfaces necessary for the execution of the Subcontractor's work, and that he provides setting drawings, templates and all other information necessary for the location and installation of material, holes, sleeves, insets, anchors, accessories, fastenings, connections and access panels. Inform other Subcontractors whose work is affected by these requirements and preparatory work.

8. Prepare interference drawings to properly co-ordinate the work where necessitate. Refer to Section 01340.

1.7 Use of Premises Before Substantial Performance

1. The Owner shall have the right to enter and occupy the building, in whole or in part, for the purpose of placing fittings and equipment, or for other use, before completion of the Contract if, in the opinion of the Consultant, such entry and occupancy does not prevent or interfere with the Contractor in the performance of the Contract. Such entry shall in no way be considered as an acceptance of the Work in whole, or in part, nor shall it imply acknowledgment that terms of the Agreement are fulfilled.

1.8 Layout of Work

1. Layout work with respect to the work of all trades. Arrange mechanical and electrical work such as piping, ducts, conduits, panels, equipment and the like to suit the architectural and structural details.

2. Alterations necessary due to conflict and interference between trades, to be executed at no cost to the Owner unless notification is given in writing before Tender Closing Date.

1.9 By-Laws and Regulations

1. Nothing contained in the Drawings and Specifications are to be so construed as to be knowingly in conflict with any law, by-law or regulation of municipal, provincial or other authorities having jurisdiction.

2. Perform work in conformity with such laws, by-laws and regulations and make any necessary changes or deviations from the Drawings and Specifications subsequently required as directed and at no cost to the Owner unless notification is given in writing before Tender Closing Date.

3. Furnish inspection certificates and/or permits as may be applicable as evidence that installed work conforms to laws, by-laws, and regulations of authorities having jurisdiction.

1.10 Protection

1. Take necessary precautions and provide and install required coverings to protect material, work and finishes from contamination, damage, the elements, water and frost.

2. Make good any damage or replace damaged materials, as directed. Repairs to be made by the trade having originally installed or fabricated the damaged material, finish or item. Protect electrical equipment from water and the elements.

3. Protect adjacent private and public property from damage and contamination.

4. Protect curbs and sidewalks from damage from trucking by means of boards and the like. Repair, or pay or repair of damage to existing roads and sidewalks.

5. Mark glass after glazing in an acceptable manner, and leave in place until final clean-up.

6. Protect floor finishes from construction traffic and transport of construction materials and equipment by means of 6 mm plywood panels.

1.11 Delivery, Handling and Storage of Materials

1. Schedule material delivery so as to keep storage at site to the absolute minimum, but without causing delays due to late delivery.

2. Store materials which will be damaged by weather in suitable dry accommodation. Provide heat, as required, to maintain temperatures recommended by material manufacturer.

3. Store highly combustible or volatile materials separately from other materials, and under no circumstances, within the building. Protect against open flame and other fire hazards. Limit volume of supply on the site to minimum required for one day's operations.

4. Handle and store material so as to prevent damage to material, structure and finishes. Avoid undue loading stresses in materials or overloading of floors.

5. Do not store material and equipment detrimental to finished surfaces within areas of the building where finishing has commenced or has been completed. All material storage within the building is subject to relocation, as directed.

6. Deliver package material in original, and Storage of unopened and undamaged containers with manufacturer's labels and seals intact.

1.12 Debris

1. Assign clean-up duties to a crew with own Foremen which will be of sufficient size to prevent accumulation of debris and dirt in any part of the structure or on the site.

2. Remove construction debris on a daily basis and legally dispose of same.

3. Under no circumstances, should debris, rubbish or trash be burned or buried on the site.

1.13 Cutting, Fitting and Patching

1. Required cutting to be done by General Contractor. Patching and painting of work to be executed by the General Contractor.

2. All sub-trades are to notify the General Contractors bidding as to the extent of the cutting, patching, and painting of their respective trades.

3. Drilling, cutting, fitting and patching necessary due to failure to deliver items to be built-in time, or installation in wrong location to be executed, as directed, at no cost to the Owner.

4. Give written notification prior to commencement of drilling and cutting of load bearing structural members and finished surfaces.

5. Cut holes with smooth, true, clean edges, after they are approved by applicable trade. Size holes and openings for hot water and steam pipes, so as to allow for expansion and contraction of such pipes.

1.14 Fastenings

1. Supply all fastenings, anchors and accessories required for fabrication and erection or work.

2. Metal fastenings to be of the same material as the metal component they are anchoring, or of a metal which will not set up an electrolysis action which would cause damage to the fastening or metal component under moist conditions.

3. Exposed metal fastenings and accessories to be of the same texture, color, and finish as base metal on which they occur. Keep to a minimum; evenly space and lay out.

4. Fastenings to be permanent, of such a type and size and installed in such a manner to provide positive anchorage of the unit to be secured. Wood plugs are not acceptable. Install anchors at required spacing to provide required load bearing or shear capacity.

5. Power actuated fastenings not to be used without prior written approval for specific use.

1.15 Snow and Ice Removal

1. Remove all snow and ice, which may impair the progress of the work, be detrimental to workmen, or impair movement of material on the site.

2. Over the duration of its use as a temporary access, the GC is to maintain the existing Park roadway access, from HWY 8 entrance to the construction zone, cleared of snow during regular weekday hours.

1.16 Surplus Materials

1. Surplus materials specifically so specified, to remain property of the Owner and be neatly stockpiled or stored, as directed.

2. All other surplus materials to become property of the Contractor; to be removed from the site and legally disposed of.

1.17 Existing Trees

1. Landscaping Clarification Notes:
   Due to some landscaping related head-start work that the School Board has already initiated and completed, the following scope is to be deleted from this contract:
   a. In reference to drawing L1A - Tree Conservation Plan: ALL existing deciduous trees and coniferous trees to be removed (noted by a dashed 'x' over tree symbol) have been cut and removed, but stumps remain. The revised scope under this contract is to remove, clear and grubb remaining stumps and roots for each deciduous and coniferous tree that is noted to be removed.
   b. In reference to drawings L1A -Tree Conservation Plan, L3 – Planting Plan School Site and L4-Planting Plan Park Site: ALL existing deciduous trees to be transplanted (noted by a 'T' symbol and number over a tree symbol) have already been removed and transplanted and this work is to be deleted from this contract. The deleted scope also includes the ongoing care of transplanted trees, to be done by others.
   c. In reference to drawings L1A, Tree Conservation Plan, Detail 1 on drawing L1B, and L3 – Planting Plan School Site: the tree protection hoarding fence along the east boundary, enclosing the east-most existing trees to remain, has already been installed and this work is to be deleted from this contract.
   d. Trimming, fertilizing of trees in the tree protection zone is complete or to be completed by others and this work to be deleted from this contract.

   All other new landscaping work as noted on plans remains part of this contract.

2. Carefully preserve other existing trees on the site not designated for removal.

3. Erect and maintain barricade and protective strapping; prevent seepage and spilling of materials injurious to the root system and take all other precautions to preserve trees.

1.18 Setting of Work

1. Provide and pay for the services of a Land Surveyor, registered in the Province of Ontario to establish the building location and two (2) widely separated bench marks at the commencement of the work.

2. Lay out building lines for the work and provide substantial stakes, batterboards or monuments to preserve lines and levels.

3. Provide to the Consultant a survey plan on CAD indicating location of perimeter foundation walls relative to property lines and their top elevation, before construction proceeds on the foundation walls.

4. Verify on the site all grades, lines, levels, dimensions and location of hydrants, existing structures, manholes, overhead and buried utilities, existing trees, roadways, sidewalks and the like, shown on the drawings, and report omissions, errors, or inconsistencies, before commencing work.
5. Upon completion of layout work and before commencement of any excavation, give ample notification to allow for inspection of lines and levels. Such inspection does not in any way mitigate the Contractor's responsibility for accuracy of layout.

6. Preserve and protect bench marks, elevation datum and monuments and check periodically for accuracy until all work is complete. Remove same and their protection, as directed, and make good site.

1.19 Documents Required and General Duties

1. **At Commencement of Contract**

    .1 Supply Performance Bond and Labour and Material Bond within ten (10) days of acceptance of the Tender.
    .2 Supply Public Liability and Property Damage Insurance Certificates.
    .3 Supply Certificates of good standing from Workers' Compensation Board for the General Contractor and all Subcontractors.
    .4 Supply Contract Sum Breakdown of all sub-trades or parts of work and general expense items.
    .5 Supply Construction Schedule.
    .6 Supply Schedule of Shop Drawing Submissions.
    .7 The Owner has paid for the cost of the Building Permit. Mechanical Subcontractor will pay the cost of other Fees related to the Work Specified under Division 15. Electrical Subcontractor will pay the cost of all permits and fees related to the Work Specified under Division 16.

.8 The General Contractor is to pay all other fees and refundable deposits if applicable.

2. **During Construction**

.1 Adjust Allowances, as required.
.2 Organize Job Meetings in accordance with Section 01200.
.3 Supply Monthly Progress Reports and Construction Schedule in accordance with Section 01200.
.4 Confirm that payments are being made to subcontractors and suppliers by submission of receipts with the second and subsequent Progress Payment Application. No payment will be made for unincorporated material on the site, unless Bill of Sale in proper format is provided.
.5 Submit with each application for payment an "S" curve billing schedule chart indicating activities, billing items, % of work and forecast %, to monitor progress as related to billing. A sample chart will be provided to Contractor.

3. **Upon Completion**

.1 Upon completion of work before the Final Certificate of Payment is issued, the following to be observed, executed and submitted:
  .1 All deficiencies to have been completed in a satisfactory manner.
  .2 All final clean-up to have been executed, as specified in Section 01710.
  .3 Finishing Hardware, Inspection and Verification.
  .4 Organize a Final Inspection tour at which to be present:
    - the Owner's authorized representative;
    - the Architectural, Structural, Mechanical and Electrical Consultants, and their supervisory personnel, if any;
    - the Contractor and his superintendent.
  .5 Where the above procedure is impossible or where any deficiencies remain outstanding, the Owner's representative and the Consultant concerned, to inspect and accept the affected work and/or material upon notification by the Contractor, that all deficiencies involving this Consultant have been made good.
  .6 A complete release of all liens arising out of this Contract, other than his own. If a subcontractor or supplier refuses to furnish a release of such a lien, furnish a bond satisfactory to the Owner to indemnify him against any claim under such a lien.
  .7 Certificates of good standing from the Workers' Compensation board, for the General Contractor and all Subcontractors.
  .8 All reference records, as specified, under Section 01720.
  .9 Certificate of Inspection from Mechanical and Electrical Engineers.
  .10 Copies of all Lists of Deficiencies with each Deficiency verified when complete by only this project's job Superintendent. The Final List of Deficiencies to be signed, completed by all concerned, if accepted.
  .11 Statement of Completion from General Contractor.
  .12 Final adjustment of all Allowances.

.13 H.E.P.C. Inspection Certificate and all other Inspection Certificates required by Provincial, Municipal and other authorities having jurisdiction.
.14 Balancing Reports. Digital and hardcopy.
.15 As-Built Drawings. – Hardcopy mark ups and digital AutoCAD v2014 or higher.
.16 Two hard copies of Operation and Maintenance Manuals. A digital copy (pdf file) of all closeout documents to be provided on a CD or USB memory stick format.

1.20 Progress Reports

1. Submit to the Architect, Monthly Progress Reports consisting of a concise narrative and a marked-up summary schedule showing physical percentage complete by item and in total. These progress calculations must agree with the Progress Payment Claims.

2. Keep permanent written daily records on the site on the progress of work. Record to be open to inspection at reasonable times and copies to be furnished upon request. Records to show notes of commencement and completion of different trades and parts of work; daily high and low temperatures and other weather particulars; number of men engaged on the site (including sub-trades) broken down in groups for each type of construction work, and particulars about excavation and shoring; erection and removal of form work; pouring and curing of concrete; floor finishing; placing and compaction of backfill, masonry work; roofing.

3. Daily progress to give particulars on commencement and completion of each trade or part of work; form work erections and removal; concrete pouring and curing; floor finishing; masonry work; roofing; waterproofing; finishing trades, tests and inspection and the like.

1.21 Inspection and Testing

1. The Owner will retain the services of Inspection and Testing Companies. The cost of inspection and testing will be deducted from the Inspection and Testing Allowance specified under Section 01020, “Allowances”.

3. Where tests or inspections reveal work not in accordance with Contract requirements, the Contractor shall pay costs for additional tests or inspections as the Architect may require to verify acceptability of corrected work.

3. The Inspection and Testing by the Owner's Testing Company does not relieve the Contractor of his responsibility to provide his own quality control in order to meet or exceed the requirements of specified standards, codes, design criteria and referenced documents.

End of Section

1.1 Selection of Products

1. If requested by the Consultant, provide the following services and/or information:

    .1 Assist the Consultant in determining qualified suppliers.
    .2 Obtain proposals from suppliers.
    .3 Make appropriate recommendations for consideration of Consultant.
    .4 Notify Consultant of any effect anticipated by selection of product or supplier under consideration, on construction schedule and contract sum.

2. On notification of selection, enter into purchase agreement with designated supplier.

1.2 Cash Allowance

1. Expend cash allowance **only** on the Consultant's written instructions and with an Owner approved Cash Allowance Expenditure (CAE) form.

2. Include in Contract price the Contractor's charges for handling at site, including uncrating and storage, protection from elements and damage, labour, installation and finishing, testing, adjusting and balancing, and other expenses including overhead and profit on account of Cash Allowance in accordance with Article GC4.1 of the General Conditions of the Contract as amended.

3. Credit the Owner with any unused portion of Cash Allowances in the statement for final payment.

4. If a test made under payment by a specific allowance proves that the material or system is not in accordance with the Documents, then the subsequent testing including Owner's testing of replacement materials or systems shall be Contractor's expense and not taken from Cash Allowance.

5. Add or deduct any variation in cost from the Cash Allowance. No adjustment will be made to Contractor's expense.

6. The amount of each allowance includes the net cost of the product or service, delivery and unloading at the site.

7. All refunds, trade and/or quantity discounts which the Contractor may receive in the purchase of goods under allowances, to be extended to the Owner.

8. Receipted invoices covering all disbursements made by the Contractor under Allowances, to be submitted to the Consultant for audit.

9. Where the Cash Allowance stipulates "Supply Only," the Contract Price and not the Cash Allowances include the installation and hook-up costs. The installation and hook-up of some equipment and materials are specified under other Sections of the Specifications. The General Contract includes the installation and hook-up not specified elsewhere.

10. Contractor's profit and overhead on all Cash Allowances to be carried in his lump sum amount, not in the Cash Allowances.

11. All Cash Allowances will be dealt with in accordance with Article GC4.1 of the General Conditions.

12. All expenditures under Cash Allowances must be approved by the Owner.

13. Include in the Stipulated Price quoted, a Cash Allowance in the amount of **$60,000, Sixty Thousand Dollars.**

    To be allocated as follows:
    .1 Roofing, air vapour barrier, waterproofing, air/barrier and steel field reviews.
    .2 Testing & Inspections (soil bearing, compaction of backfill around foundation walls and below SOG, compaction of sub-base for asphalt areas, reinforcing inspections, concrete testing, mortar and grout tests)
    .3 Hardware supply only.
    .4 Signage: interior and exterior, supply and install.
    .5 Data / IT.
    .6 Security System, supply and install.

14. Taxes HST not to be included in Cash Allowance amounts and will be carried separate from the General Contractor's Stipulated Sum Amount.

15. Refer to Section 01005 for co-operation with others assigned to this Section.

End of Section

1.1 Project Meetings for Co-ordination

1. In consultation with the Consultant during the second week of construction, arrange for site meetings weekly or every 2 weeks as appropriate to the stage of construction, for project coordination. Such meetings shall fall at the same time each week the meeting is scheduled.

2. Responsible representatives of the Contractor's and Subcontractor's office and field forces and suppliers shall be obliged to attend.

3. Inform the Owner, Consultant, and those others whose attendance is obligatory, of the date of each meeting, in sufficient time to ensure their attendance.

4. Provide physical space for meetings, prepare an agenda, chair and record the minutes of each meeting. Relevant information must be made available to all concerned, in order that problems to be discussed may be expeditiously resolved. Identify "action by: _____".

5. Within three days after each meeting, distribute digital copies of the minutes to each invited person.

1.2 Pre-construction Meeting

1. Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

2. Include in the agenda the following:

    .1 Appointment of official representative of participants in the Work.
    .2 Scheduling of Work. Schedule to include a detailed breakdown of mechanical and electrical works.
    .3 Interference with ongoing business.
    .4 Work by other Contractors.
    .5 Schedule of submission of shop drawings and samples.
    .6 Requirements for temporary facilities, site sign, offices, storage sheds, utilities.
    .7 Delivery schedule of specified equipment.
    .8 Site security.
    .9 Contemplated change notices, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
    .10 Record drawings.
    .11 Maintenance manuals.
    .12 Take-over procedures, acceptance, warranties.
    .13 Monthly progress claims, administrative procedures, photographs, holdbacks.
    .14 Appointments of inspection and testing agencies or firms.
    .15 Insurance, transcript of policies.
    .16 Schedule for progress meetings.

1.3 Project Meetings for Progress of Work

1. Conduct progress meetings in accordance with the schedule and/or decisions made at Pre-construction meeting.

2. Inform the Owner, Consultant, project consultants, Subcontractors and suppliers and those whose attendance is obligatory, of the date of the meeting, in sufficient time to ensure their attendance.

3. Include in the agenda the following:

    .1 Review, approval of minutes of previous meeting.
    .2 Review of Work progress since previous meeting.
    .3 Field observations, problems, conflicts.
    .4 Problems which impede construction schedule.
    .5 Review of off-site fabrication delivery schedules.
    .6 Corrective measures and procedures to regain projected schedule.
    .7 Revisions to construction schedule.
    .8 Progress during succeeding work period.
    .9 Review submittal schedules: expedite as required.
    .10 Maintenance of quality standards.
    .11 Pending changes and substitutions.
    .12 Review proposed changes for effect on construction schedule and on completion date.
    .13 Other business.

1.4 Progress Records

1. Maintain a permanent written record on the site of the progress of the work using standard OGCA form. This record shall be available to the Consultant at the site, and a copy shall be furnished to same on request. The record shall contain:

    .1 Daily weather conditions, including maximum and minimum temperatures.
    .2 Dates of the commencement and completion of stage or portion of the work of each trade in each area of the project.
    .3 Conditions encountered during excavation.
    .4 Dates of erection and removal of formwork, in each area of the project.
    .5 Dates of pouring the concrete in each area of the project, with quantity and particulars of the concrete.
    .6 Work force on project daily per trade.
    .7 Visits to site by personnel of Consultant, Jurisdictional Authorities and testing companies.

End of Section

1. General

1. Submit to Architect, for review, shop drawings, product data and samples specified.

2. Until submission is reviewed, work involving relevant product must not proceed.

2. Shop Drawings

1. Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.

2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

3. Maximum sheet size 24” x 36” as a PDF file.

3. Project Data

1. Certain specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.

2. Above will only be accepted if they conform to following:
   .1 Delete information which is not applicable to project.
   .2 Supplement standard information to provide additional information applicable to project.
   .3 Show dimensions and clearances required.
   .4 Show performance characteristics and capacities.
   .5 Show wiring diagrams (when requested) and controls.

4. Coordination of Submissions

1. Review shop drawings, product data and samples prior to submission.

2. Verify:
   .1 Field measurements.
   .2 Field construction criteria.
   .3 Catalogue numbers and similar data.

3. Coordinate each submission with requirement of work and Contract documents. Individual shop drawings will not be reviewed until all related drawings are available.

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

5. Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Architect's review of submission, unless Architect gives written acceptance of specified deviations.

6. Notify Architect, in writing at time of submission, of deviations from requirements of Contract documents.

7. After Architect's review, distribute copies.

5. Submission Requirements

1. Schedule submissions at least fourteen (14) days before dates that reviewed submissions will be required to be returned.

2. Submit a digital copy (PDF) of shop drawings, product data to Architect for review.

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

4. Submissions must include:
   .1 Date and revision dates.
   .2 Project title and number.
   .3 Name of:
      .1 Contractor.
      .2 Subcontractor.
      .3 Supplier.
      .4 Manufacturer.
      .5 Separate detailer when pertinent.

5. Identification of product or material.
   .1 Relation to adjacent structure or materials.
   .2 Field dimensions, clearly identified as such.
   .3 Specification Section number.
   .4 Applicable standards, such as CSA or CGSB numbers.
   .5 Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract documents.

6. Interference Drawings
   .1 Prepare interference drawings for all work in confined space ie: ceiling space.

End of Section

1.1 Access

1. Provide and maintain adequate service roads to project site to provide safe and convenient access for deliveries.

1.2 Contractor's Site Office

1. Provide office adequately heated, lighted and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table, telephone, and facsimile machine. Pay telephone not acceptable.

2. Maintain in clean condition.

3. Provide and maintain in clean condition: two separate plans layout tables, minimum 1200 x 1800 each. One table shall be used by the General Contractor and subcontractors at their discretion. The second shall be provided for use by subcontractors and by the consultant or Inspection and Testing Companies during site visits or project meetings.

1.3 Storage Sheds

1. Provide adequate weathertight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.4 Sanitary Facilities

1. Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

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

3. When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval or Architect.

1.5 Parking

1. Provide, on site, sufficient temporary parking. Owner will not be responsible for any parking cost incurred by Contractor.

1.6 Site Enclosures

1. Provide around the construction site a temporary leased 1.8 m high chain link fence, complete with man and truck gates, which shall be locked when no work is in progress. Maintain fences in good repair.

2. Provide siltation control fencing as part of site enclosure, as indicated in Section 01575, and/or required Municipal or Regional authorities. Maintain/restore/replace siltation control fencing as directed throughout the construction period to ensure proper function.

1.7 Enclosure of Structure

1. Provide temporary weathertight enclosures protection for exterior openings until permanently enclosed.

2. Erect enclosures to allow access for installation of materials and working inside enclosure.

3. Design enclosures to withstand wind pressure.

1.8 Power

1. Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.

2. Install temporary facilities for power such as pole lines and underground cables to approval of local power supply authority.

3. Electrical power and lighting systems installed under this Contract may be used for construction requirements with prior approval of Architect, provided that guarantees are not affected. Make good damage. Replace lamps which have been used over period of three (3) months.

1.9 Water Supply

1. Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

1.10 Drainage

1. Refer to Section 01575 for site drainage and pumping requirements.

1.11 Scaffolding

1. Provide scaffolding in accordance with all by-laws and safety regulations. Scaffolding to be designed by professional engineer when of a complicated nature or when required by safety regulations. Remove promptly when no longer required.

1.12 Heat and Ventilating

1. Pay for cost of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted unless prior approvals given by the Architect.

2. Furnish and install temporary heat and ventilation in enclosed areas, as required to:

    .1 Facilitate progress of work.
    .2 Protect work and products against dampness and cold.
    .3 Prevent moisture condensation on surfaces.
    .4 Provide ambient temperatures and humidity for storage, installation, curing of materials.
    .5 Provide adequate ventilation to meet health regulations for safe working environment.

3. Maintain minimum temperature of 10 degrees C or higher where specified as soon as finishing work is commenced and maintained until acceptance of structure by Engineer.

4. Ventilating:

    .1 Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
    .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
    .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
    .4 Ventilate storage spaces containing hazardous or volatile materials.
    .5 Ventilate temporary sanitary facilities.
    .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.

5. Maintain strict supervision of operation of temporary heating and ventilating equipment to:

    .1 Conform with applicable codes and standards.
    .2 Enforce safe practices.
    .3 Prevent abuse of services.
    .4 Prevent damage to finishes.
    .5 Vent direct -fired combustion units to outside.

6. The Architect may permit the use of permanent system providing agreement can be reached on:

    .1 Conditions of use, special equipment, protection and maintenance.
    .2 Guarantees will not be affected.
    .3 Approval of the Owner.

End of Section

1.1 Construction Safety Measures

1. Observe and enforce construction safety measures required by the National Building Code; the O.B.C.; The Provincial Government; Workers' Compensation Board; and, Municipal authorities.

2. In particular, the Occupational Health and Safety Act (Ont. Re. 213/91), the Occupational Health and Safety Act, the regulations of the Ontario Ministry of Labour and Ontario Hydro Safety requirements shall be strictly enforced.

3. Contractor shall ensure that copies of all applicable construction safety regulations, codes and standards are available on the job-site throughout the period of construction. All workers are to be informed that these documents are available for reference at any time.

4. The Contractor shall ensure that all supervisory personnel on the job-site are fully aware of the contents of the Occupational Health and safety Act (Ontario Regulation 213/91 - Construction Projects) the Workers' Compensation Act" and, Bill 208 (Chapter 7, Standards of Ontario) “An Act to Amend the Occupational Health & Safety Act and the Workers’ Compensation Act”, and, that they comply with all requirements and procedures prescribed therein. These documents include, but are not limited to, the following construction safety requirements:

    .1 Contractor to register with the Director of the Occupational Health and Safety Division before or within 30 days of the commencement of the project, (O.Reg. 213/91, sec 5).
    .2 File a notice of project with a Director before beginning work on the project, (O.Reg 313/91,sec 6).
    .3 Notification prior to trenching deeper than 1.2m, (O.Reg. 213/91,sec 7).
    .4 Accident Notices and Reports, (O.Reg. 213/91, sec 8 through sec 12).
    .5 General Safety Requirements, (O.Reg. 213/91, sec 13 through sec 19).
    .6 General Construction Requirements, e.g. protective clothing, hygiene practices, housekeeping, temporary heat, fire safety, access to the job-site, machine and equipment guarding and coverings, scaffolds and platforms, electrical hazards, roofing, et al, (O.Reg. 213/91, sec 20 through sec 221).
    .7 Establish a Joint Health and Safety Committee where more than 19 workers are employed for more than 3 months, (Bill 208, S.8(2) to S.8(14).
    .8 Establish a Worker Trades Committee for all projects employing more than 49 workers for more than 3 months, (Bill 208, S-8a(1) to S.8b(4).
    .9 Ensure that all activities arising out of (.07) and (.08) above are recorded and that minutes are available to an inspector of the Ontario Ministry of Labour.

5. The Contractor shall be considered as the "Constructor" in consideration of the rights and responsibilities for all construction safety requirements, procedures, facilities and inspection of all work performed by the Contractor, Subcontractors/Sub-trades and other Contractors engaged on this project.

6. In the event of a conflict between any of the provisions of the above authorities the most stringent provisions are to be applied.

1.2 Material Safety Data Sheet

1. Material safety Data Sheets (MSDS) must be available at the job-site for any product listed on the Hazardous Ingredients List prior to being used, installed or applied inside of the building.

2. A Material Safety Data Sheet is to be submitted to the Architect for any product which is known to create, or suspected of creating, a health hazard or discomfort during construction or upon commissioning of the project including, but not limited to, the following:

   .1 adhesives
   .2 solvents
   .3 sealants, (caulking, vapour seals, etc.)
   .4 sprayed-on fireproofing
   .5 resilient flooring
   .6 carpet, paint, varnish or other coatings
   .7 exposed membrane waterproofing
   .8 special coatings, (terrazo sealants, chafing coatings, etc.)
   .9 solder, brazing and welding and other filler metal
   .10 other products whose particles or vapours may become air borne after installation.
   .11 any other product as directed by the Consultant.

3. Comply with WHMIS regulation, Workplace Hazardous Material Information System.

1.3 Fire Safety Requirements

1. Comply with requirements for Building Construction, the Ontario Building Code, the Ontario Fire Code, the requirements of Local Fire Authorities and of the requirements of the Office of the Fire Marshal.

1.4 Overloading

1. Ensure no part of Work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.5 Falsework

1. Design and construct falsework in accordance with CSA S269.1-1975.

1.6 Scaffolding

1. Design and construct scaffolding in accordance with CSA S269.2-M1980.

2. Scaffolding to be designed by a Professional Engineer when required under the Occupational Health and Safety Act.

1.7 Materials Specifically Excluded

1. Asbestos and/or asbestos-containing products are not permitted. Submit Material Safety Data Sheets for any product suspected of containing asbestos if so requested by

Consultant. Examples of some materials requiring close scrutiny and/or confirmation include:

.1 Transite drainage pipe - whether buried or above grade - not permitted.
.2 Composite floor tile containing asbestos - not permitted.
.3 Lay-in ceiling tiles containing asbestos - not permitted.
.4 Insulation and/or jacketing for pies, ducts, motors, pumps, etc. - not permitted if any asbestos is present.

2. Solder for all piping is to be lead-free.

.1 "Lead Free" shall mean solder which contains less than 0.030% of lead when dissolved in fluoroboric and nitric acids and tested by inductively coupled argon plasma atomic emission spectroscopy. "Steelbond 281" and "Siverbrite" are acceptable solder products.
.2 The mechanical contractor shall provide an affidavit signed by the Principal of the company, on company letterhead, that all of the solder used on the project was either one of the two acceptable products or that the solder used (identified by brand name) meets or exceeds the testing criteria.
.3 The Owner shall undertake random testing of the soldered joints. Should testing prove that the solder used was not as specified, the Owner shall take action against the contractor to the full extent of the law.

3. All paint and finish coatings are to be lead and mercury-free. Submit Material Safety Data Sheets confirming that these products are free of all lead and/or mercury compounds.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. These specifications apply to all 16 divisions of the project specification. It is the responsibility of the contractor to apply these provisions wherever practical within specification limits to all products and services used on this project.

2. Recognized that currently specified materials and methods may conflict with the basic intention of this section. Where reasonable alternate materials and methods exist that are not specified here, and that do not compromise quality or create additional cost for the owner, notify the Architect of such alternate materials or methods. Do not proceed to use alternate materials or methods to those specified without the express approval of the Architect.

3. Elsewhere, apply the provisions of this section to all work. Exceptions can only be made when signed off by the Architect. Suitability of all products used is the responsibility of the contractor.

1.2 Compliance Specifications

1. The contractor must comply with all applicable health, safety and environmental regulations.

1.3 Beyond Compliance Specifications

1. These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Owner's intention to develop a specification which maximizes environmentally "friendly" materials and methods wherever possible within current technical and budget limitations.

2. Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore these specifications cover both material and methods.

3. The primary goal of beyond compliance specification is to reduce the use of products or methods which have negative health and environmental impacts both during and after construction. These considerations may include full life cycle impacts, associated with raw materials, manufacturing, transport, deconstruction and their eventual fate.

4. These specifications will specifically address primary categories of readily identifiable products, ingredients and methods.

5. These provisions apply to both indoor and outdoor applications equally.

1.4 Exceptions

1. These specifications recognize that not all substitutes are equal and therefore exceptions can be made based on substantive evidence of necessary and superior performance. Special considerations may be given to restricted substances when secondary provisions are made such as sealed in place (contained) applications. All such exceptions must be approved in writing by the Architect.

PART 2 - MATERIALS

2.1 Products or Substances to be Avoided or Limited in Use

1. No product containing the following substances may be used on this project when an equivalent product without or with a lower concentration of this substance is suitable and available. All products containing substances which are known to cause health effects including but not limited to cancer, mutagenic, neurological, or behavioral effects should be avoided if suitable substitutes not containing or containing lower concentrations are available. This provision shall be limited to information contained on Material Safety Data Sheets, therefore MSDS sheets must be reviewed for all products for which such sheets are required. Applications for exceptions must be accompanied by related MSDS and product application and performance sheets, clearly showing a need for the exception.

2.2 Volatile Organic Compounds

1. No product containing volatile organic compounds (in over simplified terms volatile petro chemical or similar plant derived solvents) may be used on this project when a suitable non VOC or failing that a low VOC substitute is available. Manufacturers may refer to the U.S. EPA definition of VOC's for guidance or alternatively use the low molecular weight organic compound descriptor.

   Example: Paints, Coatings, Primer, Adhesives, Chalks, Firestops, etc.

2. Waterborne equivalents are available for most of the solvent borne products used in construction and in most cases would be the preferred alternative. Waterborne products may in some instances have high VOC contents; therefore the fact that a product is waterborne does not automatically make it acceptable.

2.3 Chlorinated Substances

1. Poly Vinyl Chloride (vinyl) and other chlorinated products should be avoided if suitable substitutes are available.

2.4 Plasticizers

1. Plasticisers which off-gas (low molecular weight) should be avoided.

2.5 Man Made Mineral Fibres

1. Products containing mineral fibres which can be emitted or abraded should be avoided.

   Examples: duct liner, mineral fibre ceiling tiles, etc.

2.6 Radiation

1. Products or methods which result in the lowest emission of Electro Magnetic Fields are preferred.

2.7 Biocides

1. Products containing biocides (pesticides, miticides, mildeweides. fungicides, rodenticides, etc.) are not to be used if suitable alternatives are available. Highly stable, low human toxicity biocides such as Portercept may be acceptable substitutes. Biocide formulas which break down, emit powders of offgass should be avoided.

2.8 Heavy Metals

1. Heavy metals such as lead, cadmium, mercury etc. should be avoided.

2.9 Aluminum

1. Raw aluminum should be avoided, anodized or factory painted aluminum is acceptable. This is particularly applicable to surfaces which people can touch.

2.10 Ozone Depleting Substances

1. Products which contain or which use Ozone Depleting Substances such as Bromide, Chlorofluorocarbons (CFC) or Hydrofluorocarbons (HFC) etc. should be avoided if suitable substitutes are available.

2.11 Greenhouse Gasses

1. Products which contain, use or generate Greenhouse gasses such as CO2 should be avoided if suitable substitutes are available.

2.12 Bituminous (tar) Products

1. Products containing tar compounds should not be used if suitable substitutes are available.

2.13 Chemical Compounds

1. Products containing the following chemical compounds should not be used if suitable substitutes are available: Neoprene, Latex, Butyl, ABS, Formaldehyde.

2.14 Adhesives

1. Adhesives containing solvents or other non preferred ingredients should be avoided if suitable substitutes are available, including systems designs which do not need adhesives or can use mechanical etc. fastening alternatives

2.15 Composite Products

1. Some composite products contain adhesives such as formaldehyde which are not preferred, and some composites such as Fibre Reinforced Plastics are not practical for recycling. These products should be avoided if suitable substitutes are available.

2.16 Cleaners and Solvents

1. Products, equipment, and methods which require the use of cleaners and solvents are not preferred if suitable substitutes are available. Examples of preferred products would include No Wax floors, or primerless caulks and adhesives, or products not requiring caulks and adhesives.

End of Section

1.1 Fires

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

1.2 Disposal of Wastes

1. Do not bury rubbish and waste materials on site.

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

1.3 Drainage

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

2. Do not pump water containing suspended materials into waterways, sewer or drainage systems.

3. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 Site Clearing and Plant Protection

1. Protect trees and plants on site and adjacent properties, which are to be retained.

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 trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

1.5 Pollution Control

1. Install and maintain temporary erosion and pollution control features as requested by local Municipal and Regional Authorities.

2. Install, maintain, restore, replace sediment control fence as required by Municipal and Regional authorities. The fence shall be in accordance with Municipal standards.

3. Install, maintain, restore, replace roadside catchbasin sediment protection at all street catchbasin in accordance with Municipal standards.

4. Install, maintain, restore, replace catchbasin sediment barrier immediately after installation of catch basins on the property in accordance with Municipal Standards.

5. Install and maintain a mud mat at the construction access, consisting of 30m x 5m x 0.45m clear stone and mud matts. Refer to site plan for location.

6. Control emissions from equipment and plant to local authorities' emission requirements.

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

End of Section

1.1 General

1. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

2. Store volatile wastes in covered metal containers, and remove from premises daily.

3. Prevent accumulation of wastes which create hazardous conditions.

4. Provide adequate ventilation during use of volatile or noxious substances.

1.2 Materials

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

2. Provide on-site dump containers for collection of waste materials, and rubbish.

1.3 Cleaning During Construction

1. Maintain project grounds, and public properties free from accumulations of waste materials and rubbish. Clean streets as often as required by the local authorities.

2. Remove waste materials, and rubbish from site.

3. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.

4. Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

1.4 Final Cleaning

1. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces exposed to view; leave project clean and ready for occupancy.

2. Employ experienced workers, or professional cleaners, for final cleaning.

3. In preparation for Substantial Performance or Fitness for Occupancy status, whichever occurs first, conduct final inspection of interior and exterior surfaces exposed to view, and of concealed spaces.

4. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all sight-exposed interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.

5. Clean and polish glass and mirrors.

6. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.

7. Broom-clean paved surfaces; rake clean other surfaces of grounds.

8. Clean exposed ductwork and structure.

9. Replace filters.

10. Clean bulbs and lamps and replace those burned out.

11. Clean diffusers and grilles.

12. Clean sinks, faucets, and water closets and controls.

13. Remove snow and ice from access to building, if applicable.

14. Maintain cleaning until project, or portion thereof, is occupied by Owner.

1.5 Removal of Temporary Facilities

1. Completely remove temporary facilities from site, including signs and foundations, making good any damage when no longer required.

End of Section

1. Requirements Included

1. Record documents, samples, specifications.

2. Equipment and systems.

3. Product data, materials and finishes, and related information.

2. Quality Assurance

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

3. Format

1. Organize data in the form of an instructional manual.

2. Binders: commercial quality, (8-1/2 x 11 inch) 219 x 279 mm maximum (2-1/2”) 65 mm ring size.

3. When multiple binders are used, correlate data into related consistent groupings.

4. Cover: Identify each binder with type or printed title “Project Record Documents”, list title of Project, identify subject matter of contents.

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

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

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

4. Contents, Each Volume

1. Table of Contents: Provide title of project; names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

2. For each Product or System: list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

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

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

5. Typed Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

5. Submission

1. Submit one copy of completed volumes in final form 15 days prior to substantial performance. For equipment put into use with Owner's permission during construction, submit Operating and Maintenance Manuals within 10 days after start-up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

2. Copy will be returned after inspection, with Consultant comments.

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

4. Submit revised volumes of data in final form within 10 days after final inspection.

5. For contract drawings (architectural, civil, landscaping, structural, mechanical, and electrical), transfer neatly as-built notations onto second set and submit both sets.

6. Prepare digital pdf file for submission and on USB of completed closeout documents.

6. Record Documents and Samples

1. In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
   .1 Contract Drawings.
   .2 Specifications.
   .3 Addenda
   .4 Change Orders and other modifications to the 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 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 a clean, dry, and legible condition. Do not use Record Documents for construction purposes.

5. Keep Record Documents and samples available for inspection by Consultant.

7. Recording As-Built Conditions

1. Consultant will provide two (2) complete sets of white prints of project drawings for the purpose of recording as-built conditions. Mark and record one set on an on-going basis as construction proceeds. **Near the end of the construction period transfer all marks neatly to second set for submission as project record documents.**

2. Refer to drawings/specifications for additional mechanical and electrical requirements.

3. Record information concurrently with construction progress. Do not conceal work until required information is recorded.

4. Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
   .1 Measure 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 Addenda and Change Orders.
   .6 Details not on original Contract Drawings.
   .7 References to related shop drawings and modifications.

5. Specifications: legibly mark each item to record actual construction, including:
   .1 Manufacturer, trade name, and catalog number of each project 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.

8. Digital As-Built Drawings

1. Retain the services of a CAD drafting company acceptable to the consultant to prepare digital CAD As-Built documents for all Architectural and Engineering drawings.

2. After the consultant has found the Redlined As-Built drawings to be acceptable, transfer to digital file all information recorded on As-Built drawings. Layering of information as per consultant's instructions.

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. Panelboard 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 instruction. Include summer, winter, and any special operating instructions.

5. Maintain Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair and reassemble 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 lists, 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 balancing reports as specified in Division 15.

15. Additional Requirements: As specified in individual specification sections.

10. Materials and Finishes

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

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

3. Moisture-protection and weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommend schedule for cleaning and maintenance.

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

11. Guarantees, Warranties and Bonds

1. Separate each warranty or bond with index tab sheets keyed to the List of Contents listing.

2. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section 01721 whenever standard preprinted trade or manufacturer's Guarantee/Warranty forms are not available. Provide written form for each warranty specified in Section 01740.

3. Obtain warranties and bonds, 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 bonds until time specified for submittal.

End of Section

1.1 Notes

1. To be made out on the letterhead of Guarantor or Warrantor which usually is a Subcontractor.

2. This format is to be used only when standard preprinted trade or manufacturer's forms are not available. Preprinted forms are to include all elements of information shown on this sample or as a minimum.

3. Comply with Requirements for Guarantee/Warranty as specified in Section 01720, Article 11.

To: Town of Pelham
20 Pelham Town Square
PO Box 400, Fonthill, ON L0S1E0

Date: _____

SECTION _____

TITLE _____

GUARANTEE/WARRANTY TO:

OWNER	Town of Pelham
PROJECT	Town of Pelham Municipal Building Addition
ARCHITECT	Grguric Architects Incorporated
REFERENCE	(to specifications or drawings)
TIME	Period of Guarantee/Warranty:_____ years
GUARANTEE/ WARRANTY	Starting Date: Substantial Performance as certified by Architect Date: _____

(Description of Guarantee/Warranty)

_____

_____

_____

Upon written notification from the Owner or the Consultant that the above work is defective any repair or replacement work required shall be to the Consultant's satisfaction at no cost to the Owner.

This guarantee shall not apply to defects caused by the work of others, maltreatment of materials, negligence or Acts of God.

SUBCONTRACTOR

_____ _____
Signature Date

Authorized Signing Officer: _____
(Name Printed)

_____
Title

Name of Firm: _____

Address: _____

Telephone Number _____

CONTRACTOR

_____ _____
Signature Date

Authorized Signing Officer: _____ _____
(Name Printed)

_____
Title

Name of Firm: _____ SEAL

Address: _____

Telephone Number _____

End of Section

1.1 Maintenance Manuals

1. On completion of project, submit to Owner one (1) copy of Operations Data and Maintenance Manual in English, made up as follows:

    .1 Bind data in vinyl hard covered, 3 ring loose leaf binder for 8½" x 11" size paper.
    .2 Enclose title sheet, labelled "Operation Data and Maintenance Manual", project name, date and list of contents.
    .3 Organize contents into applicable sections of work to parallel project's specification break-down. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
    .4 A digital copy of all documents in the manuals must be provided on a memory stick format to be PDF.

2. Include following information, plus data specified.

    .1 Maintenance instructions for finished surface and materials.
    .2 Copy of hardware and paint schedules.
    .3 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
    .4 Names, addresses and phone numbers of sub-contractors and suppliers.
    .5 Guarantees, Warranties and bonds showing:
        .1 Name and address of project.
        .2 Guarantee commencement date (date of Final Certificate of Completion).
        .3 Duration of guarantee.
        .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
        .5 Signature and seal of Contractor.
        .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.

3. Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.

4. Include in the Manuals a complete set of final shop drawings indicating corrections and changes made during fabrication and installation.

End of Section

PART 1 – GENERAL

1.1 Bonds

1. Refer to Supplementary Conditions and to Standard Contract Document CCDC No. 2, 2008 for bonding requirements for this project, both at the time of tender submission and throughout the duration of the construction period.

1.2 Standard Warranty

1. Refer to Document 00820 Supplementary Conditions and to Standard Contract Document CCDC No. 2, 2008 for warranty requirements and conditions for the standard warranty which is required for the work of this contract.

1.3 Extended Warranties

1. Refer to individual specifications sections for requirements of extended warranties required for particular sections or items of work.

2. Extended warranties are required to be issued by manufacturers, fabricators, suppliers and/or installers, sometimes jointly, due to their unique position in the construction process and their ability to guarantee a particular section of work. Refer to individual requirements of extended warranties requested.

3. Unless specifically noted otherwise, all extended warranties shall commence on the date of Substantial Performance of the Work as certified by the Consultant.

4. Listed below is a summary of extended warranties required for individual Sections. This list, if inconsistent with the specified requirements of individual extended warranties, shall be deemed correct with respect to length of extended warranties. Extended warranties required shall include, but not be limited to, the following:

   Extended warranties (total warranty period listed, including entire building warranty)

02600	Asphalt Paving	2 years
06400	Architectural Woodworking	2 years
07520	Modified Bituminous Membrane Roofing	refer to section
07615	Preformed Metal Siding	5 years
07620	Sheet Metal Flashing & Trim	2 years
07900	Sealants	5 years
07901	Joint Sealers for Roofing	2 years
08100	Commercial Steel Doors & Frames	refer to section
08520	Aluminum Windows and Doors	10 years
08800	Glazing	5 years
09310	Wall Ceramic Tile	3 years
09330	Floor Porcelain Tile	3 years
09510	Acoustic Unit Ceiling	2 years
09671	Epoxy Floor (Sealed Concrete)	1 year
09900	Painting	2 years

End of Section

1.1 Description of Work

1. This Section includes parameters for the general design and performance for the work of Sections which comprise the building envelope including but not limited to, masonry cavity walls, metal cladding, soffits, windows, entrances and roofing.

2. Performance of the building envelope shall be guaranteed by the Contractor.

1.2 Design

1. **General:** Design and engineer as required, fabricate, erect, and/or install building envelope in compliance with the Ontario Building Code, other regulations and requirements of authorities having jurisdiction.

2. Take into account construction tolerance limitations, creepage, deflection and other movements of the structure.

3. Accommodate, by means of expansion and contraction provisions, any movement in the building envelope assemblies themselves and between the assemblies and the building structure. Allow for expansion and contraction of components caused by ambient temperature range, surface temperature variation of components, wind, seismic forces, structural deflection and racking; without causing misalignment of joints, breakage of joints and air/vapour barriers, water and air penetration through the assembly, glass breakage, or other defects detrimental to appearance or performance.

4. Method of attachment to the structure shall take into account site peculiarities so that site and air vibrations or normal temperature movements of the building do not loosen, weaken and/or fracture the connection between building envelope assembly components and the structure or between the components themselves.

5. Reinforce building envelope assembly components, as required, so that the members can safely sustain design loads.

6. Assemble and secure assemblies in manner which will keep stresses on sealants within the sealant manufacturer's recommended maximum performance levels.

7. **Rain Screen Principle**: Except where detailed otherwise, construct building envelope assemblies based on the "Rain Screen" principle as advocated by the National Research Council of Canada. All voids between the assembly components as well as those between components and the structure shall have:

    .1 gaskets, baffles, overlaps, seals and compartmentalization as required to provide a barrier "Rain Screen" to effectively prevent excessive rain water entry into any of the building envelope cavities but to allow pressure equalization of cavity air spaces.

.2 air barriers and seals are required to prevent entry of interior building air into building envelope cavities, and exterior air into the building. Air barriers and seals shall be able to withstand wind design pressures.
.3 such provisions in the form of openings between cavities and the building exterior of sufficient cross sections to provide adequate pressure equalization. All openings shall be effectively baffled against direct rain water entry. Air spaces shall be baffled and compartmentalized to prevent chimney effect within the air spaces vertically and horizontally.
.4 Thermal separators, isolators and seals placed to eliminate contact between interior humid air and a cold surface or structural component to prevent condensation and ice build-up on such surfaces during cold weather.

1.3 Water, Vapour and Moisture

1. Comply with the design and performance requirements specified in the building code, and as specified herein, including the following principles:

2. Drain to the exterior face of the assembly, any water entering at joints and any condensation occurring within the building envelope assembly.

3. Design, fabricate and install the assembly to be watertight to the interior under the interior and exterior design conditions in combination with movements occurring due to loads imposed.

4. At design conditions no water penetration to the building interior side of the assembly shall occur.

5. The requirements for an air barrier and a vapour barrier are intended to be provided at the same plane in the building envelope design unless otherwise indicated or specified. In such cases, the Drawings and Specifications refer to "air/vapour barrier". The definition of the air/vapour barrier for the purpose of these Specifications is "a continuous membrane including joints of membrane between components and to adjacent construction which prevents or retards penetration of moisture laden air and the diffusion of water vapour through it".

6. The maximum water vapour transmission of all components forming the vapour barrier shall be (1.72 ng/Pa x s x sq.m.) (0.3 Imperial Perms) unless specified otherwise.

7. At design conditions no condensation shall occur on room side surfaces.

8. Sound: Provide completed installations free from vibrations, wind whistles and noise due to thermal and structural movement and wind pressure.

9. Seismic: Fabricate and erect cladding assemblies to prevent damage due to earthquake forces as required by The Ontario Building Code.

1.4 Quality Control

1. **General:** Materials and workmanship shall be subject to inspection at any time. Cooperate in permitting access for inspection to all places where work is being done or stock is being stored.

2. Owner's quality control inspection and testing is specified in the technical sections and will be paid from Cash Allowance except as otherwise specified. Pay for inspections and retesting to verify acceptability of corrected work.

3. Allow sufficient time for testing, evaluation, alterations and retesting so as not to interrupt the Progress Schedule for the Project.

4. The Consultant may require testing of connections and special prefabricated inserts, as part of the work of this Section.

1.5 Sealants

1. Sealants used for the various building envelope assemblies shall be selected from those specified in the respective assembly Section, and shall be coordinated with the sealant being provided under other building envelope Sections. Preferably, one sealant by the same manufacturer shall be used throughout. If different sealants are selected, from those specified, it is the responsibility of the respective Section to ensure compatibility between selected sealant, substrates, and sealants of other Sections which come in contact with the selected sealant.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Not applicable.

1.2 Existing Conditions

1. Take over structures to be demolished based on their conditions (on date that tender is accepted).

1.3 Demolition Drawings

1. Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details clearly showing sequence of disassembly work or supporting structures.

1.4 Protection

1. Prevent movement, settlement or damage of adjacent grades. Provide bracing, shoring as required.

2. Prevent debris from blocking surface drainage inlets which must remain in operation.

3. Protect existing items designated to remain and materials designated for salvage. In the event of damage to such items, immediately replace or make repairs to approval of Owner and at not cost to Owner.

PART 2 - PRODUCTS

1. Not applicable.

PART 3 - EXECUTION

3.1 Work

1. Dispose of demolished materials except where noted otherwise.

3.2 Safety Code

1. Unless otherwise specified, carry out demolition work in accordance with Canadian Construction Safety Code 2010.

2. Should material resembling spray or trowel-applied asbestos be encountered, notify Architect. Any asbestos encountered will be removed by the Owner's Contractor.

3.3 Preparation

1. Disconnect electrical and telephone service lines entering areas to be demolished as per rules and regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve other areas during period of demolition.
2. Inspect site and rectify with Architect items designated for removal and items to remain.
3. Disconnect and cap mechanical services in accordance with requirements of local authority having jurisdiction.
4. Natural gas supply lines to be removed by gas company or by qualified tradesman in accordance with gas company instructions.

3.4 Demolition & Field Work

1. Demolish areas as indicated on the drawings.
2. Remove existing equipment, services and obstacles, where required, for refinishing or making good of existing surfaces, and replace same as work progresses.
3. At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times).
4. Demolish in a manner to minimize dusting. Keep dusty materials wetted.
5. Demolish masonry and concrete walls in small sections. Carefully remove and lower structural framing and other heavy or large objects.
6. Burning materials on site is not permitted.
7. Remove contaminated or dangerous materials from site and dispose of in safe manner.
8. Employ rodent and vermin exterminators to comply with health regulations.

3.5 Salvage

1. Carefully dismantle items containing materials for salvage and stock pile salvaged materials at locations as directed by Architect.

3.6 Restoration

1. Upon completion of work, remove debris, trim services and leave work site clean.
2. Reinstall areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

End of Section

PART 1 - GENERAL

1.1 General Requirements

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

1.2 Related Work Specified Elsewhere

1. Site Grading — Section 02210
2. Excavation, Backfilling and Rough Grading — Section 02220

1.3 Examination

1. Examine the Drawings, Specifications, and Bore Hole data which show soil conditions at boreholes in locations shown on Drawings. Visit the site and determine the work extent and nature of the existing conditions. In no circumstances will any claims against the Owner be allowed resulting from failure to ascertain the work herein described or implied.

2. Report to the Consultant in writing any conditions which will prejudice the proper completion of the work of this Section. Commencement of work constitutes acceptance of existing conditions.

1.4 Protection

1. Establish locations of all electrical, telephone, or other service installations existing in the areas of site preparation by contacting the service owners and obtaining their approval to work in such areas. Contact the Municipality and local utilities to review proposed scheduling, work activities and regulations pertaining to all work beyong the limits of the property including but not limited to parking areas, stormwater outlet and headwall and asphalt driveway entrances. Provide adequate markers or take protective measures to ensure that no damage will be caused under this Section. Repair or replace damaged work as required without cost to the Owner.

2. Electronically locate, map and record location of services prior to doing any excavation.

1.5 Dust Control

1. Provide and maintain to the Consultant’s satisfaction, adequate system to avoid any nuisance caused by dust and dirt rising throughout the area of operations.

1.6 Silt Control

1. Provide and maintain to the Consultant’s and to the Authorities’ satisfaction, control systems to prevent silt from entering any storm drainage system. Refer to Site Services Drawing for details.

PART 2 - PRODUCTS

2.1 Materials

1. Not applicable.

PART 3 - EXECUTION

3.1 Disposal of Waste and Surplus Materials

1. Except where specified or indicated on Drawings to be retained on site, or to be reused, remove from the site, all waste and surplus materials resulting from site preparation work on a daily basis. Dispose of as required in accordance with local or provincial regulations. Under no circumstances shall the burning of rubbish be permitted on the site. Where items are to be reused, store on site where designated and provide temporary protection to same to prevent damage by construction operations.

End of Section

PART 1 - GENERAL

1.1 General Requirements

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

1.2 Related Work Specified Elsewhere

1. Site Grading:	Section 02210
2. Excavation, Backfilling and Rough Grading	Section 02220
3. Topsoil and Finish Grading:	Section 02260

1.3 Definitions

1. Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees and surface debris.

2. Close-cut clearing consists of cutting off or removing at or near flush with original ground surface standing trees, brush, scrub, roots, stumps and embedded logs and disposing of fallen timber and surface debris.

3. Clearing isolated trees consists of cutting off to not more than a specified height above ground of trees designated grubbing and disposing of felled trees and debris.

4. Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm diameter and disposing of all fallen timber and surface debris.

5. Grubbing consists of excavation and disposal of stumps and roots boulders and rock fragments to not less than a specified depth below original ground surface.

1.4 Protection

1. Prevent damage to fencing trees, landscaping, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses, root systems of trees which are to remain. Make good damage.

2. Apply approved tree paint to cuts or scars suffered by vegetation designated to remain.

PART 2 - PRODUCTS

2.1 Materials

1. Not applicable.

PART 3 - EXECUTION

3.1 Clearing

1. Clear trees, shrubs, uprooted stumps and surface debris not designated to remain.

2. Cut off trees, brush, and scrub as indicated or as directed at a height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations may be 1000 mm.

3. Cut off unsound branches and cut down dangerous trees overhanging area cleared.

4. Close Cut Clearing

5. Cut off trees, shrubs, stumps and other vegetation at ground level to within 100 mm of original ground surface.

6. Perform close cut clearing by hand so that existing insulation of fibrous material is not damaged.

7. Cut off unsound branches and cut down dangerous trees overhanging area cleared.

3.2 Isolated Trees

1. Cut off isolated trees indicated or directed by Consultant at a height of not more than 300mm above ground.

2. Grub out isolated tree stumps.

3. Underbrush Clearing

4. Clear underbrush from areas indicated at ground level.

3.3 Grubbing

1. Grub out stumps and roots to not less than 400 mm below original ground surface.

2. Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m^3.

3.4 Removal and Disposal

1. Remove cleared and grubbed materials off site in a manner acceptable to Consultant and Municipal Authorities.

2. Usable timber and rocks become property of Contractor.

3.5 Finished Surface

1. Leave ground surface in a condition suitable for immediate grading operations or stripping of topsoil.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Clearing and Grubbing: Section 02110
2. Site Grading: Section 02210
3. Top Soil and Finish Grading: Section 02260

PART 2 - PRODUCTS

1. Not applicable.

PART 3 - EXECUTION

3.1 Stripping of Top Soil

1. Remove top soil from areas to be excavated, paved and regraded.
2. Strip top soil when dry enough to prevent contamination of subgrade.
3. Stockpile top soil on site, where directed.
4. Remove from site existing grass and vegetation and surplus top soil, if any.

End of Section

PART 1 - GENERAL

1.1 General Requirements

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

1.2 Related Work Specified Elsewhere

1. Clearing and Grubbing: Section 02110
2. Topsoil and Finish Grading: Section 02260
3. Asphalt Paving: Section 02600

1.3 Site Conditions

1. Refer to Section 00300.
2. Known underground and surface utility lines and buried objects are indicated on site plan. Confirm exact locations of utility lines and buried objects prior to machine excavation or grading.

1.4 Protection

1. Prevent damage to trees, natural features, bench marks, existing pavement, surface or underground utility lines which are to remain. Make good damage.

PART 2 - PRODUCTS

2.1 Materials

1. Fill material: Type “4” in accordance with Part 2 of Section 02220 – Excavation, Backfilling and Rough Grading.
2. Obtain approval of excavated or graded material used as fill for grading work. Protect approved material from contamination.

PART 3 - EXECUTION

3.1 Stripping of Topsoil

1. The original topsoil will be stripped from the site as part of the work described in Section 02120.

3.2 Grading

1. The Contractor shall use the information shown on the Drawings as well as the information observed during visits to the site during the Tender Period, as the basis for the "Existing Conditions" of the site.

2. Rough grade to levels, profiles, and contours allowing for surface treatment as indicated. Ensure that rough grading operations to not promote water ponding in construction areas. Level depressions with Type “4” fill if suitable compaction can be demonstrated.

3. Perform construction grading and/or pre-grading to allow proper construction access to the Work. Grade site to accommodate vehicle movement, materials, handling and storage and placement of granular base materials (to be used during the construction period).

4. Grade to prevent water ponding on site during construction period. Create additional ditches, swales, slopes, ponds, etc. as required by Contract Documents and Municipal Authorities for control of drainage, sedimentation and topsoil retention.

5. Rough grade to following depths below finish grades:
   150 mm for grassed areas.
   450 mm for flowerbeds.
   600 mm for shrub beds.
   540 mm for heavy duty asphalt paving.
   420 mm for medium duty asphalt paving.
   275 mm for concrete walks and/or unit paving.

   Note that the rough grading elevations listed above are nominal.

6. Slope rough grade away from building 1:50 minimum.

7. Grade swales and ditches to profiles and depths indicated.

8. Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

9. Compact filled and disturbed areas to maximum dry density to ASTM D698-78, as follows:
   90% under landscape areas.
   98% under paved and walk areas and playing fields.

10. Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 Testing

1. Inspection and testing of soil compaction will be carried out by designated testing laboratory as directed by Consultant.

2. Costs of tests will be paid by a Cash Allowance specified in Section 01020.

3.4 Surplus Material

1. Remove surplus material from site in a manner acceptable to Consultant and Municipal Authorities.

2. Remove material unsuitable for fill, grading or landscaping from site in a manner acceptable to Consultant and Municipal Authorities.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Excavation and Backfill for Mechanical and Electrical: Divisions 15 & 16
2. Safety Requirements: Section 01545
3. Environmental Protection: Section 01575
4. Top Soil and Finish Grading: Section 02260

1.2 Shoring, Bracing & Underpinning

1. Prevent movement or settlement, safeguard and maintain integrity of adjacent structures, earth, bench marks, services, walks, paving, trees, bearing piles, curbs, landscaping, adjacent grades. Provide bracing, shoring and underpinning required.
2. Shore and brace excavations to prevent failure in accordance with Canadian Construction Safety Code 1977 and applicable local regulations.
3. Make good and pay for any damage and be liable for any injury resulting from inadequate shoring, bracing or underpinning.

1.3 Utility Lines

1. Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify Architect of findings.
2. Known underground and surface utility lines and buried objects are indicated on site plans. No guarantee is given of completeness and accuracy.
3. Make good and pay for damage to existing utility lines resulting from work.

1.4 Protection

1. Protect bottoms of excavations from softening. Should softening occur, remove softened soil and replace with footing concrete.
2. Protect bottoms of excavations from freezing.
3. Construction banks in accordance with local by-laws.
4. Provide adequate protection around bench markers, layout markers, survey markers, and geodetic monuments.
5. Provide protection to ensure no damage to existing facilities and equipment situated on site.
6. Effect approved measures to minimize dust as a result of this work.

7. Do not stockpile excavated material to interfere with site operation or drainage.

1.5 Compaction Densities

1. Compaction densities are percentages of maximum densities obtainable from ASTMD698-70.

PART 2 - PRODUCTS

2.1 Materials

1. See Soil Report for suitability of existing soil as fill. Excavated or graded material to be approved before use as fill. Protect such approved material from contamination.

2. **Type 1 Fill:** Clean, graded 20 mm clear crushed stone. Containing less than 10% passing the No. 4 sieve.

3. **Type 2 Fill:** Clean, natural river sand and gravel material, free from silt, clay, loam friable or soluble materials and organic matter, graded within the limits of MTC granular class “B” material.

4. **Type 3 Fill:** Concrete backfill 15 Mpa strength at 28 days complying with the requirements of Section 03300.

5. **Type 4 Fill:** Excavated pervious soil free from roots, rocks larger than 75 mm and building debris. If sufficient quantity of material is not available from excavation, use imported fill having same or better characteristics.

6. **Type 5 Fill:** Fine grain material such as clay, that is relatively impervious to the flow of water.

2.2 Stockpiling

1. Stockpile fill materials in areas designated by Architect. Stockpile granular materials in manner to prevent segregation. Protect stockpiled fill material from freezing.

2. Protect fill materials from contamination.

PART 3 - EXECUTION

3.1 Preparation

1. **Lines and Levels:** Establish accurate lines and levels as required. Supply batter board, line stakes and templates. Establish permanent reference lines and bench marks required.

2. Prevent damage to sides and bottoms of excavated pits and trenches from exposure to sun and rain which would cause cave-ins or softening of beds on which foundations and drains rest.

3. **Keep excavations free of water while work is in progress:** Prevent flow of water and earth fines into excavated pits and trenches. Seal or divert flow from springs that fill excavations.

4. Bail, pump out or divert water from excavations, from whatever cause, as it accumulates, and until the permanent drainage is operational and foundations are in place.

3.2 Excavating

1. Excavate to elevations and dimensions indicated for installation, construction and inspection of work.

2. Excavate to well defined lines to minimize quantity of fill material required.

3. Earth bottoms of excavations to be dry, undisturbed soil, level, free from loose or organic matter.

4. Excavation must not interfere with normal 45 deg. splay of bearing from bottom of any footing.

5. Correct unauthorized excavation at no extra cost as follows:
   .1 Fill under bearing surfaces and footings with type 3 fill.
   .2 Fill under other areas with Type 2 fill compacted to 100% density.

6. Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw. Seal cuts with approved tree wound dressing.

7. Remove paving, walks, rubble and other obstructions encountered in course of excavation.

8. Keep a record of founding elevations of footings. This record must be approved by the *Consultant* before claims for extra will be considered.

9. Extras will be paid only if, upon excavating to the specified founding elevations, it is found that conditions do not meet the requirements set forth in the *Contract Documents*. No extras will be paid if footings are lowered due to construction activity, over excavation, or through undermining by the installation of electrical and mechanical services.

10. Use hand methods to carry out final trimming of footing beds, prior to placement of reinforcement and concrete. Accurately level the bottom of footing excavations.

11. Remove water, disturbed soil or foreign matter from footing excavations before placing reinforcement or concrete.

12. Footings are not to be concreted until the soil at founding elevation is inspected and approved by the geotechnical engineer.

3.3 Backfilling

1. Do not commence backfilling until areas of *Work* to be backfilled have been inspected, and pipe and conduit joints tested and accepted by *Consultant*.

2. Areas to be backfilled shall be free from debris, snow, ice, water or frozen ground. Backfill material shall not be frozen or contain ice, snow or debris.

3. Prior to placing fill under slabs on grade, compact existing subgrade to obtain same compaction, as specified for fill. Remove “soft” material and fill with approved material.

4. Prior to installation of foundations compact existing subgrade to obtain bearing capacity. Remove soft material and fill with approved material.

5. Backfill simultaneously each side of walls and other structures to equalize soil pressures.

6. Request reviews by *Consultant* and geotechnical engineer of excavation prior to beginning backfilling.

7. Obtain Consultant’s acceptance prior to placing backfill against basement walls.

8. Where temporary unbalanced earth pressures are liable to develop on walls or the structures, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Architect.

9. Place and compact fill materials in continuous horizontal layers not exceeding 200 mm loose depth. Do not disturb or damage buried services, drainage system, waterproofing and dampproofing. Make good any damage.

10. Do not use frozen material for backfilling or filling.

3.4 Fill Locations & Compaction

1. **Type 1 Fill:**
   - .1 Use under interior concrete slabs on grade to a minimum compacted depth of 200 mm.
   - .2 Use under all exterior concrete slab on grade to a minimum compacted depth of 150 mm.
   - .3 Compact to at least 100% standard proctor maximum dry density.

2. **Type 2 Fill:**
   - .1 Use within building area, in trenches, pits and fill for over-excavated areas to underside of type 1 Fill.
   - .2 Compact to at least 100% standard proctor maximum dry density.

3. **Type 3 Fill:**
   - .1 Use under foundations where specified.

4. **Type 4 Fill:**
   - .1 Use at exterior side of perimeter walls to subgrade level.

.2 Use on backside of retaining walls to subgrade level on high side for minimum 500 mm from wall. Compact to 95% standard proctor maximum dry density.

5. **Type 5 Fill:**
   .1 Use at perimeter of building at weeping tile location, above type 2 fill, in landscaped areas prior to placing top soil – See Section 02411.

3.5 Grading

1. Rough grade to levels, profiles, and contours allowing for surface treatment as indicated. Under paved areas, subgrade must be properly shaped and crowned to provide drainage of the sub-base to the catch basins and to the sub-drainage system. Cross fall to be 2% minimum.

2. Slope rough grade away from building 1:50 minimum.

3. Grade ditches to depth required for maximum run-off.

4. Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Moisture content of fill and existing surface to be approximately the same to facilitate bonding.

5. Compact filled and disturbed areas to standard proctor maximum dry density to ASTM D698-78 as follows:
   .1 95% under landscaped area.
   .2 100% under paved and walk areas and under sports field.

6. Do not disturb soil within branch spread of trees or shrubs to remain.

3.6 Inspection & Testing

1. Refer to Section 01005, Paragraph 21.

3.7 Surplus Material

1. Dispose of surplus material from site.

2. Dispose of material unsuitable for fill, grading or landscaping from site.

End of Section

PART 1 - GENERAL

1.1 Related Work in Other Sections

1. Site Grading: Section 02210

2. Excavation, Backfilling and Rough Grading : Section 02220

1.2 Landscape Sub-Contractor's Work

1. The work of the following sections must be performed by one only subcontractor referred as the landscape sub-contractor.
   - Section 02260 Top Soil and Finish Grading
   - Section 02487 Sodding
   - Section 02490 Trees, Shrubs and Groundcovers

1.3 Quality Assurance

1. Should the source of topsoil be exhausted, test topsoil from new source, submit soil analysis report and recommendations for correction and obtain the approval from the Consultant before using.

2. Obtain approval of the topsoil in writing from the Consultant.

3. Test topsoil for NPK, Mg, Soluble salt content, organic matter, pH and permeability.

4. Submit 2 copies of the soil analysis report and recommendations for correction to the Consultant.

1.4 Product Delivery, Storage and Handling

1. Stockpile topsoil in locations designated by the Consultant.

2. Do not spread topsoil in a frozen or muddy condition.

1.5 Site Conditions

1. Should the source of topsoil be exhausted, test topsoil from new source, submit soil analysis report and recommendations for correction and obtain the approval from the Consultant before using.

2. Prevent damage to existing buildings, sidewalks, pavement, utility lines, servicing and other existing structures which are to remain.

3. Do not bury foreign material beneath areas to be landscaped. Dispose of debris prior to topsoil placement and remove from the site.

1.6 Product Delivery, Storage and Handling

1. Stockpile topsoil in locations designated by the Consultant.

2. Do not spread topsoil in a frozen or muddy condition.

PART 2 - PRODUCTS

2.1 Materials

1. Topsoil: From stockpile stripped from site.

2. Imported Topsoil: A fertile, friable natural loam; containing not less than 4% organic matter for lay loams and not less than 2% organic matter for sandy loams to a maximum of 15%, and capable of sustaining vigorous plant growth, free of subsoil contamination, roots and stones over 50mm in diameter, reasonably free of weeds (as determined by the Consultant), and having a pH ranging from 6.0 to 7.5.

PART 3 - EXECUTION

3.1 Preparation

1. All subgrade shall be approved by the Consultant before the placement of topsoil.

2. Fine grade the subgrade eliminating uneven areas and filling low spots. Remove all debris and all subsoil that has been contaminated with oil or gasoline.

3. Compact finished subgrade to 95% Standard Proctor Dry density for areas under sod or planting.

4. Scarify subgrade to a depth of 100mm.

5. Topsoil to be compacted to a firmness sufficient to show a heel imprint of not more than 3mm deep. The top 50mm of topsoil shall be of a fine texture suitable for placement of sod.

6. Manually spread topsoil around trees and plants to prevent damage by grading levelling equipment.

7. Float the area until surface is smooth. Cut smooth falls to catch basin rims and finish up flush.

8. Do not cover catch basins, valve covers or inspection pits

9. Fine grade the topsoil to ensure positive drainage away from buildings and sidewalks; provide positive drainage from curb edges.

10. Leave surface smooth, uniform and sufficiently firm to prevent sinkage pockets when irrigated.

11. Obtain approval of topsoil grading prior to the placing of plant material or sod.

3.2 Spreading of Topsoil

1. Spread dry topsoil during dry weather over approved, dry, unfrozen subgrade where sod is indicated.

2. Keep topsoil 20mm below finished grade for sodded areas.

3. Apply topsoil to the following minimum compacted depths:
   150mm for seeded areas
   150mm for sodded areas
   450mm for flower beds
   600mm for shrub beds

4. Fine grade topsoil eliminating rough and low areas and to ensure positive drainage.

5. Roll topsoil with a 50kg roller to compact and retain surface. Compact to 85% SPD

3.3 Raking-Out

1. Hand rake areas as a final surface preparation.

2. Coordinate the scheduling of hand raking to ensure that sodding can occur as soon as possible after hand raking.

3.4 Clean-Up

1. Make good any damage caused by topsoil spreading activities at no extra cost.

2. Clean up immediately any soil or debris spilled onto pavement or concrete.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Site Grading: Section 02210

2. Topsoil and Finish Grading : Section 02260

1.2 Landscape Sub-Contractor's Work

1. The work of the following sections must be performed by one only subcontractor referred as the landscape sub-contractor.
   - Section 02260 Top Soil and Finish Grading
   - Section 02487 Sodding
   - Section 02490 Trees, Shrubs and Groundcovers

1.3 Quality Assurance

1. Laying of sod to be carried out by experienced personnel under the direction of a skilled foreman.

1.4 Delivery & Storage

1. Schedule deliveries in order to keep storage at jobsite to minimum without causing delays.

2. Deliver, unload and store sod on pallets.

3. Deliver sod to site within 24 h of being lifted and lay sod within 36 h of being lifted.

4. Do not deliver small, irregular or broken pieces of sod.

5. During wet weather allow sod to dry sufficiently to prevent tearing during lifting and handling.

6. During dry weather protect sod from drying and water sod as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod will be rejected.

1.5 Scheduling of Work

1. Schedule placing of topsoil and finish grading to permit sodding immediately.

1.6 Inspection

1. Obtain approval of the Consultant of the finish topsoil surface before proceeding with sodding.

PART 2 - PRODUCTS

2.1 Materials

1. **Nursery Sod:** Quality and source to comply with standards outlined in "Guide Specification for Nursery Stock," Section 17, 1978 Edition, published by Canadian Nursery Trades Association.

    .1 Number one (#1) Kentucky Bluegrass/Fescue Sod: Sod grown from minimum 40% Kentucky Bluegrass, 30% Creeping Red Fescue.

2. **Water:** Potable.

3. **Herbicide:** Standard commercial (Canada Pest Control Products Act).

4. **Fertilizer:** Complete synthetic slow release fertilizer with maximum 35% water soluble nitrogen. Formulation ratio 20-10-10 brand name fertilizer for application during maintenance period.

5. **Topsoil:** For sodding and seeding, use existing topsoil stockpile as specified in Section 02111. Provide additional imported topsoil if required at no extra cost and as specified under Section 02490.

6. **Wooden Pegs:** 17 mm x 17 mm x 200 mm.

PART 3 - EXECUTION

3.1 Application of Fertilizer

1. Apply fertilizer before sodding.

2. Spread fertilizer with mechanical spreaders over entire area of topsoil at rate of 16 kg (100 m^2) or area.

3. Mix fertilizer thoroughly into upper 50 mm of topsoil.

3.2 Finish Grading

1. Fine grade entire topsoil area to contours and elevations. Eliminate rough spots and low areas to ensure positive drainage.

2. Roll topsoil with 50 kg. roller, minimum 900 mm wide to compact and retain surface.

3. Leave surface smooth, uniform, firm against deep foot printing, with a fine loose texture.

3.3 Laying of Sod

1. Obtain approval of topsoil grade and depth before starting sodding.

2. Lay sod during growing season. Sodding during dry summer period, at freezing temperatures or over frozen soil is not acceptable.

3. Lay sod in rows, perpendicular to slope, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.

4. Provide close contact between sod and soil by means of light roller. Heavy rolling to correct irregularities in grade is not permitted.

5. Water immediately after sod laying to obtain moisture penetration through sod into top 100 mm of topsoil.

6. Provide adequate protection of sodded areas against erosion and mechanical damage. Remove protection after lawn areas have been accepted.

7. For slopes greater than 3:1 lay sod sections at right angles to slopes and secure with wooden pegs. Place 6 pegs per m^2, 100 mm below top edge and to prevent shifting of sod and drive pegs flush with top of sod soil.

8. Lay pieces of sod in turf stone apertures.

3.4 Maintenance

1. Ensure maintenance equipment suitable to Consultant.

2. Water sodded areas in sufficient quantities and at required frequency to maintain sub-soil immediately under sod continuously moist for depth of 75 to 100 mm.

3. Cut grass first time when it reaches height of 40 to 50 mm. Remove clippings which will smother grassed areas.

4. Mow grass once a week (every seventh day) during the growing season at a height of 60 mm.

5. Trim grass edges around planting beds, building walls, light standards, signs, trees, etc., in neat lines as to original layout.

6. Keep sodded areas clean, pick up all debris, papers, excess construction materials or similar materials from all sodded areas and remove from site.

7. Apply herbicide when broad-leaf weeds start developing in competition with grass. Apply herbicide in accordance with manufacturer's instructions when winds are less than 10 km/h, when air temperature is above 10 deg. C.

8. Beginning in early April, fertilize sodded areas with fertilizer for four (4) successive months with a complete slow release fertilizer. Formulation ratio 20-10-10, brand name fertilizer at a rate of 300 lbs/acre.

3.5 Acceptance

1. It is the Contractors responsibility to maintain the sod in good condition until accepted.

2. Sodded areas will be accepted at final inspection provided that:

    .1 Sodded areas are properly established.
    .2 Sod is free of bare and dead spots and without weeds.
    .3 No surface soil is visible when grass has been cut to height of 45 mm.
    .4 Sodded areas have been cut twice.

3. Lawns sodded in fall will be accepted in following spring one (1) month after start of growing season provided acceptance conditions are fulfilled.

4. Replace any deteriorated sod with new sod at the direction of the Consultant.

End of Section

PART 1 - GENERAL

1.1 Source Quality Control

1. The work of the following sections must be performed by one only subcontractor referred as the landscape sub-contractor.
   Section 02260 Topsoil and Finish Grading
   Section 02487 Sodding
   Section 02490 Trees, Shrubs and Groundcovers

2. Obtain approval of plant material at source.

3. Notify consultant of source of material at least seven days in advance of shipment. No work under this section is to proceed without approval.

4. Acceptance of plant material at its source does not prevent rejection on site prior to or after planting operations.

5. Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal and Provincial regulations.

1.2 Shipment and Pre-Planting Care

1. Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.

2. Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire which would damage bark, break branches or destroy natural shape of plant. Give full support to root ball of large trees during lifting.

3. Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.

4. Remove broken and damaged roots with sharp pruning shears.

5. Keep roots moist and protected from sun and wind. Heel-in trees and shrubs, which cannot be planted immediately, in shaded areas and water well.

1.3 Guarantee

1. The contractor hereby warrants that plant material as itemized on plant list will remain free of defects for one year.

2. End-of-Warranty inspection will be conducted.

1.4 Replacements

1. During warranty period, remove from site any plant material that has died or failed to grow satisfactorily as determined by consultant.

2. Replace plant material as soon as horticulturally acceptable.

3. Extend warranty on replacement plant material for a period equal to the original warranty period.

4. Continue such replacement and warranty until plant material is acceptable.

PART 2 - PRODUCTS

2.1 Materials

1. Water: potable and free of minerals, which may be detrimental to plant growth.

2. Stakes: T-bar steel stakes 50 x 50 x 6 x 2440 mm, wood 50 x 50 x 2400 mm.

3. Accessories: factory galvanized, cables, wire tighteners.

4. Guy wires: steel wire strand to CSA G4-M1977 at the following sizes:

   .1 Shrubs and trees under 77 mm caliper use 2.4 mm wire.
   .2 Trees 75 to 150 mm caliper use 3 mm wire.

5. Tree rings: fabricated from 3 mm galvanized wire encased in two ply reinforced 12 mm diameter rubber garden hose or equivalent.

6. Root ball burlap: 150 g Hessian burlap.

7. Wire baskets: to be ungalvanized metal.

8. Mulch: Submit samples prior to shipping to site:

   .1 Shredded bark mulch.

9. Topsoil:

   .1 For tree pits, planters, and shrub beds to be imported triple mix.

10. Antidesiccant: wax like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.

2.2 Plant Material

1. Conform to the horticultural standards of the Canadian Nursery Trades Associations with respect to grading and quality. Supplied in strict accordance with Plant List.

2. All plants shall be No. 1 Grade, nursery grown, under proper cultural practices with respect to fertile soil, ample spacing, regular cultivation, weed, pest control, adequate moisture and pruning, in accordance with good horticultural practices as advocated by the Canadian Nursery Trades Association. All such plants shall have been transplanted and/or root pruned regularly, but not later than nine (9) months prior to arrival on the site. The Contractor shall submit sources of plant material, in writing, if so requested by the Consultant.

3. Additional plant material qualifications:

    .1 Plant material obtained from areas with milder climatic conditions from those of site acceptable only when moved to site prior to the breaking of buds in their original location and heeled-in, in a protected area until conditions suitable for planting.
    .2 Use trees and shrubs with strong fibrous root system free of disease, insects, defects of injuries and structurally sound. Use trees with straight trunks, well and characteristically branches for species. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.
    .3 Cold storage: written approval from the consultant required for use of plant material which has been held in cold storage.
    .4 Container grown stock: acceptable if containers large enough for root development. Trees and shrubs must have been grown in container for minimum of one growing season but not longer than two. Root systems must be able to "hold" soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
    .5 Balled and burlapped: coniferous and broad-leafed evergreens over 500 mm tall must be dug with soil ball. Deciduous trees in excess of 3 m height must have been dug with large ball. Root balls must include 75% of fibrous and feeder root system. Secure root balls with burlap and heavy twine, rope of wire basket.
    .6 Collected plant material: will not be permitted.
    .7 Substitutions to plant material as indicated on planting plan not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and or equal size as those originally specified. Give timely notice, in writing, to the Consultant when applying for substitutions.

PART 3 - EXECUTION

3.1 Workmanship

1. Stake out location of trees and planting beds as per planting plan. Obtain approval prior to excavating.

2. Apply antidesiccant in accordance with material manufacturer's instructions.

3. Coordinate operations. Keep sit clean and planting holes drained. Immediately remove soil or debris spilled on pavement.

3.2 Planting Time

1. Plant deciduous plant material during dormant period before buds have broken. Plant material noted for spring planting only, must be planted in dormant period.

2. Plant material imported from region with warmer climate conditions may only be planted in early spring.

3. When permission has been obtained to plant deciduous plant material after buds have broken, spray plants with antidesiccant to slow down transpiration prior to transplanting.

4. Plant evergreens in spring before bud break. Apply antidesiccant to evergreens before digging.

5. When permission has been obtained, trees, shrubs and ground covers growing in containers may be planted throughout growing season.

6. Plant only under conditions that are conducive to health and physical conditions of plants.

7. Provide planting schedule. Extending planting operations over long period using limited crew will not be acceptable.

3.3 Excavation

1. Shrubs: excavate planting beds 450 mm deep and the full extend of bed areas as shown on plans. Dispose of excavated material off site.

2. Provide drainage for planting holes in heavy soil if natural drainage does not exist. Have method approved.

3. Protect bottom of excavation against freezing.

4. Remove water which enters excavations prior to planting. Ensure source of water is not ground water.

3.4 Planting

1. Loosen bottom of planting hole to depth of 150 to 200 mm.

2. Plant trees and shrubs vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to roads and walks.

3. With balled and burlapped root balls, loosen burlap and cut away minimum top 1/3 without disturbing root ball. Do not pull burlap or rope from under root ball. With container stock, remove entire container without disturbing root ball. Non-biodegradable wrappings must be removed.

4. Place plant material to depth equal to depth they were originally growing in nursery.

5. During planting of bare-rooted stock, first shake backfill of planting soil among the roots.

6. Tamp planting soil around root system in layers of 150 mm eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.

7. Build 100 mm deep saucer around outer edge of hole to assist with maintenance watering.

8. When planting is complete, give surface of planting saucer dressing of organic 1:2:2 fertilizer at rate of 12 kg/100 m^2 for shrub beds or 40 to 50 g/mm of caliper for trees. Mix fertilizer thoroughly with top layer of planting soil and water in well.

3.5 Protective Wrapping

1. Protective wrapping installed by the nursery to prevent damage during shipping is to be removed upon planting to allow for inspection of the trust.

3.6 Tree Support

1. Tree support is shown on planting details.

2. Where guy wires are used close to pedestrian ways fasten flags to wires to make them clearly visible.

3.7 Pruning

1. Prune trees and shrubs after planting, as directed, to compensate for loss of roots suffered during transplanting. Postpone pruning, of those trees where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cuts flush with main branch, smooth dead and injured branches and branches that rub causing damage to bark. Trim out crown of trees and shrubs without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches.

3.8 Mulching

1. Obtain approval of planting beds before mulching material is applied. Loosen soil in planting beds and pits and remove debris and weeds. Spread mulch to minimum thickness of 50 mm. Mulch material susceptible to blowing must be moistened and mixed with topsoil before applying. When mulching is placed in fall, place immediately after planting. When mulch is placed in spring, wait until soil has warmed up.

3.9 Maintenance Before Acceptance

1. Perform following maintenance operations from time of planting to acceptance by Consultant:

.1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
  .1 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
.2 Remove weeds monthly.
.3 Replace or respread damaged, missing or disturbed mulch.
.4 For non-mulched areas, cultivate as required to keep top layer of soil friable.
.5 Apply pesticides in accordance with Federal, Provincial and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from Consultant prior to application.
.6 Remove dead or broken branches from plant material.
.7 Keep trunk protection and guy wires in proper repair and adjustment.
.8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
.9 Be responsible for protection of all planted areas, until all project work has been completed, approved and accepted.

3.10 Acceptance

1. Plant material will be accepted no sooner than the date at which the project is declared fit for occupancy provided that the following criteria are meet:

2. Plant material has been planted for 90 days, exhibits healthy growing condition and is free from disease, insects and fungal organisms.

3. Plant material installed less than 90 days prior to frost will be accepted in following spring, 30 days after start of growing season provided that acceptance conditions are fulfilled.

4. All plant material will be inspected prior to acceptance. All plants must be in a healthy, vigorous, growing condition at time of inspection. All planting beds and tree pits shall be mulched, free of weeds, leaves, broken branches and debris, and in a neat and tidy condition.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Site Grading: Section 02210
2. Excavation, Backfilling and Rough Grading: Section 02220
3. Cast-in-Place Concrete: concrete curbs Section 03300

1.2 Extended Warranty:

1. Submit a warranty for asphalt paving installation, covering materials and labour and the repair or replacement of defective work, but for two (2) years total.

PART 2 - PRODUCTS

2.1 Materials

1. S**ub-Base:** Generally, use Fill type"4" where required to reach design elevations.
2. **Base:** 50 mm and 19 mm crusher run limestone.
3. **Heavy Duty Pavement for Parking and Driveways:** Hot mix, hot laid asphaltic concrete HL8 and HL3, mixture conforming to O.P.S.S. #1150.05.
4. **Medium Duty Pavement for Playground and Walkways:** Hot mix, hot laid asphaltic concrete HL8 and HL3, mixtures conforming to O.P.S.S. #1150.05.
5. **Joint Painting Material:** SS-1 emulsion in accordance with O.P.S.S. #1103.05.

PART 3 - EXECUTION

3.1 Preparation

1. Regard locations and instructions on drawings. Report any discrepancies or questions to the Consultant prior to proceeding with the work. In particular pay attention to the exact delineation of all edges of pavement and types of pavement;
2. Set out work in accordance with lines and levels shown on Drawings. Maintain such lines and levels through duration of work. Ensure positive drainage toward catch basins is maintained in all areas.
3. Compact sub-grade to a minimum of 98% Standard Proctor density.
4. Paint exposed edge of asphaltic joints, edge of manhole and catchbasin frames, curbs and similar items with SS-1 emulsion.

3.2 Installation

1. Inspect site grades prior to installation. Review the precise grade requirements required on the grading plan. Review with the Consultant prior to installation if any conditions exist that may cause deviations from grades shown on Drawings. Coordinate catchbasin elevations with those shown on Mechanical site plan.

2. **Pavement Section:**

   .1 Heavy Duty:
   - minimum 300 mm compacted thickness of 50 mm crusher run limestone compacted to 100% Standard Proctor Maximum Dry Density (SPMDD), ASTM-D698 .
   - 150 mm compacted thickness Base course of 19 mm crusher run limestone compacted to 100% SPMDD.
   - 60 mm compacted thickness of granular asphalt HL8.
   - 40 mm compacted thickness of granular asphalt HL3.

   .2 Medium Duty:
   - 200 mm compacted thickness of 50 mm crusher run limestone Sub-Base compacted to 100% Standard Proctor Maximum Dry Density (SPMDD), ASTM-D698.
   - 150 mm compacted thickness Base course of 19 mm crusher run limestone compacted to 100% SPMDD.
   - 40 mm compacted thickness of granular asphalt HL8.
   - 30 mm compacted thickness of granular asphalt HL3.

3. **Placing Granular Materials:**

   .1 Exercise due care at all times to prevent granular materials from being contaminated by clay or other types of deleterious materials.
   .2 Place materials immediately after sub-grade is inspected by the Architect and as follows:
      .1 To required width and thickness indicated on Drawings in layers not exceeding 100 mm compacted thickness crusher run limestone.
      .2 Grade each layer and compact to a minimum 100% standard Proctor density to a smoother surface conforming to required cross-section.
   .3 Finished surface of granular material must not deviate more than 10 mm from designed grade.

4. **Placing Asphaltic Pavement:**

   .1 Obtain Consultant's inspection of compacted granular base before commencing asphalt paving.
   .2 Air temperature during placing of mixture must be minimum 7 deg. C and rising. Temperature of mixture when spread must be not less than 120 deg. C nor more than 150 deg. C. Do not increase temperature of mixture to offset long distance hauling.
   .3 Compact asphaltic mixture as soon as it can bear roller without undue displacement and hairline cracking and continue until all roller marks are eliminated. Speed of roller must at all times be slow enough to avoid displacement

of mixture. Keep roller wheels slightly moistened by water to prevent adhesion of mixture. Excess water will not be permitted. Compact mixture with hot tampers in locations that are not easily accessible to machine roller.

.4 Rolling Procedure:
  .1 Initial and final rolling must be accomplished using self-propelled Class "B" roller.
  .2 Intermediate rolling must be carried out using self-propelled Class "C" roller or "D" roller. Intermediate roller must follow breakdown roller as closely as possible.

.5 Upon completion of compaction each pavement course must be:
  .1 Smooth and true to crown and grade with variation not more than 6 mm from thickness shown on Drawing. Do not place any asphaltic course less than 25 mm thick nor more than 75 mm thick.
  .2 Free from depressions exceeding 3 mm as measured with 3 m straight edge paralleling centre line of driveways/aisles.
  .3 Compacted to a density not less than 97% Marshall.

5. **Joints:**

.1 Cut back bituminous course to its full depth in straight or curved lines as required to expose fresh, straight, vertical surface. Remove broken and loose material.
.2 Asphalt must be placed in such a manner that joint must not be allowed to cool before adjacent asphalt course is applied.
.3 Where paving is comprised of two or more courses, joints must overlap by not less than 600 mm.
.4 Carefully place and compact hot asphaltic material against joints. Correct any unsatisfactory joint before proceeding with work.
.5 Feathering of joints will not be permitted.

3.3 Inspection & Testing

1. Refer to Section 01005.

2. Field inspections during installation, and core samples of all asphalt areas will be taken as part of Inspection and Testing. If tests show asphalt to be substandard to that specified, all asphalt shall be removed and replaced at the Contractor’s expense. Cash credits will not be accepted for work which does not fully comply with drawings and specifications.

3.4 Certification of Grades

1. The Contractor is required to provide as-constructed elevations of the parking area to verify that the parking lot has been constructed in accordance with the contract drawings.

3.5 Pavement Markings

1. **Parking Spaces:**

    .1 Lay out lines as indicated on drawings and apply 100mm yellow - wide for parking, use mechanical application equipment.
    .2 End limit of each line to have clean, sharp 90° corners with no over spray fogging.
    .3 Thickness of paint application to be consistent throughout.
    .4 Under-sprayed lines shall be repainted.

2. **Handicapped Symbols, as indicated on the Drawings, and as follows:**

    .1 1200mm x 1200mm- White symbol in blue box.

3. **Emergency Fire Route Markings :**

    .1 Lay out lines as indicated on drawings and apply.

End of Section

PART 1 - GENERAL

1.1 Related Work

1.	Excavation, Backfilling & Rough Grading	Section 02220
2.	Concrete Reinforcement	Section 03200
3.	Cast-in-Place Concrete	Section 03300

1.2 Reference Standards

1.	CSA-A23.1-14	Concrete Materials and Methods of Concrete Construction
2.	CSA-A23.2-14	Test Methods and Standard Practices for Concrete
3.	CSA S269.1-16	Falsework and Formwork for Construction Purposes
4.	CSA-S269.3-M92 (R2013)	Concrete Formwork for Construction Purposes

1.3 Co-ordination

1. Install anchors, sleeves, bolts, inserts, drains, expansion joint components and other items supplied under other sections of the specifications required to be built into, anchored to, or passing through concrete work, in co-ordination with the other trades.

2. Supply templates for setting all anchorages required for the buildings and shelters.

1.4 Design of Formwork

1. Assume full responsibility for the complete structural design and construction of formwork including shoring and bracing to resist vertical and horizontal loads due to the weight of wet concrete, self weight of forms, wind, fluid pressure of concrete, and other forces arising from equipment used in placing the concrete.

1.5 Waste Management and Disposal

1. Place materials defined as hazardous or toxic waste in designated containers.

2. Ensure emptied containers are sealed and stored safely for disposal away from children.

3. Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

PART 2 - PRODUCTS

2.1 Materials

1. Formwork Lumber: Plywood and wood formwork materials to CAN/CSA-A23.1-14/A23.2-14. Formwork materials used on site shall be new and acceptable to the Consultant, prior to erection. Panels shall be fabricated for use as form panels, finished one side, with

sealed edges and a minimum thickness of 19mm. Panels shall be smooth and free from defects which would show up on concrete surfaces exposed to view.

2. Formwork Liner: Plastic laminate, vinyl, polyethylene, neoprene or approved products new and acceptable to the Consultant to provide the surface texture and forms required for the design as shown.

3. Form Coating: for wood forms and as recommended by manufacturer for form liner.

4. Form stripping agent: CPD colourless non-staining odourless or as recommended by manufacturer of form liner.

5. Joint Tape: non staining, water impermeable, self releasing, where required.

6. Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface, and not leaving metal closer than 25 mm to the surface of the concrete for walls. Snap tie length shall suit wall thickness as noted on drawings.

7. Tie Hole Plugs: 25mm dia. tapered PVC hole plugs to be provided on all exposed walls.

8. Form Ties/Supports: External clamping devices to retain form tight, uniform and easily removable around all columns.

PART 3 - EXECUTION

3.1 Erection

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

2. Construct forms to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1-14, and to produce acceptable finish where exposed.

3. Construct falsework in accordance with CSA S269.1-6.

4. Obtain approval from soils testing engineer for bearing surfaces prior to erection of forms.

5. Obtain Consultant's approval for use of earth forms.

6. Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

7. Align form joints and make watertight. Keep form joints to minimum.

8. Use (25) mm chamfer strips on external corners of beams, joints, columns, walls etc., exposed to view.

9. Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

10. Provide blocking and anchorage for hollow metal frames set to be cast into forms.

11. Clean formwork in accordance with CAN/CSA-A23.1-14 before placing concrete.

12. Forms shall remain in place for a minimum duration of 48 hours for footings, curbs, etc. and all other non self-supporting structural components.

13. Forms shall remain in place for a minimum of 72 hours for all columns.

14. Re-use of formwork and falsework subject to requirements of CAN/CSA-A23.1-14.

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

16. When forms are stripped during the curing period, cure and protect the exposed concrete in accordance with Section 03300 Cast-in-Place Concrete.

17. Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.

18. Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Concrete Formwork & Accessories — Section 03100
2. Cast-in-Place Concrete — Section 03300

1.2 Reference Standards

1. CSA-A23.1-14 — Concrete Materials and Methods of Concrete Construction
2. CSA-A23.2-14 — Test Methods and Standard Practices for Concrete
3. CSA A23.3-14 — Design of Concrete Structures
4. CSA G30.5-M1983 (R1998) — Welded Steel Wire Fabric for Concrete Reinforcement
5. CSA G30.18-09 (R2014) — Carbon Steel Bars for Concrete Reinforcement
6. ACI 315-2004 (SP66) — Detailing Manual
7. ACI 315R-04 — Manual of Structural and Placing Drawings for Reinforced Concrete Structures
8. CSA W186-M1990 (R2012) — Welding of Reinforcing Bars in Reinforced Concrete Construction

1.3 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.

2. Indicate bar sizes, spacing, location and quantities of reinforcement, mesh, mechanical splices, chairs, spacers and hangers with identifying code marks to permit correct placement without reference to structural drawings; (to Reinforcing Steel Manual of Standard Practice - Metric Supplement 2004 by Reinforcing Steel Institute of Ontario).

3. Detail placement of reinforcing where special conditions occur.

4. Design and detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.

1.4 Substitutes

1. Substitution of different size bars permitted only upon written approval of the Consultant.

PART 2 - PRODUCTS

2.1 Materials

1. Reinforcing Steel: billet steel, deformed bars to CAN/CSA G30.18-M92 (R2002) epoxy coated, unless indicated otherwise. Use Grade 400R bars for all reinforcing unless

noted otherwise, to sizes as shown on the drawings.

2. Welded Wire Fabrics: Where no reinforcement is shown, provide 152 x 152 MW 18.7 x MW 18.7 (6" x 6" x 6/6) welded wire fabric at 37mm (1½ ") below the finished surface of slabs on grade or walks, or toppings 62mm (2½") in thickness or greater. Lap ends and sides of fabric in accordance with requirements of CSA Standard CAN/CSA-A23.1, but in any event, not less than 300mm (12").

PART 3 – EXECUTION

3.1 Fabrication

1. Fabricate reinforcing in accordance with CSA-A23.1.

2. Obtain Consultant's approval for locations of reinforcement splices other than shown on steel placing drawings.

3. Ship bundles of bar reinforcement, clearly identified in accordance with bar list.

3.2 Storage of Reinforcing

1. Reinforcing shall be stored off the ground to keep it free from dirt and to maintain its fabricated form.

3.3 Field Bending

1. Do not field bend reinforcement except where indicated or authorized by the Consultant.

2. When field bending is authorized, bend without heat, applying a slow and steady pressure.

3. Replace bars which develop cracks or splits.

3.4 Placing

1. Place reinforcing steel as indicated on reviewed shop drawings and in accordance with CSA-A23.1.

2. Obtain Engineer's approval of reinforcing steel and position.

3. Locate reinforcing bars to provide proper concrete cover. Reinforcing cover will be carefully inspected by the Consultant, and reinforcing with inadequate cover will not be acceptable.

4. Fold all the wires behind bars, away from form faces.

5. Modify bars on site to accommodate box-outs, inserts, etc., as directed by the Consultant.

3.5 Field Cutting of Reinforcing

1. Field cut reinforcing bars only where permitted by the Consultant.

End of Section

PART 1 - GENERAL

1.1 Related Work

1.	Excavation, Backfilling and Rough Grading	Section 02220
2.	Asphalt Paving	Section 02600
3.	Concrete Formwork & Accessories	Section 03100
4.	Concrete Reinforcing	Section 03200
5.	Structural Metal Framing	refer to drawings
6.	Metal Fabrications	Section 05500
7.	Rough Carpentry	Section 06100
8.	Mechanical	Division 15
9.	Electrical	Division 16

1.2 Reference Standards

1.	CSA-A23.1-14	Concrete Materials and Methods of Concrete Construction
2.	CSA A23.2-14	Test Methods and Standard Practices for Concrete
3.	CAN/CSA-A3001	Portland Cement
4.	CAN/CSA-A23.5-M86	Supplementary Cementing Materials
5.	CAN/CSA-A362-93	Blended Hydraulic Cement
6.	CSA G30.18-09 (R2014)	Carbon steel bars for concrete reinforcement
7.	CSA G30.3-M1983 (R1998)	Cold-Drawn Steel Wire for Concrete Reinforcement
8.	ASTM A820/A820M-16	Standard Specification for Steel Fibres for Fibre Reinforced Concrete.

1.3 Samples

1. At least (3) weeks prior to commencing work, inform the Consultant of the proposed mix design and proposed source of ready mixed concrete.

2. A sample of the finishes shall be prepared and remain as the minimum acceptable standard for the project.

1.4 Certificates

1. Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.

2. Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1.

1.5 Quality Assurance

1. The Contractor shall employ an independent inspection and testing company to carry out all testing and inspection as required. The Consultant will appoint the inspection and testing company. The cost of inspection and testing shall be paid by the Contractor, out of the Cash Allowance carried for this testing under Division 1.

2. Samples and methods of moulding shall conform to the requirements of CSA-A23.2.

3. Additional testing shall be made if there is a distinct change in job conditions or if required by the Consultant or the authority having jurisdiction.

4. Compression tests shall be performed in accordance with CSA-A23.2 and good practice.

5. Failure to meet strength requirements will result in rejection of materials, strengthening or replacement of those portions that failed to develop the specified strength.

6. Concrete slump shall be tested at time that cylinders are cast and at such other times deemed necessary.

7. The addition of water and admixtures on the site is hereby prohibited and unacceptable for the project.

1.6 Submittals

1. Submit shop drawings in accordance with Section 01300 Submittals.

1.7 Waste Management And Disposal

1. Designate a cleaning area for tools to limit water use and runoff.

2. Carefully coordinate the specified concrete work with weather conditions.

3. Ensure emptied containers are sealed and stored safely for disposal away from children.

4. Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.

5. Choose least harmful, appropriate cleaning method which will perform adequately.

PART 2 – PRODUCTS

2.1 Materials

1. Formwork: As specified in Section 03100.

2. Formwork Lumber:
   .1 Plywood and wood formwork materials to CSA-A23.1. Formwork materials brought on site shall be new.
   .2 Panels shall be fabricated for use as form panels, finished one side with form coating, with sealed edges and a minimum thickness of 17mm.

3. Panels shall be smooth and free from defects which would show up on concrete surfaces exposed to view.

4. Form Coating: Formaseal, as manufactured by Sika.

5. Joint Tape: Non-staining, water impermeable, self-releasing.

6. Form Ties: Removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface, and not leaving metal closer than 25mm to the surface of the concrete.

7. Tie Hole Plugs: 25mm dia. tapered P.V.C. hole plugs.

8. Reinforcing Steel: As specified in Section 03200.

9. Reinforcing Steel: Billet steel, grade 400R, deformed bars to CAN/CSA-G30.18 to sizes shown on structural drawings. Where none is shown, provide 15M bars at 300mm centres as minimum steel.

10. Wire Mesh: Welded Wire Fabric to sizes and locations shown on drawings. Where none is shown, provide 152x152xMW18.7xMW18.7 W.W.F. one layer as minimum.

11. Portland Cement: to CAN/CSA-A3001, Type GU.

12. Water: to CSA-A23.1.

13. Aggregates: To CSA-A23.1. Coarse aggregates to be normal density. Use blend of 10mm and 20mm for coloured patterned concrete slabs.

14. Air Entraining Admixture: To CAN/CSA3-A23.5.

15. Chemical Admixtures: To CAN/CSA3-A23.5 water reducing type WN. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.

16. Colour Admixtures: Integral coloured pigments to C-979-86. Two (2) colours to be selected by Consultants from manufacturer's standard range.

17. Non-Shrink Grout: Sternson M-Bed Superflow or approved equal.

18. Floor Hardener: Surflex TR trap rock hardener, shake on, by Euclid Chemical Company. Application rate of 5kg/m^2 (1.0 lb/ft^2).

19. Interior Cure and Seal Compound: Interior slabs shall be W. R. Meadows "Intex". No resin-based compounds will be accepted.

20. Exterior Cure and Seal Compound: Exterior concrete slabs and gutters shall be W. R. Meadows "Sealtight CS-309".

21. Expansion Joint Filler: Shall be Sealtight asphalt expansion joint filler, W. R. Meadows.

22. Joint and Sawcut Filler: Shall be Loadflex by Sika or Jointflex by CPD.

23. Joint Tape: Shall be Sealtight Gusset Tape by W. R. Meadows.

2.2 Concrete Mixes

1. Proportion normal density concrete in accordance with CSA A23.1, to give following properties for concrete in foundation walls, footings and any other unspecified concrete:
   .1 Cement: Type GU Portland cement
   .2 Maximum 25% slag cement content
   .3 Minimum compressive strength at 28 days: 25 MPa.
   .4 Nominal size of coarse aggregate: 20 mm.
   .5 Slump at time and point of discharge: 50 to 100 mm.
   .6 Air content: 0 to 3%.

2. Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give following properties: for concrete in slabs-on-grade:
   .1 Cement: Type GU Portland cement
   .2 Maximum 25% slag cement content
   .3 Minimum compressive strength at 28 days: 25 MPa.
   .4 Nominal size of coarse aggregate: 20 mm.
   .5 Slump at time and point of discharge: 60 to 100 mm.
   .6 Air content: 0 - 3% maximum.

3. Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in exterior structural slabs and sidewalks/curbs:
   .1 Cement: Type GU Portland cement
   .2 Maximum 25% slag cement content
   .3 Minimum compressive strength at 28 days: 32 MPa.
   .4 Class of exposure: C-2.
   .5 Nominal size of coarse aggregate: 20 mm.
   .6 Slump at time and point of discharge: 60 to 100 mm.
   .7 Air content: 5 to 8%.

4. Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in grouted masonry blocks.
   .1 Cement: Type GU Portland cement
   .2 Maximum 25% slag cement content
   .3 Minimum compressive strength at 28 days: 20 MPa.
   .4 Nominal size of coarse aggregate: 10 mm.
   .5 Slump at time and point of discharge: 50 to 100 mm.
   .6 Air content: 0 - 3% maximum.

5. Do not change job mix formula without prior approval of the Consultant.

6. In addition to 28 day strength tests, 7 days test may be carried out. If average strength at 7 days is less then 70% of specified 28 day strength, check mix at once and adjust to ensure required strength is obtained.

PART 3 - EXECUTION

3.1 Workmanship

1. All concrete shall be as set forth in CSA-A23.1 and shall be composed of cement, fine and coarse aggregates and water.

2. Concrete shall be delivered and discharged within 1½ hours after the introduction of the mixing water at the batch plant.

3. Mixing, placing, compaction, curing, hot and cold weather protection shall conform to CSA-A23.1. Use power vibrators in sufficient number and in location and duration to the Consultant's complete satisfaction as required.

4. Obtain the Consultant's approval before placing concrete. Provide 24 hour notice prior to placing of concrete.

5. Pumping of concrete is permitted only after approval of equipment and mix.

6. Ensure reinforcement and inserts are not disturbed during concrete placement in order to maintain proper coverage.

7. Prior to placing of concrete obtain the Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.

8. Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

9. Do not place load upon new concrete until authorized by the Consultant.

3.2 Formwork

1. Verify lines, levels and column centres before proceeding with formwork and ensure

dimensions agree with drawings.

2. Construct forms to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1.

3. Align form joints and make watertight. Keep form joints to minimum.

4. Use 25mm chamfer strips on all vertical and horizontal corners of exterior retaining walls as indicated on drawings.

5. All surfaces of formwork which face concrete, which will be exposed to view are to be coated with protective form coating to minimize transfer of wood grain to finished concrete.

6. Clean formwork in accordance with CSA-A23.1 before placing concrete.

7. Re-use of formwork is subject to requirements of CSA-A23.1.

8. When forms are stripped during the curing period, cure and protect the exposed concrete.

9. Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.

10. Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

3.3 Inserts

1. Co-ordinate and verify that the Electrical Contractor has set all ducts, boxes and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated on structural or civil drawings must be approved by the Consultant.

2. Co-ordinate and verify that the Mechanical Contractor has set all floor drains, cleanouts, trench drains to provide a smooth, flush appearance with the **'FINISHED FLOOR SURFACE'** and to ensure a positive and uniform slope towards the drains.

3. Do not eliminate or displace reinforcement to accommodate inserts or hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Consultant before placing of concrete.

4. Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete. With the Consultant's approval, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be at least 100 mm in diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used. Protect anchor bolt holes from water accumulations. Set bolts and fill holes with non-shrink grout or epoxy (as noted on drawings).

5. Set hollow metal frames, plumbed, squared and braced with blocking in locations shown on drawings.

3.4 Grouting

1. Grout underside of steel column bearing plates with non-shrinking grout to manufacturer's instructions. Place grout to cover steel shims left in place.

3.5 Finishing

1. Finish all concrete surfaces in accordance with Section 03350.

3.6 Expansion Control

1. Expansion Joints: Install expansion joint material between slabs on grade and masonry walls, for interior slabs and at max. 6000mm spacing for exterior slabs and curbs, and between slabs on grade and concrete curbs.

2. Control Joints: Sawcut control joints at a maximum spacing of 3000mm in each direction and where noted on drawings. Cut joints within 24 hours of placing and to a depth as detailed on drawings.

3.7 Water/Vapour Control

1. Butt joints tight together and tight to foundation wall. Seal all joints with gusset tape including foundation wall junctions.

2. Protect during placing of concrete to ensure the integrity of the barrier is maintained. Repair immediately any penetrations or areas damaged in accordance with the manufacturer's recommendations.

3.8 Curing and Protection

1. Cure and protect newly finished slabs and steps in accordance with CSA A23.1.

2. Coat exterior slabs, curbs with curing compound and leave for 30 days. Apply sealer after curing period has expired.

3. Cure finished concrete surfaces in a manner which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that curing compounds are compatible with adhesives for finishes to be applied later.

4. For all concrete slabs that are to remain exposed, curing compound is to be applied at a rate required for use as a sealer/hardener, in accordance with the manufacturer's instructions.

3.9 Field Quality Control

1. Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Consultant in accordance with CSA-A23.1.

2. The Consultant will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
3. Inspection or testing by Consultant will not augment or replace contractor quality control nor relieve him of his contractual responsibility.

3.10 Tolerances

1. Cast-in-Place concrete shall be constructed within the dimensional tolerances specified in CSA-A23.1, as specified elsewhere in this section. Concrete floor slabs shall be constructed as moderately flat slabs and within the tolerances listed below.

2. Conform in line, level and plumbness to the following tolerances. These are maximum values.

3. Variation from vertical, in lines and surfaces of walls piers:

:	In height of 3m (10')	-	6mm (1/4")

4. Variation from level or from grades shown in floors grade:

:	In any 3m (10')	-	3mm (1/8")
:	In any bay up to 6m (20')	-	6mm (1/4")
:	In any 12m (40')	-	12mm (1/2")

5. Variation from straight or from correct position in walls:

:	In length up to 6m (20')	-	12mm (1/2")
:	In any 12m (40')	-	12mm (1/2")

6. Variation in size and location of sleeves, floor open and the like and in location of bolts, inserts and fastenings: - 6mm (1/4")

7. Variation in location of bolts, inserts, sleeves and fastenings when in group:

:		-	3mm (1/8")

8. Variation in cross-section of slabs, walls and piers:

:	Maximum oversize	-	12mm (1/2")
:	Maximum undersize	-	6mm (1/4")

9. There shall be no variations from required level at junction of walls and floors.

10. Where drains occur, floors shall be properly and uniformly sloped to allow complete drainage of the area.

3.11 Duct Bank (Interior)

1. Excavate to elevations shown and form duct bank as shown on electrical drawings.

2. Place reinforcing steel as shown. Electrical Contractor to place ducts.

3. Place coloured concrete and finish top surface with wood float.

3.12 Defective Concrete

1. Concrete is defective when:
   .1 Containing visible honeycombing or embedded debris.
   .2 Concrete damaged by freezing or which is unsatisfactory due to placement at too high a temperature.
   .3 Average 28 day strength of any three consecutive strength tests is less than specified minimum 28 day strength.
   .4 Any 28 day strength test result in less than 88% of specified minimum 28 day strength.
   .5 Cracking occurs in locations other than at control and construction joints.
   .6 Curing is not carried out strictly according to the specifications.

2. Remove and reconstruct in entirety any defective concrete footing, slabs, walls as directed by the Consultant.

3.13 Cold Weather Protection

1. Refer to CSA Standards CSA-A23.1 and CSA-A23.2 Provisions and Publications. Include for tarped heated enclosures - no non-freeze additives such as calcium will be tolerated on this project.

End of Section

PART 1 - GENERAL

1.1 Related Work

1.	Concrete Formwork & Accessories	Section 03100
2.	Cast-in-Place Concrete	Section 03300
3.	Rough Carpentry	Section 06100
4.	Fire Stopping and Smoke Seals	Section 07950
5.	Floor Porcelain Tile	Section 09330
6.	Resilient Tile Flooring	Section 09660
7.	Painting	Section 09900
8.	Mechanical	Division 15
9.	Electrical	Division 16

1.2 Reference Standards

1. CSA-A23.1-14 Concrete Materials and Methods of Concrete Construction
2. CSA-A23.2-14 Test Methods and Standard Practices for Concrete

1.3 Qualification

1. The work of this Section shall be carried out by an established concrete finishing company having a proven record of satisfactory workmanship for a period of at least 5 years prior to this contract and approved by the Consultant.

1.4 Scope of Work

1. Supply all materials, labour and service to provide acceptable finishes to all concrete floors, exterior slabs and exterior steps where indicated or required.

2. Supply all labour, materials and equipment necessary and as required to provide acceptable finishes for all concrete floor slabs, exterior concrete sidewalks, aprons, steps, traffic deck and exposed concrete retaining walls where noted on drawings and specified herein.

PART 2 - PRODUCTS

2.1 Materials

1. Concrete Mixes: As specified in Section 03300.

2. Curing and Sealing Compounds: As specified in Section 03300.

3. Concrete Hardeners: As specified in Section 03300.

4. Formwork: As specified in Section 03100.

5. Exposed Aggregate: As specified in Section 03300.

6. Admixtures: As specified in Section 03300.

7. Retarders: As specified in Section 03300.

PART 3 - EXECUTION

3.1 Curing and Protection

1. Cure, seal and protect newly finished slabs and steps in accordance with CSA-A23.1, Section 21, and as specified in Section 03300.

3.2 Concrete Finishing

1. General: Finish surfaces of all concrete in a manner acceptable for the installation of finished floor materials or if exposed in a manner acceptable to the Consultant.

2. Broom Finish: Concrete floor surfaces, which are to receive quarry, ceramic tile or precast terrazzo, and exterior sidewalks and concrete paving Type 1 shall have a fine broom finish after trowelling.

3. Steel Trowel Finish: All interior concrete floors, and concrete curbs which are to receive special flooring, resilient flooring or remain exposed, shall have steel trowel finish. After surfaces have been floated, steel trowel with machine trowels to produce a smooth, dense, hard surfaces with close surface tolerances.

4. Learning Steps Area: Provide all new formwork and smooth trowel finish for exposed concrete in this area.

5. Control Joints: Sawcut control joints as shown on drawings. Maximum spacing of control joints 3000mm in each direction. Co-ordinate locations with finished floor control joints. Sawcut joints within 24 hours of placing and to a depth as detailed on drawings.

6. Provide sample for approval by the Consultant. Make every effort to ensure that colour of materials is constant throughout. Bush hammering shall be sufficient to expose the coarse aggregate. Sample shall be applied to actual surface of concrete walls which shall remain as a minimum standard upon acceptance by the Consultant.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Cast-In-Place Concrete: Section 03300
2. Structural Metal Framing Section 05100
3. Miscellaneous Metal Fabrication: Section 05500
4. Air Vapour Barrier Membrane: Section 07112
   Note: in order to maintain continuity and quality control, the supply and installation of the full project scope of vapour barrier membrane is to be carried by a single trade.
5. Building Insulation: Section 07212
6. Mix Specified for Filling Blocks: Section 03300

1.2 Reference Standards

1.	CSA-S304.1-04	Design of Masonry Structures
2.	CSA- A370-04 (R2009)	Connectors to Masonry.
3.	CAN/CSA-A371-04 (R2009)	Masonry Construction for Buildings.
4.	CSA A179-04 (R2009)	Mortar and Grout for Unit Masonry
5.	CSA-A82-06	Fired Masonry Brick From Clay or Shale
6.	CSA A165 Series-04	CSA Standards for Concrete Masonry Units.
7.	CSA G30.18-09	Carbon Steel Bars for Concrete Reinforcement
8.	CAN/CSA-A3000-08	Cementitious Materials Compendium
9.	ASTM A951/A951M-06	Standard Specification for Steel Wire for Masonry Joint Reinforcement
10.	ASTM C216-07a	Standard Specification for Facing Brick (Solid Masonry Units Made from Clay of Shale)
11.	ASTM C568-08a	Standard Specification for Limestone Dimension Stone
12.	ASTM A1064/A1064	Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
13.	ASTM C331-05	Standard Specification for Lightweight Aggregates for Concrete Masonry Units
14.	ASTM A153/A153M-09	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

1.3 Source Quality Control

1. Submit laboratory test reports certifying compliance of masonry units (and mortar ingredients) with specification requirements.

2. For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption for units proposed for use.

3. All masonry: mortar and grout is to be tested in accordance with CSA-S304.

1.4 Product Delivery, Storage and Handling

1. Ensure that materials are delivered to job site in dry condition.

2. Except where wetting of bricks is specified, keep materials dry until use.

3. Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

4. Store cement under cover. Keep dry and unfrozen.

5. Pile sand on platforms. Exclude foreign matter.

6. Materials stacked on floors of building shall not exceed structural design loads.

1.5 Cold Weather Requirements

1. Comply with Clause 6.7.2 of CSA-A371.

1.6 Hot Weather Requirements

1. Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

1.7 Protection

1. Until completed and protected by flashings or other permanent construction, keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain.

2. Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

3. Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

4. When air temperature has dropped below 0 degrees C (eg. Overnight), ensure that materials are above freezing and free from ice when installed.

5. Prevent work from freezing for at least 48 hours by enclosure, artificial heat, or other acceptable method.

6. Provide adequate bracing to walls during erection to prevent damage due to winds or other lateral loads.

7. Make good any damage to masonry work until completion of the work.

8. Build masonry in enclosures heated by approved smokeless means, when temperature remains below 0 degrees C. All materials shall be above 4 degrees when installed.

9. Demolish and replace masonry work damaged by freezing.

10. Supplement CSA-A371 as follows:

    .1 Maintain temperature of mortar between 5° C and 50° C until used.

1.8 Job Mock-up

1. Construct mock-up panel of exterior and interior masonry wall construction 2 m x 2 m showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar, application of membrane air vapour barrier, insulation and workmanship. Mock-up may be part of construction.

1.9 Submittals

1. Make submittals in accordance with Section 01340.

2. Submit samples of:

    .1 Masonry units (each type).
    .2 Veneer anchors.
    .3 Masonry reinforcement.
    .4 Mortar Colours.
    .5 Each masonry accessory.

PART 2 - PRODUCTS

2.1 Materials

1. **Concrete Masonry Units:**

    Must be "Bubble Cure" or autoclave process, modular metric size conforming to CSA Standard A165 series.
    Normal Weight - H/20/A/M, S/20/A/M.
    Lightweight - H/20/C/M, S/20/C/M.
    Use normal weight in below ground floor elevation. Use light weight for all above grade walls. All exposed corners to have bullnose units. All block to be uniform in color, shade and texture. Special shapes as required.

2. **Acoustical Concrete Masonry Units:**

   N/A

3. **Architectural Concrete Masonry Units:**
   .1 **Architectural Unit A**: Shouldice Text Stone Texture 190mm x 390mm x 90mm Acceptable equal by Arriscraft.

4. **Clay Brick Masonry Units:**

   .1 **All units**: Clay Brick, Grade "SW", by Meridian Brick, passing Test Methods specified in CSA-A82. Final selection to be confirmed by Architect. Acceptable Alternate by Brampton Brick.

   .2 **Brick Type "A"** (Field/Accent colour): Spadina – metric modular, by Meridian Brick. Norman size.

5. **Glass Block Units**:

   .1 Decora Units – Clear 190mm x 190mm x 90mm. Set in neoprene perimeter edging within aluminum window frames.

6. **Portland Cement:**

   .1 Type 10, in accordance with CSA A3001.

7. **Masonry Cement:**

   .1 Type "S" and shall comply with CSA A3002.

8. **Hydrated Lime**:

   .1 Type "S", in accordance with CSA A179.

9. **Aggregate:**

   .1 Fine grain aggregate, grading in accordance with CSA A179. When 6mm joints are specified, grain shall pass through a 1.18 mm sieve.

10. **Water:**
    .1 Ensure that water contains no salts which may cause efflorescence.

11. **Horizontal Masonry Reinforcing:**
    Welded truss type or ladder type, as specified from wire to ASTM A951, hot dipped galvanized after fabrication to ASTM A153-05, Class B2, minimum coating 457 G/m2, wire size 4.76 mm diameter. Reinforcing as per the following:
    - Single wythe walls Dur-O-Wal DW 100;
    - Double wythe walls (up to 390 in width) Dur-O-Wal DW 120;
    - Double wythe walls (greater than 390) Dur-O-Wal DW 220;
    - Cavity Walls Blok-Lok- Blok truss II - BL37 to accommodate 95 mm cavity with 64 mm

thick insulation. Use Blok-truss BL 30- or DW 100 if using Ferro slotted block ties. Similar reinforcing by Dur-O-Wal, Blok-Lok, and Hohmann & Barnard Inc. is acceptable.

12**. Reinforcing Bars:** billet steel to grade 400, deformed bars to CSA-G30.18.

13**. Brick Ties:**

.1 Hook type box ties, 4.76 mm galvanized steel wire, to be used in conjunction with Block-Lok Block-Truss II BL 37 at concrete block back-up wall.
.2 Ferro Slotted Rap-Ties 16 gauge sheet metal, hot tipped galvanized, with 4.76 mm hot tipped galvanized V-Ties – Use at concrete wall back-up, at wood parapet and where other ties are not practical.
.3 Ferro slotted block ties, 16 gauge sheet metal, hot-dipped galvanized, with 4.76mm hot-dipped galvanized V-ties to accommodate 95 mm cavity with 64 mm thick insulation. To be used in conjunction with horizontal reinforcing as specified under paragraph 2.10.

14. **Dampproof Course:** Modified bitumen flashing membrane, Blueskin SA manufactured by Bakor, or approved equal.

15. **Lateral Support Anchors:**

.1 **Vertical:**
.1 At intersection and abutting load bearing walls, use prefabricated corners and tees to match horizontal reinforcing.
.2 At intersection of non-load bearing walls with load bearing or non-load bearing walls, use corrugated galvanized ties.
.3 At wood parapet and similar conditions, use slotted Rap ties by Fero. Ensure ties extend a minimum of 50 mm into the brick or block outer wythe.
.4 At connection with existing masonry, use joint stabilization anchors by Dur-O-Wall D/A 2200.
.5 At control joints, use joint stabilization anchors by DUR-O-WALL D/A 2200.
.6 At connection with steel structure use weld-on column assembly D/A 709 and D/A 701 by DUR-O-WALL. Supply welded anchor to steel trade for installation.

.2 **Horizontal:** At underside of building structure use steel angles on both sides of partitions as specified in Section 05121 and detailed on structural drawings. Where not practical, use D/A 2200 joint stabilization anchors by DUR-O-WALL. Fasten to structure. Install at 800 mm O.C.

16. **Bolts and Anchors:** To CSA-A370.

17. **Natural Mortar:**

.1 **Generally:** Use materials only as specified in CSA A179. Ensure that weather and aggregate used in mortar, other than in walls buried in earth, will not cause efflorescence.
.2 **Mixes:** Mix mortars as specified in CSA A179 using the Proportion Specification.

.3 **Mortar Types:**
- .1 For masonry walls in contact with earth and bedding forbearing plates and lintels: Mortar Type "S".
- .2 For load-bearing walls: Mortar Type "S".
- .3 For brick: Mortar Type "N" (1:1:6) premixed "Betomix 1-1-6", portland cement, "S" type, hydrated lime as supplied by Daubois Inc., Jiffy Mortar Systems; Maxi-Mix 1-1-6 silo mortar; or approved equivalent. Mix on site with sand, water, and colour pigment.
- .4 For all other masonry walls, use regular Type "N" mortar.

.4 **Grout:** To CSA A179 Table 5.

18. **Colour Pigments:** Pigments constituted of ground colored natural aggregates or metallic oxide pigments, color by architect, the ratio of coloring agent/density of portland/lime shall not exceed 10%.

19. **Mortar Dropping Control Device**: "Mor-Control" manufactured by Dur-O-Wal or Mortar-Net.

20. **Weepholes**: 90 mm x 90 mm x 10 mm purpose made PVC, designed to drain cavities to prevent insects from entering. Colour to be chosen by Architect from manufacturer's full range.
21. Metal flashing at top of foundation wall and at exterior lintels: 24 gauge prefinished sheet metal with Stelco or Dofasco series 8000 finish – color to match brick. With self adhering membrane flashing at underside (Blue Skin SA).

PART 3 - EXECUTION

3.1 Workmanship

1. Build masonry plumb, level, and true to line, with joints in proper alignment.

2. Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3. Set out and build masonry work to the respective dimensions called for on the drawings. Build and lay the block true to line, and level, align vertical joints. Keep angles, reveals, etc. square and plumb.

4. Assume complete responsibility for dimensions of this work.

5. Construct masonry fire rated assemblies in accordance with tested design specifications.

6. Make all joints uniform, in line, square and plumb, with mortar compressed to form joints as specified.

7. Course units to bring wall to required elevations using even, uniform, horizontal and vertical joints of maximum 10mm thickness. Horizontal joints brick soldier coursing to suit adjacent running bond.

8. Check and co-ordinate location of all anchors, connections and built-in items.

9. Bond units at intersection of walls by horizontal prefabricated “tee” or corner reinforcing units.

10. Lay each solid unit in full bed or mortar. Fill vertical joints. Slushing of joints not permitted.

11. Base course to be solid concrete masonry units laid in full mortar bed.

12. Lay each hollow unit in full bed or mortar for face shells. Butter vertical joints full. When laying closure units, butter vertical units already in place instead of units being placed.

13. Lay exposed masonry units using blocks having square, unbroken edges and corners.

14. Tolerances:

    .1 Variation from mean plane: 6 mm when measured with 3000 mm straight edge.
    .2 Variation from plumb: 6 mm on any vertical line up to 6000 mm high.
    .3 Variation in wall opening sizes: 6 mm maximum.
    .4 Variation of building lines from plan: in any bay or 6000 mm maximum – 12 mm or in 1200 mm or more, 20 mm.

15. Lay out masonry units carefully so as to run as often as possible in full and half unit dimensions. All exposed ends shall match the finish of the faces.

16. All units cut around pipes, ducts, openings, etc. shall be accurately and neatly cut with a power carborundum wheel, and remaining voids shall be slushed full with mortar.

17. Make joints flush and smooth on both sides excepts where they are to be exposed to view. When exposed to view, tool the joints concave, unless otherwise noted.

18. Lay and set up all units carefully so that both faces of the walls are true and even. Do not use chipped or cracked units where exposed to view, even where the defect would not impair strength or durability.

19. Take particular care to keep cavities, weep holes, vents and exposed faces of all units free of mortar.

3.2 Tolerances

1. Clause 6.2 of CAN3-A371 applies except as follows: Walls to receive thinset ceramic tile: plumb within 1:600.

3.3 Exposed Masonry

1. Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.

3.4 Jointing

1. Concave joints, allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints.

2. Raked joints, where split rib blocks are used, allow joints to set just enough to remove excess water, then rake joints uniformly to depth of rib and compress with square tool to provide smooth, compressed, raked joints of uniform depth.

3. Where joints are concealed in walls and where walls are to receive plaster, tile insulation, or other applied material, except paint or similar thin finish coating, strike flush.

3.5 Weepholes

1. Install weepers at regular intervals at both top and bottom of walls as indicated on Drawings. Ensure weepers are clear and unblocked mortar.

3.6 Joining of Work

1. Where necessary to temporarily stop horizontal runs of masonry, and in building corner, Step-back masonry diagonally to lowest course previously laid. Do not "tooth" new masonry. Fill in adjacent course before heights of stepped masonry reach 1200 mm.

3.7 Cutting

1. Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects.

2. Make cuts straight, clean, and free from uneven edges. Use masonry saw where necessary.

3.8 Building-In

1. Build in items required to be built into masonry by other trades.

2. Prevent displacement of built-in items during construction. Check for plumbness, alignment, and correctness of position, as work progresses.

3. Brace door jambs to maintain plumbness. Fill door frame with concrete.

3.9 Wetting of Bricks

1. Except during winter, wet clay brick having an initial rate of absorption exceeding 1g/min/100mm^2; wet to uniform degree of saturation, to 24 hours before laying, and do not lay until surface is dry.

2. Similarly, wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

3.10 Support of Loads

1. Where concrete fill is used in lieu of solid units, use 20 MPa concrete to Section 03300.

2. Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.

3.11 Provision for Movement

1. Leave 5 mm space below shelf angles.

2. Leave 6 mm space and do not use wedges between tops of non-load bearing walls and partitions and structural elements.

3.12 Loose Steel Lintels

1. Install loose steel lintels. Centre over opening width.

3.13 Control Joints

1. Except as noted following, control joints required at maximum of 6000 mm o.c. in continuous walls having no openings, intersections or column locations. Refer to elevations for locations on exterior walls and advise Consultant of variances prior to executing the work. Control joints are not shown for clarity on the drawings for interior walls. If in doubt, request assistance from the Consultant.
2. At doorway locations, unless indicated otherwise on elevation drawings, use one side of doorway beyond lintel. Use building paper to prevent that end of lintel to bond.

3. Use standard block with concrete filled end core to form key. Line one side of core with building paper before filling core to prevent bonding. Complete vertical separation, full height and thickness of wall are required.

4. Stop masonry reinforcing at each side of the joints. Caulking specified in Section 07900.

5. At expansion joints in brick and veneer, install Rapid Expansion joint DA 2015, to leave vertical joint free of mortar to allow for horizontal expansion.

3.14 Horizontal Reinforcing

1. Horizontal reinforcing at 400 mm o.c. (every 2nd course), except solid walls greater than, or equal to 340 mm in width. At 340 mm, or greater, horizontal reinforcing at 200 mm o.c. (every course). Use prefabricated corners and tees at all intersecting load bearing walls.

3.15 Vertical Reinforcing

1. Install vertical reinforcing to size and spacing as shown on Drawings. Fill voids with 20MPa concrete.

3.16 Brick Ties

1. Install specified brick ties at maximum 800 mm horizontal and 400 mm vertical spacing.

3.17 Bonding

1. Walls of two or more widths: bond using metal ties in accordance with subsection 9.4 of CSA-A371.

2. Procedure approval by Architect.

3. In cavity walls, keep all cavity spaces free of mortar and debris by placing a wood strip on the ties. Retain strip on a wire line and pull up level and clean off droppings prior to placing next course of ties. Install mortar control device at 300 mm o.c. horizontally, in a staggered pattern so as to overlap each other on each side. Install in every 2nd course above foundation and shelf angles.

3.18 Sound and Fire Separation

1. All load bearing and non-load bearing partitions shall carry to the underside of structure above, except for allowing for deflection of structure.

2. All openings in partitions, even above ceilings shall be patched to maintain sound and fire separation.

3. In fire separations and sound separations, spaces between partition and structures to be firestopped or sound sealed under Section 07270.
4. Use U.L.C. labeled mortar for all patching in fire separations.

3.19 Dampproof Course Flashing

1. Install dampproof course flashing at ground floor elevation in all walls on foundations.

3.20 Testing

1. Masonry units to be tested in accordance with S304.1, Clause 15.1, for engineered masonry design, and in conformance with clause 15.1.2.

2. Mortar testing to be in accordance with S304.1, clause 15.2.

3. Grout testing to be in accordance with S304.1, clause 15.3.

3.21 Blockwork - General

1. Do not wet concrete block before laying.

2. Lay block with thicker end of face shell upward.

3. Lay interior block in running board, concave tooled joints.

4. Use solid block or hollow block filled with concrete for top 2 courses under point bearing loads extending minimum 200 mm each side of bearing and where indicated.

5. Install special shaped units where indicated.

6. In block walls install continuous trussed wire reinforcement, as noted.

7. Where resilient base is indicated, tool the joints to within 100 mm of the floor. Cut joints flush behind the base.

8. Extend all walls/partitions to underside of steel/concrete deck unless shown otherwise on drawings and as required. Co-ordinate wall locations with structure above and prior to commencing work, advise Consultant of interference.

9. When masonry walls are not built at once, the ends of the walls are to be raked back at an angle, or terminated at a control joint. Toothing will not be permitted.

3.22 Mortar

1. Measure loose damp ingredients accurately by volume. Place water in mixer, add half volume of sand, add cement, add remainder of sand, add water for plasticity. Mix for at least four minutes. Keep mixer clean.

2. Incorporate colour into mixes in accordance with manufacturer's instructions.

3. Use clean mixer for coloured mortar.

4. Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into a ball. Allow to stand for not less than 1 hour nor more than 2 hours then remix with sufficient to produce mortar of proper consistency for pointing.

3.23 Concrete Core Fill

1. All concrete block walls shall have vertical grout core fill each side of openings and where shown and as detailed on the drawings.

2. Core fill in walls shall extend from bottom bearing surface to underside of bond beams or structure.

3. Grout core fill shall be placed with a trunk or chute in maximum lifts 2000 mm. Compaction shall be by interior mechanical vibrator. All fill shall be placed in accordance with CSA A23.1.

4. Fill minimum ½ block core each side of frame from foundation to underside of lintels of all door openings over 1 metre wide.

5. Provide inspection openings in base of walls to be grouted. Make good to match adjacent block work after inspection and approval by Engineer.

3.24 Reinforced Block Lintels

1. Install reinforced concrete block lintels at all openings where steel lintels are not indicated in accordance with structural details.

2. Install shoring and bracing as required to openings prior to placing lintel units and concrete fill.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Installation of anchors in concrete and masonry: Section 03300 and Section 04200
2. Painting: Section 09900

1.2 Scope

1. Provide all miscellaneous metal items except those listed above Under Article 1.1.

1.3 Reference Standards

1. ASTM A167-99(2009) Standard Specification for Stainless and Heat-Resisting Chromium - Nickel Steel Plate, Sheet and Strip.
2. ASTM A325-09ae.1 Standard Specification for Structural Bolts, Steel, Heat-Treated, 120/105 ksi Minimun Tensile Strength.
3. ASTM A143/A143M-07 Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
4. ASTM A307-07b Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
5. ASTM A563-07a Standard Specification for Carbon and Alloy Steel Nuts.
6. ASTM A780/A780M-09 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
7. CAN/CSA-S16-09 Design of Steel Structures.
8. CSA W59-03(R2008) Welded Steel Construction (Metal Arc Welding).
9. CSA-G40.20-04/G40.21-04(R2009) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
10. ASTM A123/A123M-09 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
11. CISC/CPMA 2-75 Canadian Institute of Steel Construction/Canadian Paint Manufacturers Association-A Quick Drying Primer for Use on Structural Steel.
12. CAN/CGSB-1.40-97 Anticorrosive Structural Steel Alkyd Primer.

13. ASTM A53/A53M-07 — Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340 prepared and stamped by a Professional Engineer licensed to design structures in the Province of Ontario.

2. Clearly indicate materials, core thickness, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.

PART 2 - PRODUCTS

2.1 Materials

1. Metals:

   .1 **Steel sections and plates:** to CAN3 G40.21, Grade 350W for tubes and Grade 300W for plates and flat shapes.
   .2 **Welding Materials:** to CSA W59.
   .3 **Bolts and anchor bolts:** to ASTM A307, A325, and A563 as applicable.
   .4 **Stainless Steel:** Type 302 or 304 alloy conforming to ASTM A167, No. 4 finish.

2. Primers, Coatings and Shop Painting

   .1 **Interior Steel in Dry Areas:** Quick drying oil alkyd conforming to CISC/CPMA 2.75.
   .2 **Exterior Steel, Interior Steel in Unheated Areas, Steel Embedded in Concrete:** Hot dip galvanized conforming to ASTM A123, minimum Z275 coating.
   .3 **Galvanizing** of structural steel components and loose lintels: refer to Section 05120.
   .4 **Galvanized Coating Touch-Up:** W.R. Meadows “Galvafroid” or Kerry Industries “Z.R.C.” zinc rich coating or similar manufacturer containing minimum 90% zinc by weight.
   .5. Apply one shop coat(s) of primer or coating as indicated above and according to manufacturer’s recommendations. Do not prime aluminum, stainless steel or those components to be galvanized or encased in concrete.
   .6 Use primer unadulterated, as provided by manufacturer. Paint on dry surfaces free from rust scale and grease. Do not paint when temperature is lower than 10 deg. Celsius and rising.
   .7 Clean surfaces to be field welded; do not paint.

3. Fastenings

   .1 Use nuts and bolts conforming to ASTM A307, A325, and A563 as applicable.
      .1 For interior work, use cadmium-plated fastenings where other protection is not specified.
      .2 For exterior work, use Type 300 or 400 stainless steel.

4. Anchors and Shims

    .1 For exposed anchorage of aluminum, if applicable, use stainless steel and otherwise to match metal anchored. For non-exposed work, anchors and shims may be galvanized steel.

5. Pipe

    .1 To ASTM A53, extra strong steel pipe for bollards.

6. Bituminous Paint

    .1 Alkali-resisting, use to insulate contact between dissimilar metals.

2.2 Fabrication

1. Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

2. Weld all connections where possible, and bolt where not possible unless indicated otherwise on drawings.

3. Use self-tapping shake-proof countersunk flat headed screws on items required to be assembled by screws or as indicated.

4. Where possible, work to be fitted and shop assembled, ready for erection.

5. Exposed welds to be continuous for length of each joint. File or grind exposed welds smooth and flush.

6. Weld all stainless steel by the Argon Arc Process. Grind smooth and polish joints, crence-free, and flush without seams.

2.3 List of Miscellaneous Metal Fabrications

1. This Section includes, but is not limited to the following list. Note: **Galvanize all exterior items** and other items noted. Prime paint all interior items.

    .1 Anchors, Bolts, Inserts, Sleeves for work in this Section.
    .2 Hangers and Supports (for work in this Section).
    .3 Lintels (if not by Structural Steel).

PART 3 - EXECUTION

3.1 General

1. Supply and install all miscellaneous metal work indicated on the Drawings and not indicated in work of other Sections in addition to items listed below.

3.2 Fabrication & Erection

1. Erect metal work square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

2. Insulate metals, where necessary, to prevent corrosion due to contact between dissimilar metals and between metals and masonry or plaster. Use bituminous paint, butyl tape, building paper or other approved means.

3. Provide suitable and acceptable means of anchorage, such as dowels, anchor clips, bar anchors, expansion bolts and shields, toggles.

4. Make field connections with items specified in Articles 2.1.4 and 2.1.5 or weld to CSA S16.

5. Hand items to be cast into concrete or built into masonry over to appropriate trades together with setting templates.

6. Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection.

7. Touch-up galvanized surfaces with zinc primer where burned by field welding. Spray or brush apply a minimum of three (3) coats of zinc-rich paint to achieve a dry film thickness of 8 mils. Apply a finish coat of aluminum paint to provide a colour blend with the surround galvanizing.

3.3 Wall Benches and Upper Shelf

1. Steel Angles, Steel Channel, Flat Bar Steel, Steel Rod as indicated on details.

2. Use secure round head fasteners or countersink holes for flat head screws.

3. Prime paint: Galvafroid.

4. Chamfer cut ends of Rod 2 mm

3.4 Railings and Guards

1. Provide railings and handrails, as shown on Drawings.

2. Galvanize all exterior railings after fabrication.

3. Wall brackets, as shown, at 1200 mm o.c. maximum.

4. Set railing standards in concrete with heated liquid sulphur to fill hole. Remove overflow immediately.

3.5 Vanity Brackets

1. Angle steel frame, as shown on drawings - shop prime painted.

3.6 Wall Brackets and Hooks

1. As shown on Drawings - prime paint.

3.7 Galvanized Steel

1. Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with ASTM A123, minimum Z275 coating.

2. Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with ASTM A123.

3. Safeguard products against steel embrittlement in conformance with ASTM A143.

4. Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.

5. The composition of metal in the galvanizing bath shall be not less than 98.0% zinc.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Concrete Forming & Accessories: Section 03100
2. Commercial Steel Doors and Frames Section 08100

1.2 Source Quality Control

1. Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

PART 2 - PRODUCTS

2.1 Materials

1. **Wood Materials:** Material, straight, sawn square, true, dressed four (4) sides properly sized, shaped to correct dimensions from nominal sizes indicated or specified.

2. **Lumber: Use only grade marked lumber. Where left exposed, use best brand of lumber available.** lumber and moisture content to conform to official grading rules of NLGA, for particular lumber and grade, and structurally conform to latest requirements of Ontario Building Code. Conform to Grading Standards, CSA Standard Softwood Lumber 2005. Moist content not greater than 19% at time of installation.

3. **Blocking, Cants, Bucks, Grounds and Nailing Strips:** Douglas fir Graded 122-C, construction or No. 2 Pine, pressure treated in accordance with CSA 080 Series 08.

4. **Plywood:** Douglas fir plywood to CSA 0121-08, good one side with waterproof adhesive.

5. **Rough Hardware:** Nails, screws, bolts, lag screws, anchors, special fastening devices and supports required for erection of all carpentry components. Use galvanized components where exposed to exterior atmosphere.

PART 3 - EXECUTION

3.1 General

1. Do all wood framing in accordance with the Ontario Building Code, Engineering Design in Wood and CSA 086 - 01.

2. Machine dressed work shall be slow fed using sharp cutters and finished members shall be free from drag, feathers, slivers or roughness of any kind.

3. Frame materials with tight joints rigidly held in place.

4. Design construction methods for expansion and contraction of the materials.

5. Erect work plumb, level, square and to required lines.

6. Be responsible for methods of construction for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other trades.

3.2 Furring and Blocking

1. Supply and install furring and blocking, required.

2. Align and plumb faces of furring and blocking to tolerance of 1:600.

3.3 Rough Bucks, Nailers

1. Install wood bucks and nailers, as indicated, including wood bucks and linings around frames for doors and windows.

2. Except where indicated, otherwise, use material at least 38 mm thick secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm between.

3. Countersink bolts where necessary to provide clearance for other work.

3.4 Roof Fascias, Cants, Nailers, Curbs

1. Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing, sheet metal fork, roof mounted equipment.
   Refer to Section 07550 Modified Bituminous Roofing.

2. In reference to section 07550 Modified Bituminous Roofing, subsection 3.4 Carpentry and Section 07610 Sheet Metal Roofing: all wood blocking work related to roofing including but not limited to parapets, walls and curbs is by Section 06100 Rough Carpentry. The general contractor is responsible to turn over this work in a dry condition to roofing contractor for making watertight as part of roofing work. After acceptance, the roofing contractor is responsible to maintain water tightness.

3.5 Supports for Mechanical Units

1. Install wood blocking for prefabricated curbs for mechanical units to allow for a level installation on sloping roof.

3.6 Pressure Treated Wood

1. Use wood pressure treated in accordance with CSA 080 for all wood members in contact with exterior walls and roofs.

2. Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3. Fasten each slat to steel frames with 2 screws at top, bottom and at diagonal bracing.

3.7 Installation of Hollow Metal Frames

1. Set frames plumb and square in their exact location and at correct elevation. Firmly block and brace to prevent shifting. Shim up where required to ensure proper alignment dimensions from finished floor to head of frame. Install temporary wood spreaders at mid-height.

2. Where pressed steel frames are installed in concrete walls, secure frames to concrete using lead expansion shields and anchor bolts through pipe sleeves. Perform drilling of concrete as required. Fill recessed bolt heads flush to frame face with approved metal filler and sand smooth.

3. Install fire rated door frames in accordance with requirements of National Fire Code Volume 4, produced by The National Fire Protection Association (NFPA 80).

3.8 General

1. Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

End of Section

PART 1 - GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for new rough carpentry in accordance with Contract Documents.

1.2 Related Sections

1. Section 07520 SBS Modified Bituminous Membrane Roofing
2. Section 07620 Sheet Metal Flashing and Trim for Roofing
3. Section 07901 Joint Sealers for Roofing

1.3 References

1. CSA B111 / ASTM F1667 - Wire Nails, Spikes and Staples
2. ANSI/ASME B18.6.1 - Slotted and Recessed Wood Screws
3. ASTM A307-Carbon Steel Bolts & Studs
4. CSA O121 - Douglas Fir Plywood
5. CAN/CSA O141 – Softwood Lumber
6. CSA O151 – Canadian Softwood Plywood
7. CAN/CSA-080 Series - Wood Preservation
8. CAN/CSA-O325.0 – Construction Sheathing
9. Graded lumber must be in accordance with rules and regulations of the National Lumber Grades Authority (NLGA).

1.4 Operations

1. Do not interrupt or delay *Owner*'s operations.
2. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Provide perimeter barricades and tarpaulins, guardrails, overhead scaffolding and other necessary protection to ensure safety of occupants, public and site workers.
2. Temporarily protect interior spaces, where overhead work is proceeding, and provide dustproof and weatherproof partitions.

1.6 Shop Drawings

1. Submit shop drawings, stamped by a Professional Engineer, licensed in Province of Ontario, if members and securement are part of structural components.

1.7 Permits

1. If required, arrange and pay for all permits, notices and inspections necessary for the proper execution of work in this section.

1.8 Quality Assurance

1. Lumber shall be identified by grade stamp of an agency certified by Canadian Lumber
   Standards Accreditation Board.
2. Plywood shall be identified by grade mark in accordance with applicable CSA standards.

1.9 Lumber Requirements

1. Dimensions of lumber must conform to dressed sizes specified in CAN/CSA-0141. Dimensions specified and shown are nominal sizes.
2. Moisture content of lumber at time of installation must be S-DRY - maximum 19% moisture content.
3. Lumber must be sound and free of splits and deficiencies, which impair strength and durability.

1.10 Securement

1. Members shall be framed, anchored, fastened, tied and braced to provide necessary strength and rigidity.
2. All nails shall be long enough so that not less than half their required length penetrates into the second member.
3. Individual pieces must be secured with minimum of 2 fasteners at all corners.
4. Splitting of wood members shall be minimized by staggering nails in the direction of the grain and by keeping nails a minimum of 52 mm (2 in.) in from edges.

1.11 Waste Management and Disposal

1. Remove from site and dispose packaging materials at approved facilities.

PART 2 - PRODUCTS

2.1 Material

1. Wood Blocking: No.1 Exterior Grade, 52 x 52 mm (2 in. x 2 in.) 52 x 104 mm (2 x 4 in.), 52 x 152 mm (2 x 6 n.), 52 x 203 mm (2 x 8 in.), 52 x 254 mm (2 x 10 in.) and 52 x 305 mm (2 x 12 in.) and as noted on drawings/details.

2. Plywood Sheathing: 13 mm (1/2 in.) and 19 mm (3/4 in.), exterior grade, solid one side (G1S) unsanded, Veneer Grade B+. Moisture content of plywood shall not exceed 19% on a 'dry weight basis'.

3. Wood Cant: 75 x 75 mm (3 x 3 in.), No.1 Grade, Pressure Treated, exterior grade

4. Shims: Constructed from plywood sheathing or tapered wood blocking to provide minimum 10% slope to interior of roof surface, as indicated on drawings.

5. Wood Sleepers: Fabricated from wood blocking and plywood, configuration, sizes and length as detailed.

6. Fasteners: Are to be of sufficient length to penetrate concrete decks 52 mm (2 in.), metal decks 19 mm (3/4 in.) and wood decks 38 mm (1½ in.). Acceptable Material:

    1. Nails: No. 10 spiral shank, hot dipped galvanized.

    2. Wood and Metal Deck Screws (Low profile head):

        1. Roofgrip #14 Buildex by ITW Construction Products
        2. #14 Heavy Duty Drill Point Fastener by Tru-Fast.
        3. Rawl #14 Deck Screw by Rawlplug Canada Ltd.

    3. Masonry anchors (Robertson head):

        1. Tapcon Plus, 6 mm (1/4 in.) diameter, Climaseal coated by ITW Construction Products.
        2. Tap-Grip heavy-duty self-tapping concrete anchors by Perma-Grip Fasteners.
        3. Rawl PERMA-SEAL TAPPER, 6 mm (1/4 in.) diameter by Rawlplug Canada Ltd.

    4. Steel: Flat head, self-tapping steel screw with coated finish, FM Approved. Fasteners to be of sufficient length to penetrate crest of metal deck 20 mm +/- 5 mm (3/4" +/- ¼").

    5. Bolts, Washers and Nuts: Size as indicated on Drawings. Hot dipped galvanized, corrosion resistant finish, 12.5 mm (1/2") diameter unless otherwise noted.

PART 3 - EXECUTION

3.1 Preparation

1. Substrates shall be structurally sound to receive rough carpentry.

2. All wood framing shall be in accordance with Ontario Building Code or more stringent requirements noted within Contract Documents.

3.2 Installation

1. Cut and fit members accurately. Mitre all corners, leaving no space or unevenness greater than 3 mm (1/8 in.) between components. Lay out work to provide a uniform transition for insulation and membrane.

2. Install continuous plywood sheathing, wood blockings, cants, studs, nailers and continuous shims where required and detailed.

3. Shims to be of sufficient height to ensure a minimum ten percent (10%) positive slope is provided on all parapet walls and under cap flashings.

4. Erect members in position, align, level, square, plumb and secure permanently in place as specified. Brace work temporarily as required to maintain safely in place.

3.3 Fastening

1. Secure new wood with minimum of 2 fasteners at 457 mm (18 in.) on centre staggered, and as follows:
    1. Into masonry: masonry anchors.
    2. Into wood: wood screws.
    3. Into metal: metal screws.

2. Secure lumber as follows:
    1. All fasteners to be placed a minimum of 12 mm (1/2”) from any edge. Install fasteners in two rows in direction of grain, with each fastener offset from one another not less than 457 mm (18”) on centre.
    2. Offset and countersink all screw fasteners flush with surface of wood blocking being secured.
    3. Co-ordinate work to keep cutting and remedial work to a minimum.

3.4 Parapets/Perimeters/Walls/Curbs/Sleepers

1. Construct parapets, perimeters, walls, curbs and sleepers as detailed.

2. Provide new HVAC equipment wood sleeper supports. Width to be a minimum of 140 mm (5.5”). Length of sleeper to span between two framing members.

3. Where possible, maintain minimum height of 305 mm (12 in.) above finished roof surface for sleepers and curbs.

4. Install wood blocking for prefabricated curbs for mechanical units to allow for a level installation where deck is sloped.

3.5 Dividers and Movement joints

1. At dividers and movement joints, neatly cut plywood to required dimensions. Cutting shall be done by 'scoring' with carbide tipped utility tool/knife or circular saw with carbide blade. Smooth cut-edges with a wood rasp.

2. Secure plywood to substrate using appropriate fasteners, screws at 205 mm (8 in.) on centre each way and along perimeters. Maintain screws 13 mm (1/2 in.) from edges and maintain 3 mm (1/8 in.) gap between each piece of board.

3.6 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Rough carpentry: Section 06100

2. Painting: Section 09900

1.2 Reference Standards

1. Do millwork to Millwork Standards of the Architectural Woodwork Manufacturers' Association of Canada (AWMAC) Premium Grade.

1.3 Samples

1. Submit duplicate 300 x 300 mm samples of each type of paneling laminate, melamine and each type of solid wood or plywood to receive stain or natural finish.

2. Submit sample of each type of hardware specified in accordance with Section 01340.

3. Submit a typical prototype unit representative of the work of this section.

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.

2. Clearly indicate details of construction, profiles, jointing, fastening and other related details.

1.5 Qualification

1. Millwork manufacturer to have not less than 5 years proven first class experience in institutional millwork and shall be a member of AWMAC.

1.6 Warranty

1. Submit a two (2) year warranty for the work of this section against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 Materials

1. Softwood lumber: to CSA 0121-M1978 and National Lumber Grades Authority (NLGA) requirements, with maximum moisture content of 10% for interior work. Yard lumber select for natural finish of species, indicated to AWMAC premium grade.

2. Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements, moisture content of maximum 10% for interior work, of species indicated to AWMAC premium grade.

3. Hardwood plywood: to CSA 0115-1967 of thickness indicated, rotary cut face veneer, birch plywood, veneer core. Select veneers to provide book match veneer strips to be 240 mm wide minimum. Grade: Select White.

4. Nails and staples: to CSA B111-1974 galvanized for exterior work, interior high-humidity areas and for treated lumber; plain finish elsewhere. Use spiral thread nails except where specified elsewhere.

5. Particle Board core: to CAN3-0188.1-M, Grade R, 720 kg/m3 density in thicknesses indicated.

6. Book Match Veneer: strips to be 240 mm wide minimum.

2.2 Plastic Laminate

1. Conforming to CAN3-A172, General Purpose - standard grade (GP-S), 1.25 mm thick for tops, Post Forming - standard grade (PF-S) 1.25 mm thick for post forming. Balance all panels with 0.5 mm backing sheet (BK) by same manufacturer as face panel. Use waterproof adhesive capable of holding materials together without failure. Provide acid resistant grade where shown. Finish shall be “Velvatex” or “Suede” by Arborite, or equivalent manufactured by Formica, Durolam Ltd., “Wilson Art” as distributed by Meteor Plywoods Ltd., “Micarta” distributed by Montego Forest Products Ltd., “Nevamar” distributed by Ceratec Inc., or approved equivalent by Octopus Products Limited. Selections to be confirmed by Consultant.

2.3 Edge Banding

1. Solid polyvinyl chloride (PVC), 3 mm thickness x full width of panel edge, colour/pattern to match finished face of melamine panel or as selected by Consultant. All exposed edges of banding to be radiused to 2 mm radius after installation on panels. Submit sample of edge-banded panel with radiused edges to Consultant for approval prior to fabrication of architectural woodwork.

    .1 Acceptable Material: Solid PVC edging as manufactured by “Woodtape” Edge-Banding.
    .2 Acceptable Material: Solid PVC edging as manufactured by “Complast Inc.”

2.4 Cabinet Hardware

1. Furnish and install all hardware to custom casework as follows:
    .1 **Cupboard Doors - 19 mm thick:**

Hinges	200 Series 110° Salice	
Roller Catches	807N	2G (SgDr) Onward
Elbow Catches	T03222	C15 (DhDr)

Door Pulls	CBH235-3 1/2" C32D
Cupboard Locks	8703/8704 14a National

.2 **Drawers - 19 mm thick.:**

Drawer Slides	KV1300X length to suit
Drawer Pulls	CBH235-3 1/2" C32D
Drawer Locks	8703 - 14a National

.3 **Shelving:**

Plaster strips	KV255 Zinc Knape & Vogt
Shelf Clips	KV256 Zinc Knape & Vogt

.4 **Cupboard Doors - 35 mm thick:**

Hinges	F179 76x76 Stanley C15
Roller Catches	504N Onward C26
Surface bolt	043-4 X Angle Strike C15
Door Pulls	CBH245-4 1/2" C32D
Cupboard Locks	44F73-44FS3-626 Best Lock

.5 **Closet Rods and Flanges**
Rods: chrome finish, Ø 33 mm.
Flanges: chrome finish, closed flanges at both ends of rods.

2. This section shall also include accessories such as rubber door silencers (2 per drawer or door), and other items necessary for the completion of the millwork.

3. Cabinet Keying: Key all cabinet and drawer locks alike in each room, and different from other rooms.

2.6 Melamine Clad Cabinetwork

1. All cabinet frames whether for base, wall or tall floor standing cases, shall be fabricated so each is a self-contained module. Front side top and bottom, exterior and interior surfaces shall be finished allowing future relocation of any module, into any bench arrangement, without need of any additional finishing.

2. Gables and panels shall be fabricated from 19 mm thick melamine surfaced panels with a P.V.C. edging applied to exposed edges.

3. Bottoms shall be fabricated utilizing the same materials and edge finish as gables. Front edge will be edged with P.V.C. edging. All other edges will be thoroughly sealed and moisture proofed prior to attachment to gables.

4. Rails shall be fabricated and machined to join the gables and form a rigid cabinet frame.

5. Tops (applies to wall and tall units only) shall be fabricated utilizing the same material and edge finish as gables. Front edge will be edged with P.V.C. edging.

6. Toe kick rail shall have a 100 mm x 19 mm section, machined to receive four screw nails for attachment to bottom front edge of gables. Cabinet base shall be plywood attached to melamine cabinet separately, ensuring the melamine OSB centre core gables do not come in contact with the floor.

7. Backs in base cupboards shall be fabricated from a 6 mm thick melamine surfaced panel.

8. Backs in wall and tall cabinets shall be fabricated from 6 mm thick melamine surfaced panels securely glued and screw nailed into the check out provided in the backs of gables, tops, and bottoms.

9. All shelves shall be adjustable at 13 mm increments, and each will be supported by a shelf support resting in four pilaster strips attached to the gables.

10. Doors shall be fabricated from 19 mm thick melamine surfaced panels. All four edges shall be P.V.C. edging.

11. Drawer fronts shall be fabricated utilizing the same material and edge finish as doors. All four edges shall P.V.C. edging. Fronts will be secured to drawer bodies with five screw nails through the front of the drawer body into the core of the drawer front.

12. Drawer bodies shall consist of box construction fabricated from 13 mm birch plywood with solid birch edge, front, sides and back with a 6 mm hardboard bottom dadoed and glued into box members. Joint front, sides and back with carefully fitted glued and tenoned joints. Alternately, Blum Metabox drawer body and side can be used.

13. 35 mm thick doors shall be solid core with plastic laminate both sides and on all four edges, color and grain to match melamine.

14. Solid hardwood glazed door fronts and frames shall receive lacquer finish. Glazing shall be 3mm tempered clear glass. Benches are millwork only, no glazing.

15. **Finish:**

    .1 Melamine surfaced panels shall be finished both sides in the same colours, patterns, and grain as selected by the Consultant.
    .2 Solid hardwood glazed doors and drawer bodies shall be sanded, then sealer coated, and sanded with two finish coats of catalytic type acid resistant varnish.
    .3 Colour of all Melamine Cabinets to be Hardrock Maple.

2.7 Shop Fabrication

1. Shop install cabinet hardware.

2. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

3. Shop assemble work for delivery to site in size easily handled and to insure passage through building openings.

2.9 Plastic Laminated Tops

1. 19 mm thick particle board core with post-forming grade plastic laminate finish bonded with resorginal formaldehyde resin glue to a particleboard core. All countertop front face to return vertically 35 mm ± . All front and backsplash edges to be rounded.

2. Underside to receive a backing sheet, sanded one side and bonded same as surfacing material.

3. Exposed edges to be finished with same material as used for the top.

4. Drip grooves to be cut into underside of the top where exposed edges occur.

5. Splash backs, curbs and curb shelves are to be of similar construction as the tops.

6. Use acid resistant post-forming grade laminate, where indicated on drawings. Colour: black.

7. At all wall termination, provide backsplash return.

2.10 Solid Surface Window Sills + Countertops

1. To be 19mm solid phenolic sills from solid surfaces series, Corian manufactured by the DuPont Company. Solid surface to be nonporous, homogeneous material. Acceptable alternate: Formica

2. Covering panels should be 1/2 inch thick cast, nonporous, filled polymer, not coated, composite construction with through body colours, as indicated on drawings. Bullnose edge treatment to have 13 mm full bullnose.

3. Joint adhesive: Manufacturer's standard one or two-part adhesive kit to create inconspicuous, nonporous joints.

4. Sealant: Manufacturer's standard mildew-resistant, UL-listed silicone sealant in colours matching components.

5. Colour by Architect from standard colour palette.

6. Location: All renovated washrooms.

2.11 Moulding and Trims

1. Fabricate mouldings in maximum practical lengths to profile shown. Solid birch to receive varnish finish unless noted otherwise. Install with concealed fasteners.

PART 3 - EXECUTION

3.1 Installation

1. Set and secure all material and components in place, rigid, plumb and square.

2. Provide heavy duty fixture attachments for wall mounted cabinets.

3. Use draw bolts in countertop joints.

4. At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.

5. Apply water resistant building paper over wood framing members in contract with masonry or cementitious construction.

6. After installation, fit and adjust operating hardware for wood and laminated plastic cabinet doors, drawers and shelves.

End of Section

PART 1 - GENERAL

1.1 Section Includes

1. Note: in order to maintain continuity and quality control, the supply and installation of the full project scope of vapour barrier membrane is to be carried by a single trade.

2. Materials and installation methods of the primary air/vapour barrier membrane system.

3. Materials and installation methods of dampproof coursing and through-wall flashing membranes.

4. Materials and installation methods for the adhesion of rigid and semi-rigid insulating materials.

1.2 Related Sections

1.	Masonry:	Section 04200
2.	Building Insulation:	Section 07212
3.	Firestopping and Smoke Seal:	Section 07270
4.	Modified Bituminous Membrane Roofing:	Section 07520
5.	Sealants:	Section 07900
6.	Aluminium Windows:	Section 08520

1.3 Submittals

1. Prior to commencing the Work, submit documentation from an approved independent testing laboratory certifying that the air leakage and vapour permeance rates of the air/ vapour barrier membranes, including primary membrane and transition sheets, exceed the requirements of the National Building Code.

2. Prior to commencing the Work submit copies of manufacturers' current ISO certification.
   Membrane, primers, sealants, adhesives and associated auxiliary materials shall be included.

3. Prior to commencing the Work submit references clearly indicating that the membrane manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of fifteen years. Submit references for a minimum of ten projects.

4. Prior to commencing the Work submit manufacturers' complete set of standard details for the air/vapour barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.

1.4 Quality Assurance

1. Submit in writing, a document stating that the applicator of the primary air/vapour barrier membranes specified in this section is recognized by the manufacturer as suitable for the execution of the Work.

2. Perform Work in accordance with the manufacturer's written instructions of the air/vapour barrier membrane and this specification.

3. Maintain one copy of manufacturer's written instructions on site.

4. At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the air/vapour barrier membrane manufacturers' representative.

5. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air/vapour barrier sealants, primers, mastics and adhesives.

1.5 Mock-Up

1. Construct mock-up in accordance with Section 01340 - Shop Drawings, Product Data & Samples.

2. Provide mock-up of air/vapour barrier materials under provisions of Division 1.

3. Where directed by consultant, construct typical exterior wall panel, 2 m long by 2 m wide, incorporating substrate, window frame, attachment of insulation, and; showing air/vapour barrier membrane application details.

4. Allow 24 h for inspection of mock-up by consultant before proceeding with air/vapour barrier work. Mock-up may remain as part of the Work.

1.6 Pre-Installation Conference

1. Convene one week prior to commencing work of this section, under provisions of Division

1.7 Delivery, Storage and Handling

1. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

2. Store role materials on end in original packaging.

3. Store liquid air/vapour barrier material, adhesives and primers at temperatures of 5°C and above to facilitate handling.

4. Keep solvent away from open flame or excessive heat.

5. Protect rolls from direct sunlight until ready for use.

1.8 Co-ordination

1. Ensure continuity of the air/vapour barrier membrane system throughout the scope of this section.

1.9 Alternates

1. Submit requests for alternates in accordance with Division 1.

2. Alternate submission format to include:

    .1 Submit evidence that alternate materials meet or exceed performance characteristics of Product requirements and documentation from an approved independent testing laboratory certifying that the air leakage and vapour permeance rates of the air/ vapour barrier membranes, including primary membrane and transition sheets, exceed the requirements of the National Building Code.
    .2 Submit copies of manufacturers' current ISO certification.
    .3 Submit references clearly indicating that the membrane manufacturer has successfully completed projects on a annual basis of similar scope and nature for a minimum of fifteen years.
    .4 Submit manufacturers' complete set of standard details for air/vapour barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.

3. Submit requests for alternates to this specification a minimum of ten (10) working days prior to tender closing for evaluation. Include a list of ten projects executed over the past ten years.

4. Acceptable alternates will be confirmed by addendum. Substitute materials not approved in writing prior to tender closing shall not be permitted for use on this project.

PART 2 - PRODUCTS

2.1 Membranes

1. Transition and continuous wall envelope barrier membrane (Self-Adhering): Basis of design is Blueskin® SA as manufactured by Bakor, a SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, or approved equal,. For application temperatures down to - 12ºC use Blueskin® SA LT. Membrane shall have the following physical properties:
    .1 Thickness: 1.0 mm (40 mils);
    .2 Air leakage: <0.005 L/s•m² @ 75 Pa to ASTM E283-91;
    .3 Water vapour permeance: 2.8 ng/Pa.m².s (0.05 perms) to ASTM E96;
    .4 Low temperature flexibility: -30°C to CGSB 37-GP-56M;
    .5 Elongation: 200% to ASTM D412-modifed.

Approved Equal: Air-Shield LM by W.R. Meadows of Canada and AquaBarrier AVB / AquaBarrier AVB LT by IKO Industries.

2. Through-wall flashing membrane and dampproof course (Self-Adhering): Blueskin® TWF as manufactured by Bakor, a SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:
    .1 Film Thickness: 0.225mm (9.0 mils);
    .2 Puncture Resistance (film); 180N minimum;
    .3 Tear Resistance (film); 58N MD;
    .4 Air leakage: <0.005 L/s•m² @ 75 Pa to ASTM E283-91;
    .5 Water vapour permeance: 2.8 ng/Pa.m².s (0.05 perms) to ASTM E96;
    .6 Low temperature flexibility: -30°C to CGSB 37-GP-56M.

    Approved Equal: Air-Shield Thru-Wall Flashing by W.R. Meadows of Canada and AquaBarrier TWF by IKO Industries.

2.2 Primers

1. Primer for self-adhering membranes: For all temperatures, Blueskin® Primer as manufactured by Bakor, a synthetic rubber based adhesive type, quick setting, having the following physical properties:

    .1 Colour: Blue;
    .2 Weight: 0.8 kg/l;
    .3 Solids by weight: 35%;
    .4 Drying time (initial set): 30 minutes.

    Approved Equal: S.A.M. Adhesive / S.A.M. Adhesive LVC by IKO Industries

2. Primer for self-adhering membranes: For temperatures above -4°C, Aquatac™ Primer as manufactured by Bakor, or approved equal, a polymer emulsion based adhesive type, quick setting, having the following physical properties:

    .1 Colour: Aqua;
    .2 Weight: 1.0 kg/l;
    .3 Solids by weight: 53%;
    .4 Water based, no solvent odours
    .5 Drying time (initial set): 30 minutes at 50%RH and 20°C.

2.3 Adhesive

1. Liquid air seal mastic and insulation adhesive: Air-Bloc 21 or 230-21 Insulation Adhesive as manufactured by Bakor, a synthetic, trowel applied, rubber based adhesive type, having the following characteristics:

    .1 Compatibility: With air/vapour barrier membrane, substrate and insulation.
    .2 Air leakage: 0.013 L/s°m² @ 100 Pa.;

.3 Water vapour permeance: 1.7 ng/Pa.m^2.s. (0.03 perms);
.4. Long term flexibility: CGSB 71-GP-24M;
.5 Chemical resistance: Alkalis and salt.

PART 3 - EXECUTION

3.1 Examination

1. Verify that surfaces and conditions are ready to accept the Work of this section. Notify in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

3.2 Preparation

1. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spawled areas in substrate to provide an even plane. Strike masonry joints flush.

2. New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.

3. Where curing compounds are used they must be clear resin based without oil, wax or pigments.

3.3 Primer for Transition and Through-wall Flashing Membrane (Self-Adhering Type only)

1. Apply primer to poured concrete, metal and glass-faced wallboard substrates at rate recommended by manufacturer. Primer not required on concrete block.

2. Allow primer to dry prior to application of the membrane.

3.4 Transition Membrane (Self-Adhering Type)

1. Align and position Blueskin, or approved equal, self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all end and side laps.

2. Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings.

3. Promptly roll all laps and membrane with a counter top roller to effect seal.

3.5 Through-wall Flashing & Dampproof Coursing (Torch Applied)

1. Where torch applied through-wall flashing & dampproof coursing are indicated on drawings, install Blueskin® TG membrane on primed and prepared surfaces in accordance with manufacturer's written instructions. Approved equal AquaBarrier TG by IKO Industries

2. For through-wall flashing ensure membrane extends fully to the exterior face of the

exterior masonry veneer. Trim off excess as directed by the consultant.

3. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Membrane shall form continuous flashing and shall extend a minimum of 200 mm up the back-up wall.

3.6 Through-wall Flashing Membrane (Self-Adhering Type)

1. Align and position the leading edge of Blueskin® TWF self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls or self angles, partially remove protective film and roll membrane over surface and up vertically.

2. Press firmly into place. Ensure minimum 50mm overlap at all end and side laps.

3. Promptly roll all laps and membrane to effect the seal.

4. Ensure all preparatory work is complete prior to applying Blueskin® TWF.

5. Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the consultant.

6. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Membrane shall form continuous flashing and shall extend up a minimum of 200 mm up the back-up wall.

3.7 Heat Sensitive Transition Membrane (Self-Adhering Type)

1. Align and position Blueskin® SA self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all end and side laps.

2. Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings.

3. Promptly roll all laps and membrane with a counter top roller to affect seal.

3.8 Inspection

1. Notify consultant when sections of work are complete so as to allow for review prior to installing insulation.

3.9 Protection of Finished Work

1. Blueskin is not designed for exposure. Good practice requires covering as soon as possible.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Masonry: Section 04200

2. Air Vapour Barrier Membrane: Section 07112
   Note: in order to maintain continuity and quality control, the supply and installation of the full project scope of vapour barrier membrane is to be carried by a single trade.

PART 2 - PRODUCTS

2.1 Insulation

1. **Perimeter Foundation Insulation:** Extruded expanded polystyrene to CAN/ULC S701-11 CAN, Type 4, butt or shiplapped edges. For use at perimeter of building and at perimeter of basement areas above and below grade as well as at miscellaneous detail locations calling for rigid insulation.

   .1 Thickness 75 mm (3.0 in.) (RSI 1.76/R 10.0) - where so indicated.
   .2 Acceptable Material: "Styrofoam SM" as manufactured by Dow Chemical Canada Inc.
   .3 Acceptable Material: "Celfort 300" as manufactured by Celfortec Inc.

2. **Cavity Wall Insulation - Masonry:** Expanded polystyrene insulation to CAN/ULC S701-11, Type 4 butt or ship lapped edges. For use in cavity wall construction above and below grade.

   .1 Thickness 100 mm or as indicated.
   .2 Acceptable Material: "Cavitymate" Type 3 as manufactured by Dow Chemical Canada Inc.
   .3 Acceptable Material: "Celfort 300" as manufactured by Celfortec Inc.
   .4 Acceptable Material: 100mm Dupont Styrofoam Thermax Insulation Wall Sheathing

2. **Cavity Wall Insulation - Metal Panel:** water-repellent and semi-rigid thermal insulation to CAN/ULC-S702-97, formed of bonded basalt fibres. For use in cavity wall construction or portions thereof with metal panel or siding cladding.

   .1 Acceptable Material: 100mm "CavityRock MD" as manufactured by Rockwool Inc.
   .2 Acceptable Material: 100mm "MB PLUS" as manufactured by Fibrex Insulations Inc.

2.2 Adhesive

1. Type A: to CGSB 71-GP-24M plus Amdt-Nov.-83, compatible with respective rigid insulation, air, vapour and waterproofing membranes and recommended by manufacturer's. Use Bakor 230-21 rigid insulation adhesive with Blueskin air-vapour barrier.

PART 3 - EXECUTION

3.1 Workmanship

1. Install insulation after building substrata materials are dry, thoroughly clean and capable of providing a firm, uniform bonding surface.

2. Install insulation to maintain continuity of thermal protection to building elements and spaces.

3. Fit insulation closely around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

4. Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use longest possible lengths to reduce number of joints.

5. In multiple layer applications offset both vertical and horizontal joints.

6. Do not enclose insulation until it has been inspected.

7. Install semi rigid board to manufacturer's requirements.

3.2 Rigid Insulation

1. **Cavity Walls Above Grade**
   Press insulation in full contact with air/ vapour barrier membrane by installing plastic wedges “Wedge-Lok” between the masonry reinforcing and the insulation. Wedges at 400 mm o.c. vertically and horizontally. Apply adhesive on board edges and press boards tightly to prevent air infiltration between boards.

2. **Cavity Walls Below Grade**
   Apply adhesive to insulation board by bead method with 4 mm diameter beads at 350 mm o.c.

3. **Perimeter Insulation**
   Apply adhesive to insulation board by spot method with daubs 40 mm diameter x 25 mm high at 200 mm o.c. each way.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Metal Stud System: Section 09111

1.2 Samples

1. Submit duplicate 300 x 300 mm size representative samples of insulation materials in accordance with Section 01340.

PART 2 - PRODUCTS

2.1 Insulation

1. Mineral Fibre: to CSA A101-M83, Roxul AFB Stud Sound Insulation - thickness as indicated on drawings.

2. Approved Equal: Dow Corning sound batt.

2.2 Vapour Barrier Film

1. Polyethylene film to CAN2-51.33-M77, 6 mil thick. Tape for sealing as recommended by manufacturer.

2.3 Accessories

1. Sealant: to CGSB 19-GP-21M.

2. Adhesive: compatible with Vapour Barrier Film.

PART 3 - EXECUTION

3.1 Insulation Installation

1. Install insulation to maintain continuity of thermal protection to building elements and spaces.

2. Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

3. Do not compress insulation to fit into spaces.

3.2 Vapour Barrier Installation

1. Place polyethylene on warm side of insulation and tight to insulation.

2. Glue vapour barrier to framing members. Lap joints 150 mm minimum and tape seal. Ensure joints occur over framing members.

3. Tape seal areas where nails or staples penetrate vapour barrier.

4. Extend vapour barrier tight to perimeter of windows, door frames and other items interrupting continuity of membrane. Tape seal and seal with sealant.

5. Seal vapour barrier at points of penetration.

6. Vapour barrier to be continuous and pass in front of shear walls and precast concrete slabs.

End of Section

PART 1 GENERAL

1.1 SECTION INCLUDES

1. Materials and installation of Air/Moisture Barrier and EIF System of STO Classic NExT A100G or approved equal by Dryvit, Durabond and DuRock.
2. Specifications based on Durex-Insulite EW-17. Select by Durabond. Acceptable equal by Dryvit , STO or DuRock,.

1.2 DESIGN REQUIREMENTS

1. Wind Load

1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.
2. Design for wind load in conformance with code requirements.

2. Moisture Control

1. Prevent the accumulation of water behind the EIF system, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly.
   a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and doorsills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.
   b. Air Leakage Prevention-- provide continuity of air barrier system at foundation, roof, windows, doors and other penetrations through the system with connecting and compatible air barrier components to minimize condensation and leakage caused by air movement.
   c. Vapor Diffusion and Condensation-- perform a dew point analysis of the wall assembly to determine the potential for accumulation of moisture in the wall assembly as a result of water vapor diffusion and condensation. Adjust insulation thickness and/or other wall assembly components accordingly to minimize the risk of condensation. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

3. Impact Resistance

1. Provide ultra-high impact resistance to a minimum height of 6'-0" (1.8 m) above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Indicate the areas with impact resistance other than “Standard” on contract drawings.

4. Color Selection

1. Select finish coat with a light reflectance value of 20 or greaterJoints
2. Design minimum 3/4 inch (19 mm) wide expansion joints in the EIFS where they exist in the substrate or supporting construction, where the EIFS adjoins dissimilar construction or materials, at changes in building height, and at floor lines in multi-level wood frame construction.
3. Design minimum 1/2 inch (13 mm) wide sealant joints at all penetrations through the EIFS (windows, doors, etc.).
4. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, “Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish System (EIFS) Joints,” and that meets minimum 50% elongation after conditioning.

5. Design joints so that air barrier continuity is maintained across the joint and drain joints to the exterior.

5. Grade Condition

1. Do not specify EIFS below grade (unless designed for use below grade and permitted by code) or for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure.

6. Trim, Projecting Architectural Features and Reveals

1. All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the EIFS wall plane, protect the top surface with waterproof base coat. Avoid the use of trim and features that exceed the maximum allowable thickness of EPS permitted by code (typically 4 inches [100 mm]) unless approved by the code official. Periodic inspections and increased maintenance may be required to maintain surface integrity of EIFS on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate maintenance and minimize maintenance burden. Refer to Sto details 1.04a and 1.04b.

7. Fire Protection

1. Where a fire-resistance rating is required by code use EIFS overrated assembly
2. Refer to manufacturer's applicable code compliance report for other limitations that may apply.

1.3 QUALITY ASSURANCE

1. Manufacturer requirements

1. Member in good standing of the EIFS Industry Members Association (EIMA).
2. System manufacturer for a minimum of twenty (20) years.
3. Manufacturer ISO 9001 certified.
4. Manufacturer's wall assembly listed in Gypsum Association Fire Resistance Design Manual.

2. Contractor requirements

1. Engaged in application of EIFS for a minimum of three (3) years.
2. Knowledgeable in the proper use and handling of EFIS materials and listed by EFIS manufacturing as having attended EIFS continuing education.
3. Employ skilled mechanics that are experienced and knowledgeable in EIFS application, and familiar with the requirements of the specified work.
4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
5 Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with EFIS manufacturing published specifications and details and the project plans and specifications.

3. Insulation board manufacturer requirements

1. Recognized by EFIS Manufacturing as capable of producing insulation board to meet system requirements and hold a valid licensing agreement with EFIS manufacturing.
2. Listed by an approved agency.
3 Label insulation board with information required by EFIS manufacturing, the approved listing agency and the applicable building code.

1.4 DELIVERY, STORAGE AND HANDLING

1. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
2. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.
3 Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.5 COORDINATION/SCHEDULING

1. Provide site grading such that EIFS terminates above finished grade a minimum of 8 inches (203 mm) or as required by code.
2. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier.
3. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall and provide sill flashing.
4. Coordinate installation of windows and doors so air barrier components are connected to them to provide a continuous air barrier.
5. Install window and door head flashing immediately after windows and doors are installed.
6. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.
7. Install copings and sealant immediately after installation of the EIF system and when EIFS coatings are dry.
8. Attach penetrations through EIFS to structural support and provide watertight seal at penetrations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. Provide Air/Moisture Barrier, EIF System and accessories from single source manufacturer or approved supplier.
2. The following are acceptable manufacturers:
    1. Sto Corp.— Air/Moisture Barrier and EIF System
    2. Plastic Components, Inc.—Accessories
    3. CGC - Densgold sheathing.

2.2 AIR/MOISTURE BARRIER

1. Sto Guard—fluid applied air/moisture barrier for masonry substrates.

2.3 ADHESIVE

1. EFIS Manufacturing Recommended Adhesive—non-cementitious, acrylic based adhesive.

2.4 INSULATION BOARD

1. Nominal 1.0 lb/ft^3 (16 kg/m^3) Expanded Polystyrene (EPS) Insulation Board in compliance with ASTM C 578 Type I requirements, and EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board. Thickness 3 1/2".

2.5 BASE COAT

1. Durex Uniplast/Arcybond 'S'—one component ready mixed non-cementitious, fiber-reinforced acrylic base coat.

2.6 REINFORCING MESHES

1. Standard Mesh

1. Mesh--nominal 4.5 oz./yd^2 (153 g/m^2), symmetrical, interlaced open-weave glass fiber fabric made with minimum 20 percent by weight alkaline resistant coating for compatibility with EFIS manufacturing materials (achieves Standard Impact Classification).

2.7 PRIMER

1. EFIS manufacturing Primer—acrylic based tinted primer.

2.8 FINISH COAT

1. Architectural textured wall coating colour from standard selection chart.

2.9 JOB MIXED INGREDIENTS

1. Water--Clean and potable.

2.10 ACCESSORIES

1. Starter Track— Rigid PVC (polyvinyl chloride) plastic track.

PART 3 EXECUTION

3.1 INSTALLATION

1. Install Air/Moisture Barrier and EIFS in compliance with manufacturers published instructions.

3.2 PROTECTION

1. Provide protection of installed materials from water infiltration into or behind them.
2. Provide protection of installed materials from dust, dirt, and precipitation, freezing and continuous high humidity until they are fully dry.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Cast-in-Place Concrete: Section 03300
2. Masonry: Section 04200
3. Rough Carpentry (Architectural) Plywood: Section 06100
4. Gypsum Board: Section 09250
5. Firestopping and Smoke Seals for Mechanical Work: Division 15
6. Firestopping and Smoke Seals for Electrical Work: Division 16
7. Sound Seal at Gypsum Board Partition Section 09250

Note: Firestopping and Smoke Seals within mechanical and electrical assemblies are specified in Divisions 15 and 16. All other firestopping and smoke seals are the responsibility of this Section.

1.2 Reference

1. ASTM E814 - Test Method of fire tests of through-penetration firestops, Factory Mutual.
2. CAN4-S101M - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
3. CAN4-S115M - Standard Method of Fire Tests of Firestop Systems.
4. ULC - List of Equipment and Materials.

1.3 System Description

1. Firestopping Materials: CAN4-S115M ASTM E814 to achieve a fire protection rating as noted on Drawings.
2. It is the intent of this Section that in conjunction with Divisions 15 and 16 a competent, single source be responsible for the firestopping and smoke seals of the entire project.

1.4 Submittals

1. Submit a product data to requirements of Section 01340.
2. Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation, ULC design references.

3. Submit proposed type of fireproofing system for each location for approval by Architect. Fireproofing System must be appropriate to achieve expected appearance and finish.

1.5 Quality Assurance

1. Manufacturer: Company specializing in manufacturing products of this Section with minimum five years documented experience.

2. Applicator: Approved, licensed and supervised by the manufacturer of firestopping materials. Company with minimum five years documented experience.

3. Product: Manufactured under ULC Follow-up Program. Each container or package shall bear ULC label.

1.6 Regulatory Requirements

1. Conform to applicable code for fire protection ratings.

2. Provide certificate of compliance for authority having jurisdiction indicating approval.

1.7 Delivery, Storage & Handling

1. Deliver and store materials in a dry, protected area, off ground in original, undamaged, sealed containers with manufacturer's labels and seas intact.

1.8 Project & Site Conditions

1. Application temperature and ventilation as per Manufacturer's instructions.

1.9 Sequencing & Scheduling

1. Sequence work to permit installation of firestopping and smoke seal materials to be installed after adjacent work is complete and before closure of spaces.

PART 2 - PRODUCTS

2.1 Materials

1. A/D Firebarrier Firestop Systems, by A/D Fire Protection Systems Inc., capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended.

2. Mineral Wood Backing Insulation: ULC labelled, preformed non-combustible material (A/D Firebarrier Mineral Wool) by A/D Fire Protection Systems Inc.

3. Retainers: Clips to support mineral wool.

4. Firestopping Sealant: ULC labelled, single component silicone bases, A/D Silicone Firebarrier Sealant by A/D Fire Protection Systems Inc.

5. Firestopping Seal: ULC labelled, single component water-base seal, A/D Firebarrier Seal by A/D Fire Protection Systems Inc.

6. Firestopping Foam: ULC labelled, two components silicone foam, A/D Firebarrier RTV Foam by A/D Fire Protection Systems Inc.

7. Firestopping Mortar: ULC labelled, non-combustible fibre reinforced, foamed cement mortar, A/D Firebarrier Mortar by A/D Fire Protection Systems Inc.

8. Damming Material: In accordance with tested assembly being installed as applicable and as acceptable to authorities having jurisdiction.

PART 3 - EXECUTION

3.1 Examination

1. Examine surfaces to receive work of this Section and report any defects which may affect the Work of this Section.

2. Verify that openings are ready to receive the Work of this Section.

3. Confirm compatibility of surfaces to receive firestopping and smoke seal materials.

4. Beginning of installation means acceptance of existing surfaces and substrate.

3.2 Preparation

1. Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.

2. Prepare surfaces in contact with firestopping materials and smoke seals to manufacturer's instruction.

3.3 Application

1. Install firestopping and smoke seal material and components in accordance with ULC listing and manufacturer's instructions.

2. Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

3. Apply in sufficient thickness to achieve rating to uniform density and texture.

4. Provide temporary forming if required.

5. Tool or trowel exposed surfaces to a neat finish where required.

6. Remove excess material promptly as work progresses and upon completion.

7. Protect installed material until cured or set.

3.4 Cleaning

1. Clean adjacent surfaces of firestopping and smoke seal materials.

3.5 Field Quality Control

1. Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.6 Scheduling

1. Firestop and smoke seal at:

    .1 Penetrations through fire separations (rated and non-rated); masonry, concrete, and gypsum board partitions and walls.
    .2 Top of fire separations (rated and non-rated); masonry and gypsum board partitions.
    .3 Intersection of fire separation masonry and gypsum board partitions.
    .4 Control and sway joints in fire separation masonry and gypsum board partitions and walls.
    .5 Penetrations through fire separation floor slabs, ceilings and roofs, if applicable.
    .6 Openings and sleeves installed for future use through fire separations.
    .7 Refer to AD drawings for locations of fire separations.
    .8 Refer to AD725 for detail of top of wall fire separation assembly.

3.7 Sound Seal

1. At top of all non fire separations masonry partitions compress mineral wool and fill space between masonry and structure. Apply sealant on at least one side of the sound separation.

End of Section

Part 1 - GENERAL

1.1 Section Includes

1. Section includes for provision of labour, materials, equipment and services for the supply and installation of the SBS Modified Bituminous Membrane Roofing in accordance with Contract Documents.

1.2 Related Sections

1. Section 06110 Rough Carpentry for Roofing
2. Section 07620 Sheet Metal Flashing and Trim
3. Section 07901 Joint Sealers for Roofing

1.3 References

1. CGSB-37-GP-56M / ASTM D6164 / ASTM 6163 - Membrane, Modified, Bituminous, Prefabricated and Reinforced for Roofing.
2. CGSB 37-GP-9M / ASTM D41 - Primer, Asphalt for Asphalt Roofing, Dampproofing and Waterproofing.
3. CAN/ULC-S701 / ASTM C578 -Thermal Insulation, Polystyrene, Boards and Pipe Covering
4. CAN/ULC–S702 / ASTM C612 – Mineral Fibre Thermal Insulation for Buildings.
5. CAN/ULC-S704 - Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
6. CAN/ULC–S107 – Fire Test of Roof Covering.
7. ASTM E108/ANSI/UL 790–Standard Test Methods for Fire Tests of Roof Coverings.
8. CAN/CSA A123.21 – Dynamic Wind Uplift Resistance of Roof Membrane Systems.
9. CSA A231.1 / CSA A231.2 - Precast Concrete Paving Slabs.
10. CAN/CSA B149.1- Natural Gas and Propane Installation Code.
11. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
12. ASTM C1177- Glass Mat Gypsum Substrate for Use as Sheathing.
13. ASTM C1278 – Fiber Reinforced Gypsum Panels
14. Canadian Roofing Contractors Association (CRCA) – Specification Manual.

1.4 Shop Drawings and Other Submittals

1. Submit to *Consultant* for review, shop drawings, prior to commencement of work. Provide six (6) copies of the shop drawings. Indicate on shop drawings all insulation layers, slopes, crickets, insulation sumps and drainage patterns.

2. Submit Shop Drawings for: Tapered Insulation indicating on shop drawings all insulation layers, slopes, crickets, insulation sumps and drainage patterns.

3. Submit Shop Drawings for: Gas Line Supports and Roof Access Ladders, stamped by Professional Engineer licensed in province of Ontario.

4. **Submit Material List and Shop Drawings to *Consultant* for review <u>prior</u> to ordering materials and commencing Work.**

5. Construction Schedule: Submit required within 10 days of contract award.

1.5 Quality Assurance

1. Skilled trades and *Contractor*s having a minimum of five (5) years related experience shall execute roofing Work.

2. *Contractors* shall be approved applicators of system specified. Documentation shall be provided prior to commencing Work.

1.6 Roof System Compliance

1. Roof system meets requirements of CAN/ULC-S107 “Fire Tests of Roof Coverings’, Class A as listed in the ULC Directory.

2. Roof system is based on a 2-ply SBS Modified Bituminous Membrane System by Soprema Inc**.** IKO Industries is an acceptable alternate.

3. Alternatives from other manufacturers will be considered upon submittal and review of technical data sheets and fire resistance test results, and warranty specimen demonstrating product equality.

1.7 Insulation Requirements

1. Polyisocyanurate Roof Insulation Manufacturers shall be members of Polyisocyanurate Insulation Manufacturers Association (PIMA). Manufacturers shall submit documentation listing their LTTR values based on CAN/ULC and ASTM test methods for 2014.

2. When insulation thickness exceeds 69 mm (2.7 in.), it shall be installed in multiple layers. Minimum thickness for bottom layer shall be 33 mm (1.3 in.) and 38 mm (1.5 in.) for top layer.

3. In multiple layer applications, if thicknesses greater than 38 mm (1.5 in.) are required, thicker layer shall be installed in bottom followed by minimum 38 mm (1.5 in.) top layer.

4. Curing Time: Insulation shall be cured and delivered to site in accordance with Polyisocyanurate Insulation Manufacturers Association (PIMA).

1.8 Warranty

1. Provide Standard Form of Warranty including all labour, material and workmanship and a Preventative Maintenance Manual.

2. Warranty shall be for a **period of two (2) years** from date of Substantial Performance, as certified by *Consultant*.

3. Provide **ten (10) year** roof membrane manufacturer's Warranty for labour, materials and workmanship with from date of Substantial Performance.

4. Repair leaks into building or roofing assembly within 24 hours of notification. Repair all roof membrane deficiencies, including ridges, blisters, splits and bare spots.

5. Carry out all repair work during warranty period as directed by *Consultant* and at no additional cost to *Owner*. *Contractor* shall extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship.

6. Defects shall include but will not be limited to: leaking; failure to stay in place; lifting; blow off; deformation; and breaking of weathertight seals.

1.9 Delivery, Storage and Handling

1. All materials shall be delivered, stored and handled in accordance with the Contract Documents, be in original manufacturer wrapping with labels intact and clearly identifying the product.

2. All modified bitumen membranes that will be used for installation on a daily basis must be stored at a minimum of 15^{o}C (58^{o}F) for a period of at least 4 hours prior to application. Stand rolled materials on end and protect edges.

3. Materials transported, stored or handled in a manner that contradicts Contract Documents, shall not be installed at the Place of the Work, shall be marked and removed from site.

4. Insulation, vapour retarders and roofing membranes must be kept dry under protective coverings or stored in trailers.

5. **Plastic wrapping installed at the factory is not to be used as an outside storage cover**. Emulsions must be maintained at temperatures above freezing.

6. Immediately remove and dispose of wet materials off site. Do not hoist materials with straps/ropes that damage materials. Use specialty supports.

7. Hoist material to roof surface on a daily basis, for same day use. **Do not 'drop' materials during handling and installation.**

1.10 Environmental Requirements

1. Do not install roofing when temperature remains below 0ºF (-18ºC) for torch applications and 23ºF (-5ºC) for asphalt applications.

2. Removal and installation of any roof components during inclement weather is not permitted.

1.11 Scaffolding, Ladders and Conveyances

1. Provide scaffolding, ladders and conveyances required for execution of Work and in accordance with the Contract Documents. Provide all hoisting equipment and barricades required to complete the Work.

2. Construct and maintain scaffolding in accordance with authorities having jurisdiction. If required, have scaffolding designed and stamped by Professional Engineer licensed in Province of Ontario.

1.12 Safety Barriers and Fire Protection

1. *Contractor* shall provide upstanding barrier protection at all perimeters, eaves and parapets. **Mesh, screen and tarpaulins shall also be provided to** prevent debris from blowing or falling over edge. Barriers shall be adequately constructed and secured to prevent toppling over.

2. Fire extinguishers must be on site within 3 m (10 ft.) and at same level as torch applicator. Maintain adequate fire watch (as recommended by membrane manufacturer) after each days roofing operations cease.

3. Torches must never be placed near combustible or flammable products. Torches should never be used where flame is not visible or cannot be easily controlled.

4. Never apply the torch directly to old and wood surfaces. Maintain adequate fire watch (as recommended by membrane manufacturer) during work and after each days roofing operations cease.

5. **Maintain minimum two (2) hour fire watch after torch applications have been completed.** Provide additional protection as required.

6. **Prior to leaving site, use digital thermometer to scan roof surface temperature for 'any hot spots' and address them accordingly.**

1.13 Protection

1. On a daily basis, provide interior protection to equipment, services, material, floors and walls by use of polyethylene or drop sheets, tape, tarps, plywood sheathing or other means to effectively protect contents.

2. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned shall be replaced at no cost to *Owner.*

3. Protect work of other sections from damage while performing roofing work. Provide tarpaulins and other coverings, as required, to protect lower and adjacent walls, finishes and surfaces. Additional protection shall be provided if instructed by *Consultant*.

4. Work is to be performed on occupied buildings. Take all reasonable precautions to protect against entry of elements and persons to unauthorized areas.

5. Prevent precipitation and debris entering openings and drains during work. Prevent damage to site, roads, curbs and building elements.

6. Protect finished roof surfaces with minimum 13 mm (1/2 in.) plywood sheathing with 25 mm (1 in.) polystyrene insulation board on underside.

7. Damaged areas and surfaces shall be repaired to satisfaction of *Consultant* at no additional cost to *Owner*.

1.14 Temporary Facilities

1. Provide temporary storage facilities for materials, tools and equipment. Location to be approved by *Owner*.

2. Provide temporary washroom facilities for workers. Secure portable washrooms to adjacent fences or walls to prevent toppling over.

3. Ground work stations shall be fully enclosed by temporary fencing and be manned at all times.

4. **Disposal bins shall be located minimum 2 m (6’-6”) away from building walls.**

1.15 Fastenings

1. Fasteners, anchors and adhesives shall be of appropriate size and type and must be used in sufficient quantity to provide positive and permanent anchorage of component.

2. Fastenings which cause spalling or cracking of material to which anchorage is being made are not permitted. **Powder-actuated** fastening devices are not permitted on this project. Only low velocity plunger-type devices are permitted.

1.16 Wiring Within Roof Assembly

1. If electrical wiring is encountered within roof assembly, Consultant and Owner shall be contacted immediately.

Part 2 - PRODUCTS

2.1 Material

1. Primer:

    1. Asphalt Cutback Primer
    2. Self-Adhesive Membrane Primer: Elastocol Stick by Soprema Inc.
       Approved equal: S.A.M. Adhesive by IKO Industries
    3. Modified Membrane Primer: Elastocol 500 by Soprema Inc. Approved equal by IKO Industries
    4. Metal Deck Primer: Rustguard Q.D. Shop Coat Primer by Devoe Coatings.

2. Thermal Barrier: Fibreglass mat faced panel with a specially treated gypsum core that resists moisture. Minimum 13 mm (1/2") thickness. Accepted products:

    1. Dens-Deck Prime Roofboard by Georgia-Pacific
    2. Approved Alternate

3. Mechanical Fasteners For Thermal Barrier and Base Layer Insulation**:**
   Factory Mutual (FM) Class 1, No.12 coated screws and 75 mm (3 in.) galvanized metal plate. Fasteners to be of sufficient length to penetrate through crests of metal deck 19 mm (3/4 in.).

4. Vapour Retarder:

    1. On Metal Decks: Sopravap'r and Elastocol Stick Primer by Soprema Inc.
       Approved equal: M.V.P. and S.A.M. Adhesive by IKO Industries

    2. Concrete Decks: Elastophene SP 2.2 by Soprema Inc.
       Approved equal: Torchflex TF 95 –SF-Base by IKO Industries

5. **Base Insulation:** 79 & 75 x 1220 x 1220 mm (3.1 in. & 3.0 in. x 4 ft. x 4 ft.), comprising of rigid closed cell polyisocyanurate foam core, bonded with **all fibre glass reinforced facer on each side**. Minimum long-term thermal resistance for 2014 material (LTTR) of RSI 1.00 (R 5.7) per 25 mm (1 in.) thickness. Provide 63 mm & 50 mm (2-1/2 in. & 2 in.) for 1220 x 1220 mm (48 x 48 in.) to create sump at drain.

    1. SOPRA-ISO by Soprema Inc.
    2. IKOTherm III by IKO Industries
    3. AC Foam III by Atlas Corporation Ltd.
    4. H-Shield by Hunter Panels

Note: All polyisocyanurate insulation boards shall be provided by one manufacturer with same production dates and lot numbers and letter submitted regarding claimed R-values.

6. Insulation / Overlay Board Adhesive: A high elastomeric, two part component, one step low rise foamable adhesive that contains no solvents.

    1. Duotack by Soprema Inc.

    2. Millennium Adhesive by IKO Industries

7. Tapered Insulation, Crickets, Backslope and Sumps: Fabricated from rigid closed cell polyisocyanurate foam core, bonded with **all fibre glass reinforced facer on each side** to layouts and slopes (0.5%, 0.75%, 1.0%, 2.0% or 4.0%) as indicated on drawings. Minimum thickness 13 mm (1/2 in.). 1220 x 1220 mm (4 x 4 ft.).
Provide 2440 x 2440 (8 x 8 ft.) tapered sump at 1% at all drain locations)

    Acceptable Suppliers:

    1. Accu-Plane Enterprises Inc.

    2. Posi-Slope Enterprises Inc.

    3. SOPRA-ISO Tapered by Soprema Inc.]\

    4. IKOTherm III Tapered by IKO Industries

    Filler pieces shall not exceed 63 mm (2.5 in.) per layer and same as tapered.

8. Overlay Board/Membrane Base Sheet: 14.7 x 914 x 2440 mm (9/16 in. x 3 ft. x 8 ft.) a high performance panel comprised of a non-woven polyester base sheet factory laminated to a high density mineral fibre insulation board, with thermofusible top surface.

    1. Xpress Board HD by Soprema Inc.

    2. High density mineral wool fibre board and Modiflex MP-180-FS Base by IKO Industries installed on-site

9. Protection Board for Flashings: 6.4 x 1220 x 1524 mm (1/4 in. x 4 ft. x 5 ft.) semi-rigid protection board composed of a mineral fortified asphaltic core formed between two saturated fibreglass felts.

    1. Sopraboard by Soprema Inc.

    2. Protectoboard by IKO Industries

10. Modified Bituminous Membrane Base Sheet Flashings for precast hollow core slab.

    1. Sopralene Flam Stick and Elastocol Stick Primer.
    Approved equal: Armourbond Flash HD and S.A.M. Adhesive by IKO Industries

2. Sopralene Flam 180 by Soprema Inc. (Flanges, End Laps, Patching). Approved equal: Torchflex TP-180- FF Base by IKO Industries

11. Modified Bituminous Membrane Liquid Flashings: Polyurethane/bitumen resin 'Alsan Flash' and 152 mm (6 in.) wide fabric reinforcement by Soprema Inc. Approved Equal: MS Detail by IKO Industries

12. Modified Bituminous Membrane Cap Sheet and Cap Sheet Flashings: Sopralene Flam 250 FR GR by Soprema Inc. (Grey Colour). Approved Equal: Prevent TP HD Cap by IKO Industries

13. Mastic: Sopramastic by Soprema Inc. Approved equal: AquaBarrier Mastic by IKO Industries.

14. Pitch-Pans:

    1. Sopramasrtic Block and Sopramastic PF sealant by Soprema Inc.
    2. ChemCurb System by Chem Link, which shall include sealer and filler.
    3. Fabricated from 0.71 mm (24 gauge) stainless steel, 102 mm (4 in.) high with 152 mm (6 in.) wide flanges, all seams continuously soldered. Allow 52 mm (2 in) gap all around protrusion for pitch-pan filler.

15. Sopraguard Tape: Self-adhesive, flame-stop tape with glass mat reinforcement. Approved equal: Modiflex Roof Tapes by IKO Industries

16. Round Top Cap Nails: Ardox spiral shank with 25 mm (1 in.) steel washer

17. Bulk Granules: Coloured granules in bulk to match cap sheet.

18. Rough Carpentry: As per Section 06 10 00 – Rough Carpentry.

19. Metal Flashing: As per Section 07 62 00 – Sheet Metal Flashing and Trim.

20. Sealants: As per Section 07 92 00 – Joint Sealers.

2.2 Roofing Accessories

1. New Roof Drain: refer to mechanical specified

2. Drain/Plumbing Couplings: 'Fernco Flexible Coupling', of appropriate size and type to suit site conditions by Fernco Connectors Ltd.

3. Vent (Soil) Pipe Sleeves: 1.6 mm (0.64 in.) thick, 75 or 102 mm (3 or 4 in.), one piece spun aluminum pre-insulated stack jack. To be minimum of 305 mm (12 in.) above finished roof surface. Diameter to suit site conditions. Acceptable Material:

    1. SJ-38 Insulated Stack Jack Flashing by Thaler Metal Industries Ltd.

4. Storm Collars and Clamps: Fabricated from same material as exhaust stacks and sleeves, with continuously soldered seams and extending a minimum of 52 mm (2 in.) down face of sleeve. Allow 6 mm (1/4 in.) gap between storm collar and sleeve.

5. Precast Concrete Pavers: 52 x 610 x 610 mm (2 x 24 x 24 in.) “Brooklin Roof Ballast’ slabs with Built-In Pedslab Pedestal System”, as manufactured by Brooklin Concrete Products Limited. Colour to be natural with standard diamond texture.

6. Paver / Gas Line Support Pedestals: 25 mm (1 in.) “Roofmate” as manufactured by Dow Chemical Canada Ltd. or Foamular 250 by Owens-Corning.

7. Sprayed polyurethane foam insulation: one component polyurethane foam insulating sealant.
    1. ENERFOAM by Abisko Manufacturing Inc.
    2. Duotack by Soprema Inc.
    3. Millennium Adhesive by IKO Industries

8. Mineral Batt Insulation: Rockwool Mineral Batt, of size and thickness to suit site requirements.

9. Aprons: Fabricated from 0.87 mm (0.034 in.) galvanized metal flashings to profile detailed.

10. Butyl Tape: 3 mm x 13 mm (1/8 x 1/2 in.) wide elastomeric butyl rubber.

11. Termination Bar: 3 mm x 25 mm (1/8 x 1 in.) 11 gauge extruded aluminum.

Part 3 - EXECUTION

1.1 Workmanship

1. Do work in accordance with Canadian Roofing Contractors Association Roofing Specifications Manual (CRCA) and Manufacturer’s requirements **except as specified within Contract Documents and to approval of *Consultant*.**

2. More stringent requirements shall govern.

1.2 Examination and Preparation

1. Examine site conditions and surfaces to ensure that they are in satisfactory condition for the commencement of Work of this section.

2. Ensure that substrates are smooth, clean and dry. Clean surfaces of all substances, which may be detrimental to new roof system. Clean adhesives with solvent and allow vapours to dissipate prior to membrane application.

3. Application of the Work, or any part of it will constitute acceptance of conditions upon which work is to proceed.

1.3 General Requirements

1. Complete new roof system, including vapour retarder, insulations and membrane and membrane flashings to each day's termination point and install temporary water cut-off. Remove water cut-off when work resumes.
2. No materials will be installed during inclement weather, rain or snowfall.
3. **Phased construction is not acceptable.**

1.4 Primer

1. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence.
2. Apply primer to curbs, wall, wood and metal at a minimum rate of 0.2 to 0.3 litres/m^2 (0.5-0.75 gal / 100 sq. ft.) with roller or spray. Do not allow primer to puddle.
3. Prevent primer from entering building interior through openings and joints in metal decks, by installing self-adhesive membrane at roof perimeters, walls, curbs and other roof openings.
4. Allow primer to cure prior to application of new roofing membrane or membrane flashings as detailed. Do not accelerate drying time by use of flame.
5. Self-adhesive membranes must be applied same day as primer.

1.5 Thermal Barrier (Canopies Only)

1. Apply thermal barrier in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners.
2. Thermal barrier shall be immediately placed into adhesive bead before a film (skin) starts to form on the adhesive bead. Install new thermal barrier panels with sides and ends supported by deck flutes and with panels placed together with moderate contact. Cut boards cleanly, avoid breaking boards to conform to roof layout.
3. Stagger end joints of adjacent rows of boards. Use largest pieces possible but no piece shall be smaller than 305mm x 305mm (12 in. x 1 in.). Fill in voids larger than 6 mm (1/4 in.) with spray foam or batt insulation.

1.6 Vapour Retarder

1. At all roof perimeters, walls, curbs, dividers, movement and control joints and penetrations, **provide 200 mm (8 in.) self-adhesive reinforcing vapour retarder to seal openings/gaps at junction of wall and hollow core precast concrete slab, to prevent primer/asphalt seepage into building.**

2. **Roll out vapour retarder on clean and fully primed surface.** Peel back first 1000 mm (3 ft.) of release paper and adhere vapour retarder in place. Hold vapour retarder tight and peel off remaining release film diagonally.

3. Apply additional rolls in similar fashion and maintain 75 mm (3 in.) side laps and 150 mm (6 in.) end laps. **Side laps shall bear on solid wood or crest of deck.** Roll vapour retarder onto deck and ensure all laps are sealed.

4. Seal vapour retarder to all penetrations by use of self-adhesive vapour retarder for all occasions. Prime surfaces as required.

5. **Vapour retarder shall provide a continuous and watertight seal if being used as a temporary roof.**

1.7 Base Insulation

1. Install first layer of base insulation over vapour retarder and mechanically secure into substrate to Factory Mutual FM 1-90 requirement layout pattern of five (5) fasteners per 1220 x 1220 mm (4 x 4 ft.) board, as per layout on drawing. Maintain fasteners a minimum of 150 to 305mm (6 to 12 in.) from all perimeters and corners. Provide 50% more fasteners for 2440 mm (8 ft.) perimeters and 75% more at corners for 3660 mm (12 ft.) each way.

2. Ensure fasteners adequately engage and penetrate crest of metal deck 19 mm (3/4 in.) or embedded into wood deck 25 mm (1 in.). Fasteners that do not engage the substrate, shall be removed and re-installed. **Do not overdrive or underdrive fasteners.**

3. Apply second and subsequent layers of insulation in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners.

4. Insulation shall be immediately placed into adhesive bead before a film (skin) starts to form on adhesive bead.

5. **Stagger all joints in insulation boards within each adjacent layer and between lower and upper layers. Walk insulation into low rise adhesive to achieve solid bond, immediately after placement.**

6. Score and cut boards as required at all undulations in substrate to allow for full contact and walk in place to ensure full adhesion. At junction with wood blocking at parapets, walls and curbs, neatly trim insulation to suit profile of wood assembly and to provide a tight/butt joint.

7. Base insulation shall be reduced 13 mm (1/2 in.) for 1220 mm (4 ft.) centred at drain sump as noted on drawings. Transition shall be ‘shaved’ to provide a smooth surface for tapered insulation or overlay board.

8. Install insulation boards ensuring panels are tightly butted and end joints between panels are staggered 610 mm (24 in.), each way.

9. Cut insulation boards to fit snugly at all perimeters, roof openings, etc., but not oversized to damage the vapour barrier during installation.

10. Do not lay more insulation boards than can be covered with roof membrane base sheet on same day. Insulation, which is damaged by moisture, shall be marked and promptly removed from site.

1.8 Tapered Insulation

1. Tapered insulation shall be applied over base insulation and under overlay board.

2. Install tapered insulation, sumps, crickets and backslope in low rise foam adhesive. Use designed applicator and apply adhesive at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft.) perimeters and at 100 mm (4 in.) at 3050 mm (10 ft.) corners.

3. Insulation shall be immediately placed into adhesive bead before a film (skin) starts to form on the adhesive bead.

4. **Tapered sump shall be installed in its entirety same day.** Under no circumstance shall sump be installed in more than one application as to build-in a high point within sump area.

5. Install insulation ensuring panels are tightly butted and walk insulation low rise foam adhesive to achieve solid bond, immediately after placement.

6. Do not lay more insulation than can be covered with base sheet / overlay board on same day.

1.9 Overlay Board / Membrane Base Sheet

1. Top layer of base insulation shall be free of rust, dust or any residue that may hinder adherence of the base sheet / overlay board.

2. Apply overlay board in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners.

3. Allow adhesive to slightly rise and then embed insulation into place and weigh down till good adhesion is attained.

4. Stagger side and end joints to adjacent boards and to underlying insulation joints. Immediately after placement, walk boards into adhesive to achieve solid bond.

5. Gradually peel back silicone release paper at laps, pressing down on membrane with an aluminum applicator to ensure good contact and adhesion. Heat weld exterior 25 mm (1 in.) edge of side lap with a hot-air gun or torch flame.

6. Where there is no factory lap, seal butt ends with a minimum 150 mm (6 in.) torch grade membrane base sheet centred over the lap to provide a watertight seal.

7. Roll side and end laps to ensure adequate adhesion in the self-adhesive laps of membrane. Laps shall be installed to shed water, commencing from low point and working upslope.

8. Do not lay more boards than can be covered with roof membrane base sheet on same day. Boards that are damaged shall be marked and promptly removed from site.

1.10 Protection Board on Perimeter Flashings, Mechanical Curbs, Sleepers, etc.

1. Install protection board in adhesive and mechanically fasten to substrate.

1.11 Roof Membrane Base Sheet Flashings

General Application Guidelines

1. Torch off poly of underlying membrane base sheet prior to primer application.

2. Apply appropriate primer to surfaces that are to receive membrane flashings at rates recommended by manufacturer. Allow primer to ‘flash off’ prior to membrane flashing application.

3. Apply membrane base sheet flashings in general conformance with details commencing from low point and working up-slope. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps. Laps shall be installed to shed water. Side laps shall be staggered minimum 305 mm (12 in.) from underlying membrane base sheet laps.

4. Apply base sheet in maximum 1 m (3.25 ft.) wide strips. Extending minimum of 150m (6 in.) beyond toe of cant (or vertical transition) and onto field of roof.

5. At wall and curbs, provide mechanical fasteners within laps of base sheet flashing, prior to applying succeeding sheet. Fasteners shall be installed at maximum 100 mm (4 in.) on centre commencing from 200 mm (8 in.) above roof membrane.

6. Extend modified bituminous base sheet over parapet, perimeter and eaves down outside face of walls 38 mm (1 ½ in.) onto lower substrate. Secure membrane flashing with large head galvanized nails at 150 mm (6 in.) on centre.

7. At exterior face of parapets / perimeters, apply self-adhesive base sheet flashing, to provide continuous cover over exposed wood and joints between substrates as detailed. Overlap self-adhesive base sheet under overhang of membrane base/cap sheet flashings at top edge of parapets / perimeters.

8. Repair defects in applications with additional piece of self-adhesive base sheet. Carry out repairs to satisfaction of *Consultant.*

Torching Applications

9. **Fully torch base sheet flashing to underlying membrane base sheet**. Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps.

Self-Adhesive Applications

10. Apply self-adhesive base sheet flashing onto primed surfaces and roll into place with adequate pressure to ensure full contact and adhesion with substrate. Membrane must be rolled into place using manufacturer's approved roller.

11. Peel back 100 to 150 mm (4 to 6 in.) of silicone release paper to hold membrane in place. Gradually peel back remaining silicone release paper, pressing down on membrane with an aluminum applicator to ensure good contact/adhesion.

12. Heat weld exterior 25 mm (1 in.) of all side and end laps providing a 3 mm (1/8 in.) bitumen bleed out.

13. Thoroughly and effectively roll membrane (using manufacturer's recommended steel roller) to attain full contact and adhesion.

1.12 Reinforcement Gussets

1. Apply gussets at every angle, on inside and outside corners in accordance with manufacturer's requirements.
2. Install self-adhesive or thermofusible gussets before application of membrane base sheet flashing,
3. Install self-adhesive or thermofusible gussets over base sheet flashing and before application of membrane cap sheet flashing.

1.13 Roof Membrane Cap Sheet

1. Base sheet application shall be reviewed by manufacturer and *Consultant* prior to proceeding with membrane cap sheet.

2. Apply membrane cap sheet commencing from centre of drain or low end and working upslope. **Fully torch cap sheet** to base sheet and extend to edge of perimeter, after base sheet flashing has been completed.
3. Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps. Maintain minimum 75 mm (3 in.) side and 152 mm (6 in.) end laps. Laps shall be installed to shed water.

4. Maintain minimum 50% stagger from base sheet. Use chalklines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.

5. Apply loose granules in areas where excess heat welding has occurred. Apply heat to affected area, place granules and embed them into warm membrane.

6. Apply membrane cap sheet without voids, wrinkles, buckles, fishmouths or any evidence of a lack of full adhesion. Repair defects to satisfaction of *Consultant*.

1.14 Roof Membrane Cap Sheet Flashings

1. Apply membrane cap sheet flashings in general conformance with details commencing from low point and working up-slope.

2. Membrane base sheets/flashings with a poly on top face shall have poly burned off prior to applying cap sheet flashings. Maintain minimum 50% stagger from base sheet flashing. Use chalklines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.

3. Fully torch modified bituminous cap sheet flashing to attain full bond.

4. Terminate cap sheet 13 mm (1/2 in.) back from outside edge of parapet blocking and past base sheet flashing 52 mm (2 in) onto flat of roof.

5. Provide 3 mm (1/8 in.) bleed out at all side laps. Maintain minimum 75 mm (3 in.) side and 152 mm (6 in.) end laps. Laps shall be installed to shed water.

6. At wall terminations, install and secure termination bar to adequately restrain the flashings. Secure termination bar at maximum 305 mm (12 in.) on centre. Apply sealant bead along entire length of termination bar.

7. Repair defects in applications with additional piece of torch grade base sheet. Carry out repairs to satisfaction of *Consultant*.

1.15 Drains

1. Cut opening through membrane base sheet, insulation, thermal barrier, vapour retarder and centre drain over pipe. Apply mastic on underside of flange.

2. Insert drain body into new drain pipe until flange is flush with roof membrane. Secure new drains with mechanical (MJ) connection and underside with deck clamp.

3. **Note: Overlay board to be completely cut-out under drain flange.**

4. Flash drain flange with one ply of torch grade base sheet. Extend membrane a minimum of 305 mm (12 in.) beyond the edge of drain flange. Membrane cap sheet to be extended continuously through drain area.

5. Install clamping ring, control flow and aluminum strainer over raised bosses and install screws to tighten ring against membrane and flashings until secure.

6. Ensure roof drains are clear of debris and free draining at project completion.

1.16 Sleeves

1. Provide all required vents, stacks and conduit sleeves and supports to suit site conditions.

2. At existing vent pipes, extend pipe with same material to 25 mm (1 in.) above top edge of sleeve. At existing exhaust stacks, extend pipe as required to allow for rain collar installation.

3. Prime stack flanges, top and bottom and set underside of flange in bed of mastic on membrane and position evenly around projection. Flash in flanges with one ply of torch grade base sheet. Extend membrane a minimum of 305 mm (12 in.) beyond the edge of drain flange.

4. Where stacks are installed on top of curbs, entire 'boxed curb' shall be covered with adequately secured overlay board and completely covered with torch grade membrane base sheet and cap sheet.

1.17 Parapets/Perimeters/Walls/Sleepers/Curbs

1. At mechanical units, provide new wood sleepers as detailed that extend over minimum 3 joist supports to maximum length required to support units or match existing. Butt new insulation to sleepers by neatly cutting perimeter to fit profile of sleeper.

2. Provide 2-ply membrane flashings over all sleepers to fully encapsulate wood and in accordance with this section.

3. Construct parapet, perimeters, wall and curbs as detailed with new wood members constructed in accordance with Section 06 10 00 – Rough Carpentry.

4. Provide 2-ply membrane flashings at all noted locations in accordance with this section and as detailed.

5. Provide metal cap flashings at sleepers and curbs prior to re-installing units.

1.18 Dividers/Movement/Control Joints

1. At all roof dividers, movement and control joints, construct as detailed with new wood members and frame in accordance with Section 06 10 00 – Rough Carpentry.

2. Provide 2-ply membrane flashings at all noted locations in accordance with this section and as detailed.

1.19 Overflow Scuppers

1. Where indicated on drawings, install new scuppers and secure to substrate.

2. Flash in scupper flanges with one-ply of self-adhesive base and one ply torch grade cap sheet.

3. All overflow scuppers to be manuf from copper.

1.20 Storm Collars

1. Install storm collars complete with clamping ring and sealant over stacks where caps cannot be installed.

1.21 Electrical/Mechanical and Gas Line Penetrations

1. At pipe/conduit penetrations, provide prefabricated pitch-pan system, adhesive and mastic or insulated sleeve. Provide minimum 25 mm (1 in.) gap between penetration and inner face of pitch-pan.

2. Clean and seal the base of the penetration top the membrane and extend minimum 25 mm (1 in.) above the pitch-pan.

3. Adhere pitch-pan system to roof membrane with a continuous 6 mm (1/4 in.) sealant bead on underside of pitch-pan and all end joints. Embed onto membrane and press in place until sealant overflows from all sides. Apply continuous sealant bead at exterior face of all end joints and at junction of pitch-pan to membrane

4. Completely fill pitch-pan with required pourable sealer/mastic, with high point in the middle and sloped to exterior edge to adequately drain moisture over perimeter.

1.22 Precast Pavers

1. Install new precast paver to required layout. Saw cut to fit at corners/walls or core hole where required to fit penetrations and field dimensions. No piece shall be smaller than 152 mm (6 in.) x 610 mm (2 ft.).

2. Set pavers on pedestals and adequately balance pavers so that ‘rocking’ does not occur. Pedestal shall be minimum 152 mm (6 in.) wide by 305 mm (12 in.) long. Maintain continuous drainage under all pavers.

1.23 Pitch – Pan Pockets

1. New pitch-pan pockets are to be provided at penetrations where specified sleeves are not suitable. All surfaces shall be clean dry and free from all deleterious material. Galvanized metal penetrations and painted metal must be prepared using a grinding machine to bare metal. PVC pipe must be sanded with sandpaper.

2. All metal surfaces and the pitch-pan pocket must be cleaned with non-greasy solvent such as acetone or Methyl Ethyl Ketone (MEK). Place pitch-pan pocket at desired location and mark outside edge for reference. Pitch pocket shall be placed with minimum 25 mm (1 in) clearance from inside of pitch pocket and penetration.

3. Seal base of penetration with sealant to prevent potential of mastic flowing through openings. Apply sealant over entire granulated surface of membrane where pitch

pocket will be installed, to avoid any water infiltration between pitch pocket and membrane.

4. Position pitch-pan pocket and apply a liberal bead of sealant at outside perimeter of pitch pocket. Use the tip of a trowel to adhere sealant to the membrane. Dispense an initial amount of mastic (equivalent to half of the nozzle), outside of the pitch pocket, to assure a homogeneous mixture of parts A and B.

5. Fill assembled pitch pocket with mastic until full, with a high point at middle and tapered to outside edge to allow for water flow over pitch-pocket.

1.24 Mechanical Equipment

1. *Contractor* shall be responsible to remove and re-install roof mounted mechanical equipment and services necessary to facilitate application of new roof system. This includes temporary removal and replacement of all associated ductwork. Do not disconnect H.V.A.C. without approval of *Owner*.

2. Mechanical pipes and gas lines must be disconnected and sufficiently supported. Use treated wood blocks located on concrete pavers resting on top of pedestals to temporarily support equipment.

3. During roof replacement operations, all H.V.A.C. ducts are to be adequately supported. Temporary removal of gas piping is responsibility of *Contractor* and must be re-installed in accordance with applicable regulations and authorities having jurisdiction.

4. *Contractor* must provide for adjustments to ducting, duct supports and piping to suit new roof elevations and new mesh and mastic repairs to match existing duct coatings.

5. At wall junctions, ductwork is to be sealed with transition membranes that are secured to wall with termination bar or metal flashings and provide a watertight junction.

6. Submit certificate from licensed mechanical contractor stating that all modifications/connections comply with Building Automation System and that it is fully functional.

1.25 Electrical Equipment

1. *Contractor* must disconnect all wiring and junction boxes required to facilitate installation of new roof system. Prior to disconnecting electrical systems, obtain approval from *Consultant* or *Owner*. Provide minimum 48 hours' notice for clearance.

2. Submit certificate from licensed electrical contractor stating the all modifications/connections comply with the Electrical Safety Authority (ESA).

1.26 Quality Control

1. *Owner* may retain an independent *Consultant* to carry out periodic supervision during construction.

2. If requested by *Consultant*, take cut-test samples of roofing membrane and membrane flashings, wrap and label samples, identify locations and submit to *Consultant* for review and testing.

3. *Contractor* shall make an allowance for **minimum of one cut test per day** and all required patching to match existing assembly. Samples must be a minimum 305 x 305 mm (12 x 12 in.) and include all new roof components including asphalt pour and gravel. Failed test results will require remedial work acceptable to *Consultant* and may entail complete removal and replacement of failed areas.

1.27 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*. Remove all stains, asphalt, caulking or other adhesive from all surfaces.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Rough Carpentry: Section 06100
2. Masonry: Section 04200
3. Air Vapour Barrier Membrane: Section 07112
4. Modified Bituminous Membrane Roofing: Section 07520
5. Building Insulation Section 07212

1.2 Design Criteria

1. Design metal siding system to provide for thermal movement of component materials caused by ambient temperature range of 100 degrees C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

2. Include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

3. Design members to withstand dead load and wind loads calculated in accordance with NBC and applicable local regulations, to maximum allowable deflection of /180th of span.

4. Provide all necessary interior reinforcing girts to withstand all loads as described in item .3.

5. Design wall system to accommodate specified erection tolerances of structure.

6. Maintain following installation tolerances:

    .1 Maximum variation from plane or location shown on approved shop drawings: 10mm/10m of length and up to 20mm/100m.
    .2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75mm.

1.3 Samples

1. Submit duplicate 300 x 300 mm samples of each siding wall system, representative of materials, finishes and colors, in accordance with Section 01340.

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.

2. Indicate arrangement of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural support members or support wall.

3. Clearly detail and indicate locations of all Z clips, J-closures and edge trims.

4. Describe in shop drawing details, suitable accommodation for the removal and joining of future cladding as described in 1.2.7 of this section and on drawings.

1.5 Acceptable Manufacturers

1. VicWest Steel Inc., Peerless Enterprises, Flynn or Agway Metals Inc.

1.6 Extended Warranty

1. Submit a warranty for metal siding system, covering materials and labour and the repair or replacement of defective work, but for five (5) years total.

PART 2 - PRODUCTS

2.1 Materials

1. Prepainted Steel: Galvanized sheet steel minimum 0.76 mm (22 ga) thickness, complying with ASTM A526-80 with Z275 designation for zinc coating. Prepainted in 8000 Series Colour: from standard colour selection group.

2. Siding profile VicWest Steel Ballara Dark Rosewood 18-3280: locations as per drawings.

3. Soffit profile VicWest Steel AD300R: locations as per drawings.

4. Roofing profile VicWest Steel – Presitige, Hidden Fastener Cladding 16” (406mm). Standard finish 26 gauge profiles.

3. For copings and flashings, provide prefinished metal 24 gauge thickness, colour from standard colour selection group.

4. Screws: to CSA B35.3-1962, head color same as exterior sheet, dished to CSA B35.3-1962.

5. Powder actuated fasteners: galvanized, peened ballistic point, plastic cap of same color as exterior sheet.

6. Sealants: in accordance with Section 07900, paragraph 2.1.4, colour selected by Architect. Allow for one (1) colour from manufacturers full range to match adjacent metal.

7. Gaskets: soft pliable arctic grade vinyl, extruded profile.

8. Touch-up paint: as recommended by panel manufacturer and Baycoat, compatible with prefinished coating.

9. Isolation coating: alkali resistant bituminous paint or epoxy resin solution.

10. Insulation: Semi-rigid. Fiberglass AF 530.

2.2 Components

1. Exterior sheet: factory preformed coated metal, to profiles and thicknesses as indicated.

2. Exterior corners: of same profile, material and finish as adjacent siding material, shop cut and brake formed to required angle, concealed corner brace, hairline exposed joint, pop rivet connections with painted head to match siding.

3. Exposed joint ends of siding sheet shop cut clean and square, backed with tight fitting filler lapping back if joint, exposed components color matched to siding.

4. Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, eaves, soffits sill and corners, of same material and finish as exterior siding, brake formed to shape. Exposed cut edges of metal profiles will not be accepted.

5. Sub-girts: zinc coated to ASTM A525-78a, G90 coating designation, profile as indicated to accept exterior sheet with structural attachment to building frame.

PART 3 - EXECUTION

3.1 Preparation

1. Protect metal surfaces in contact with concrete, masonry mortar, plaster or other cementitious surface with isolation coating.

3.2 Installation

1. Install sub-girts to masonry walls through air vapour barrier membrane.

2. Install exterior finish siding to internal sub-girts with concealed fasteners.

3. Install insulation using adhesive and ensure a continuous thermal barrier.

4. Provide notched and formed closures, sealed to arrest direct weather penetration at vertical profiles for exterior siding. Ensure continuity of "pressure equalization" of rain screen principle.

5. Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.

6. Supply and install flashing at connection between roof and preformed metal siding.

3.3 Control Joints

1. Construct control joints, as indicated.

2. Use cover sheets, of brake formed profile, of same material and finish as adjacent material.

3. Use mechanical fasteners to secure sheet Expansion Joints materials.

4. Assemble and secure wall system to structural frame so stresses on sealants are within manufacturer's recommended limits.

3.4 Cleaning

1. Wash down exposed surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

2. Remove excess sealant with recommended solvent.

End of Section

PART 1 - GENERAL

1.1 Section Includes

1. This Section includes for provision of all labour, materials, equipment and services for sheet metal flashing and trim Work in accordance with Contract Documents.

1.2 Related Sections

1. Section 06110 Rough Carpentry for Roofing
2. Section 07520 SBS Modified Bituminous Membrane Roofing
3. Section 07901 Joint Sealers for Roofing

1.3 References

1. ASTM A653M- Sheet Steel, Zinc Coated (Galvanized) by the Hot Dipped Process, General Requirements.
2. CAN/CGSB 37-GP-9M / ASTM D41- Asphalt Primer.
3. Canadian Sheet Steel Building Institute (CSSBI) Bulletin No. SSF-3, Core and Maintenance of Pre-finished Sheet Steel Building Products.
4. Canadian Roofing Contractors Specification Manual- 'FL' Series Details.
5. SMACNA Architectural Sheet Metal Quality Assurance Manual - 2015

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of flashing and sheet metal type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Mock-Up

1. Locate mock-ups at specific areas designated by *Consultant*.
2. Fabricate mock-ups in minimum 2440 mm (8 ft.) lengths with reviewed materials, approved methods including, joints, seams, expansion joints, starter strips and fasteners.

3. Mock-up, if accepted, shall represent the minimum standard for work. Mock-up may be included as part of final work.

1.8 Quality Assurance

1. Flashing and Sheet Metal Work shall be executed in accordance with SMACNA Architectural Sheet Metal Quality Assurance Manual - 2015 by skilled trades having a minimum of five (5) years related experience.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Warranty shall be submitted against defects in workmanship and materials.

2. *Contractor* must extend the Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to leaking, failure to stay in place, lifting, deformation and breaking of weathertight seals.

3. Provide all additional Warranties that may be available from manufacturer.

Part 2 - PRODUCTS

2.1 Material

1. Prefinished Steel Sheet: Galvanized steel, 0.71 mm (24 gauge) core nominal thickness, zinc coated (galvanized) to designation G90 by the hot dip process, with a prefinished coat. Profiles as detailed.

2. Pre-finished Coat and Primer: 8,000 series finish, factory applied coating on high grade primer. Colour to be approved by Consultant/Owner selected from standard colours listed in General Colour Card.

3. Starter (Hook) Strips: Fabricated from prefinished steel sheet, 0.87 mm (22 gauge) core nominal thickness. Minimum 100 mm (4 in.) wide face **or as detailed** and shall extend onto wall substrate minimum 38 mm (1-1/2 in.) and be continuous.

4. Termination Bar: 3 mm x 25 mm (1/8 x 1 in.) extruded aluminum bar.

5. Fasteners: In accordance with Section 06 10 00 – Rough Carpentry.

6. Touch-up paint: As supplied and recommended by sheet steel manufacturer.

7. Exposed Sheet Metal Fasteners: Self-Drilling Hex Head with washer and colour coded cap.

8. Cap, Counter and Fascia Metal to be fabricated to layouts and details shown on drawings and to extent required.

9. Overflow Scuppers: Overflow (Where Shown on Drawings): Fabricated from 0.71 mm (24 gauge) stainless steel. To be a minimum 203 mm wide x 104 mm high (8 x 4 in.) with continuously soldered seams with a 152 mm (6 in.) wide apron/flanges. Bottom edge to extend 38 mm (1-1/2 in.) past wall and top edge 25 mm (1 in.) with open end.

10. Sealants: In accordance with Section 07 92 00 – Joint Sealer.

Part 3 - EXECUTION

3.1 Fabrication

1. Shop fabricate flashing, sheet metal and trim in accordance with requirements of SMACNA and the Contract Documents. Form sheet metal on bending brake, shaping, trimming and hand seaming on bench.

2. Fabricate cap flashings, counter flashings, closures, starter strips, and other miscellaneous sheet metal work with prefinished sheet metal in general accordance with applicable CRCA 'FL' series specifications and / or as indicated on Drawings.

3. Form sections square, true, and accurate to size. Flashings shall be free from distortion, oil canning, twists, buckles, discolouration and other defects detrimental to appearance and performance.

4. Double back all edges a minimum of 13 mm (1/2 in.).

5. Form joints with S-locks and make allowances for movement. Mitre and form standing seams at all corners. Make allowance for movement at joints.

6. Provide a counter flashing and an intermediate vertical flashing where the cap flashing is greater than 610 mm (24”) above the top of the roofing membrane. Form vertical flashings in 1220 mm (4 ft.) maximum lengths.

7. Fabricate cap flashings, counter flashings and starter strips to details shown and where required.

8. Fabricate metal in 2400 mm (8 ft.) maximum lengths with an unbroken face less than 225 mm (9 in.). Form flashings with an exposed unbroken face exceeding 225 mm (9 in.) and a girth greater than 610 mm (24 in.) in 1220 mm (4 ft.) maximum lengths.

9. **Provide horizontal stiffening rib “V” on all face metal exceeding 225 mm (9 in.) in girth and where shown on drawings.**

10. Provide an ‘S-Lock’ joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and base counter flashing.

11. Where soldered joints are absolutely necessary and where approved for use in prepainted metal, clean paint off both surfaces before soldering for minimum area necessary.

12. Sheet metal coming in contact with a metal of a different type must be back painted with two (2) coats of isolation coating.

3.2 Sheet Metal Flashing and Trim

1. Provide a continuous starter strip for all metal cap and counter flashings and gravel stops secured at a maximum 406 mm (16 in.) on centre in a zig-zag-pattern.

2. Install flashings and sheet metal that includes but not limited to; cap flashings, counter flashings, curb and sleeper counter flashings, starter strips and other miscellaneous trim work in accordance with Contract Documents.

3. Parapet and perimeter cap flashings shall be installed with a **minimum 10% positive slope** to interior of roof. Slope to be provided by installation of continuous wood shims, plywood and wood blockings as detailed and in accordance with Section 06 10 00 – Rough Carpentry.

4. Saw cut new reglet or re-use existing (where approved by *Consultant*), into masonry surfaces to accommodate installation of sheet metal flashings. Reglet is to be a minimum 19 mm wide x 25 mm deep (3/4 in. x 1 in.).

5. Install sheet metal work with concealed fasteners. Install exposed fasteners only when and where permitted by *Consultant*. Install fasteners in an approved manner as to prevent water penetration at point of fastening and to be evenly and neatly distributed. Provide fasteners with washers.

6. At reglets, return top edge of flashings into reglet 25 mm (1 in.). Secure flashings with pin grips, spaced at maximum 406 mm (16 in.) on centre and apply sealant bead to shed water.

7. Provide continuous termination bar at top edge of membrane flashings where indicated on Drawings and at locations where membrane flashings terminate at base of a wall and no other means of mechanical securement is specified or indicated. Fasten termination bar to substrate at a maximum 305 mm (12 in.) on centre with appropriate fasteners.

8. Fasteners are to be located a minimum of 305 mm (12 in.) above roof membrane – where possible.

9. End joints of adjacent lengths shall be completed using ‘S-Lock’ joints. This shall be accomplished by inserting the end of one length in a 25 mm (1 in.) deep "S" lock formed in the end of the adjacent length. Concealed portion of the "S" lock shall extend 25 mm (1 in.) outwards and shall be nailed to substrate. Face nailing of joints will not be permitted.

10. Top edge of counter flashing shall be inserted under cap flashings.

11. Provide three exposed fasteners on interior side of cap flashing, evenly spaced per 2400 mm (8 ft.) length.

3.3 Overflow Scuppers

1. Where indicated on drawings, install new scuppers and secure to substrate.

2. Flash in scupper flanges in accordance with appropriate roof section.

3.4 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested b *Consultant*.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Caulking in connection with roof flashing: Section 07901

2. Caulking between members of aluminum windows: Section 08520

1.2 Environmental Conditions

1. Sealant and substrata materials to be minimum 5 deg. C.

2. Should it become necessary to apply sealants below 5 deg. C, consult sealant manufacturer and follow their recommendations.

1.3 Warranty

1. Contractor hereby warrants that caulking work will not leak, crack, crumble, melt, shrink, run lose adhesion or stain adjacent surfaces in accordance with General Conditions, but for five (5) years total.

PART 2 - PRODUCTS

2.1 Materials

1. Primers: type recommended by sealant manufacturer.

2. Joint Fillers:

   .1 General: compatible with primers and sealants, outsized 30 to 50%.
   .2 Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
   .3 Neoprene or butyl rubber: round solid rod, Shore A hardness 70.
   .4 Polyvinyl chloride or neoprene: extruded tubing with 6 mm minimum thick walls.
   .5 Bond breaker: pressure sensitive plastic tape which will not bond to sealants.
   .6 Sealant Type A: One component, chemical curing, conforming to CAN2-19.13-M82, Class C-2-25-B-N; multi-component, chemical curing, conforming to CAN2-19.24-M80, Type 2, Class B.
   .7 Sealant Type B: Multi-component, chemical curing mildew resistant conforming to CGSB 19-GP-22M.
   .8 Sealant type C: Multi-component, acrylic emulsion base, conforming to CGSB 19-GP-17M.
   .9 Sealant type D: One component, polyurethane base, chemical curing, conforming to CAN2-19.13-M82, Class C-1-25-B-N; or multi-component, chemical curing, conforming to CAN2-19.24-M80, type 1.

3. Color of Sealants: to be selected by Consultant. Allow for a total of three (3) colours for Type A, two colours for Type B, two colours for Type C and one colour for Type D. Locations as directed on site by Consultant.

4. Joint cleaner: xylol, methylethyl-ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

5. Vent tubing: 6 mm inside diameter extruded polyvinyl chloride tubing.

PART 3 - EXECUTION

3.1 New Work

1. Caulk where specified in 3.4 and everywhere required.

2. Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.

3. Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

4. Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.

5. Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.

6. Examine joint sizes and correct to achieve depth ratio 1/2 of joint width with minimum width and depth of 6 mm, maximum width 25 mm.

7. Install joint filler to achieve correct joint depth.

8. Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

9. Apply bond breaker tape where required to manufacturer's instructions.

10. Prime sides of joints to sealant manufacturer's instructions immediately prior to caulking.

3.2 Application

1. Apply sealants, primers, joint fillers, bond breakers, to manufacturer's instructions. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

2. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave joint.

3. In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting vent tubing at bottom of each joint and maximum to 1500 mm o.c. vertically. Position tube to drain to exterior.

4. In precast concrete panel facing, vent space behind panels by inserting vent tubing at bottom of each vertical caulked joint and at every second intersection of horizontal and vertical joints. Position tube to drain to exterior.

5. Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.

6. Use sealants specified in the following locations:

   Type A: Joints between windows or door frames and adjacent building components; control and expansion joints and all other locations where sealing is required, except in locations designated for Type B, C and D. Ensure that sealant chosen (from the several specified under "MATERIALS") for each location is recommended by manufacturer for use on surfaces encountered.

   Type B: Joints between splash backs and walls.

   Type C: Joints between interior metal door frames and partitions.

   Type D: Joints in horizontal surfaces between concrete slabs, pavers and precast concrete panels.

End of Section

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for joint sealers in accordance with Contract Documents.

1.2 Related Sections

1. Section 06110 Rough Carpentry for Roofing
2. Section 07520 SBS Modified Bituminous Membrane Roofing
3. Section 07620 Sheet Metal Flashing and Trim

1.3 References

1. Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualifications Board for Joint Sealant.
2. CAN/CGSB-19.24 - Multi-Component, chemical curing sealing compound.
3. CAN/CGSB-19.13 - Single Component, elastomeric, chemical curing sealing compound.
4. CGSB 19-GP-14 - Sealing Compound, One-Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
5. CAN/ULC-S115-05 Standard Method of Fire Tests of Firestop Systems.
6. ULC List of Equipment and Materials, Firestop Systems and Components.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of sealant type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Quality Assurance

1. Skilled trades with minimum five years related experience shall execute Work.

1.8 Mock-Up

1. Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, sealant and tooling. Mock-up may be included as part of finished work.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Guarantee shall be submitted against defects in workmanship and materials.

2. *Contractor* must extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to; joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, change of colour, loss of adhesion, loss of cohesion and staining of adjoining or adjacent materials on surfaces.

3. Provide all additional Warranties that may be available from manufacturer.

1.10 Environmental Requirements

1. Conform to manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants.

2. Materials must be stored at minimum of 20^{o}C (68^{o}F) immediately prior to application. Sealant applications must be carried out when ambient temperature is above 0^{o}C (32^{o}F).

2. PRODUCTS

2.1 Material

1. All materials in a sealant system shall be compatible with each other and with substrate.

2. Colour(s) of sealants shall be selected to match adjacent substrate and shall be approved by *Consultant* or *Owner*.

3. Elastomeric Sealants: One part elastomeric, non-sag urethane based sealant, for masonry to masonry, masonry to metal junctions. Acceptable Material:

    1. Dymonic as manufactured by Tremco Incorporated.

    2. Vertical Wall Joints - Three-component, chemically curing, epoxidized polyurethane sealant, 'Dymeric 240' by Tremco Incorporated.

4. Silicone sealants: Silicone based sealant, for metal to metal junctions and glazing. Acceptable Material:

    1. Spectrum 2 as manufactured by Tremco Incorporated.
    2. Dow Corning 999-A Silicone Building & Glazing Sealant by Dow Corning Canada Inc.

5. Butyl sealants: Butyl rubber and polyisobutylene blend sealant. Butyl sealant to be compatible with modified bituminous membrane flashings. Acceptable Material:

    1. Tremco Butyl Sealant as manufactured by Tremco Incorporated.
    2. Modified Membrane manufacturer's approved sealant.

6. Firestop Sealant: By Tremco, Dow Corning Canada Inc., GE Silicone, 3M Corporation or approved equal, to CAN/ULC-S115-05.

7. Joint Backing: Polyethylene, urethane, neoprene or vinyl, extruded foam recommended by sealant manufacturer. Circular shape with diameter 25% greater than joint width before installation.

8. Primer: As recommended by sealant manufacturer to assure adhesion of compound and to prevent staining of substrate materials.

9. Joint Cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant as recommended by sealant manufacturer.

10. Bond Breaker Tape: Polyethylene bond breaker tape, which will not bond to sealant.

3. EXECUTION

3.1 Removal of Exiting Sealants

1. Remove existing sealants, backing material, dust, oil, grease, oxidation, millscale, coatings and all other loose material by cutting, brushing, scrubbing, scraping and grinding.

2. Rake out joints, cracks and crevices to receive sealant, to a depth measuring half the joint width. Clean out existing reglets to satisfaction of *Consultant*.

3.2 Preparation

1. Examine joint sizes and conditions to establish correct depth to width ratio for joint backing and sealant. Clean joint surfaces of deleterious material and substances including dust, rust, oil grease, and other matter that may impair work.

2. Ensure joint surfaces are dry and frost free. Prepare substrate as recommended by sealant manufacturer ensuring adjacent surfaces are not damaged.

3. Commencement of Work implies acceptance of existing conditions and assuming full responsibility for finished condition of the Work.

3.3 Priming

1. To prevent staining, mask adjacent surfaces prior to priming and caulking.
2. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.
3. Prime copper, concrete and masonry surfaces to receive sealant.

3.4 Application

1. Install joint backing all joints prior to applying sealants. Diameter of backing material shall be 25% more than width of joint.
2. **Maintain minimum 2:1 width to depth ratio for sealant.**
3. Apply bond breaker tape where joints are of insufficient size to install joint backing or at 90° junctions or where required by sealant manufacturer or *Consultant*. Ensure bond surface area meets the minimum required size recommended by sealant manufacturer.
4. Where required, mix materials in strict accordance with sealant manufacturer’s instructions. Apply sealant using appropriate gun with proper size nozzle.
5. Apply sealant in continuous beads, in solid contact to underlying surfaces with sufficient pressure to fill voids and joints solid.
6. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities. Superficial skin bead is not acceptable.
7. Tool exposed surfaces before skinning occurs to attain concave shape using approved tools.
8. Cure sealant in accordance with the manufacturer's requirements. Do not cover up sealants until proper curing has taken place.

3.5 Clean-up

1. Clean adjacent surfaces immediately and leave work neat and clean.
2. Remove excess and droppings using recommended cleaners as work progresses.
3. Remove bonding tape after initial set of sealant.
4. Remove all excess material, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

End of Section

PART 1 - GENERAL

1.1 Work Included

1. A single manufacturer shall fabricate products included within the scope of this Section.

2. Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).

3. Supply only of steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Architect.

4. Supply only of flush steel doors with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Architect.

5. Supply only of steel panels, similar in construction to steel doors, with flush or abetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Architect.

6. Doors and frames shall be prepared for, but not limited to, preparation for continuous hinges, heavy weight hinges, cylindrical locks, rim and concealed vertical rod/ mortise lock case exit devices, surface door closers and concealed overhead stops.

1.2 Related Work

1. Building-in of frame product into unit masonry, previously placed concrete, structural or steel or wood stud walls.

2. Supply and installation of wood, plastic or composite core doors.

3. Supply and installation of builders' hardware except as specified for acoustic assemblies.

4. Drilling and tapping for surface mounted or non-templated builders' hardware.

5. Caulking of joints between frame product and other building components.

6. Supply and installation of gaskets or weather-strip.

7. Supply and installation of louvers or vents.

8. Supply and installation of glazing materials.

9. Site touch-up and painting.

10. Wiring for electronic or electric hardware.

11. Field measurements.

12. Fasteners for frame product in previously placed concrete, masonry or structural steel.

13. Steel lintels, posts, columns or other load-bearing elements.

14. Field welding.

1.3 Requirements of regulatory agencies

1. Install fire labeled steel door and frame product in accordance with NFPA-80, current edition, unless specified otherwise.

1.4 References

1.	ANSI A115.IG-1994	Installation Guide for Doors and Hardware
2.	ANSI A250.4-1994	Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
3.	ASTM A653-M97	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4.	ASTM A924-M97	Standard Specification for General Requirements for Sheet, Metallic-Coated by the Hot-Dip Process.
5.	ASTM B117-95	Method of Salt Spray (Fog) Testing.
6.	ASTM C177-97	Test Method for Steady-State heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot -Plate Apparatus.
7.	ASTM C518-91	Test method for Steady State Heat Flux Measurements and Thermal Transmission properties by means of the heat Flow Meter Apparatus.
8.	ASTM C578-95	Specification for Rigid, Cellular polystyrene Thermal Insulation.
9.	ASTM C665-95	Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
10.	ASTM D1735-92	Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.
11.	CAN4-S104-M80	Fire Tests of Door Assemblies.
12.	CAN4-S105-M85	Standard Specification for Fire Door Frames Meeting the performance required by CAN4-S104.
13.	CAN4-S106-M80	Standard Method for Fire Tests of Window and Glass Block Assemblies.

14. CGSB 41-Gp-19Ma Rigid Vinyl Extrusions for Windows and Doors

15. CGSB 82.5-M88 Insulated Steel Doors.

16. CSA A101-M83 Mineral Fiber Thermal insulation for Buildings.

17. CSA W59-M89 Welded Steel Construction (Metal Arc Welding)

18. ISO 9001:1994 Quality Systems – Model for Quality Assurance.

19. NFPA-80, 1999 Fire Doors and Windows

20. CSDMA Dimensional Standards for Commercial Steel Doors and Frames.

21. Manufacturers Standard and Galvanized Sheet Gauges

22. Fleming Fire Labeling Specifications

23. ULC List of Equipment and Materials, Volume 2

1.5 Testing and Performance

1. Door constructions covered by this specification shall be certified as meeting Level “A” (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6.4 mm /13.6kg force, total deflection at 136.1kg force not to exceed 63.5 mm and permanent deflection not to exceed 3.2 mm) when tested in strict conformance with ANSI-A250.4-1994. Test shall be conducted by an independent nationally recognized accredited laboratory.

2. Fire labeled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN4-S106. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service procedures issued to the manufacturer.

3. Should any door or frame specified by the Architect to be fire rated, not qualify for labeling due to design, hardware, glazing or any other reason, the Architect shall be so advised before manufacturing commences.

4. Core materials for exterior doors shall attain a thermal resistance rating of RSI 1.06 (R6.0) when tested in accordance with ASTM C177 or ASTM C518.

5. Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial steel door and frame assemblies, the integration of builders’ or electronic hardware and glazing materials and their impact on the scope of work.

6. Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.

7. Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.6 Test Reports

1. All alternates to this specification shall be submitted to the Architect for acceptance ten (10) days prior to bid date, complete with test reports from independent, nationally recognized testing authorities, certifying that:

   .1 Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A250.4-1994, Level "A".
   .2 Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.

2. All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.7 Submittals

1. Submit shop drawings in accordance with the General Conditions of the Contract.

2. Indicate each type of door, frame, steel, core, material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, paneled or louvered) and arrangement of standard builders' hardware.

3. Include a schedule identifying each unit, with door marks or numbers referencing the numbering in Architect's schedules or drawings.

4. Provide confirmation in writing that all aspects to reinforcing, construction, and gauge of metal are met as written in this section.

1.8 Warranty

1. All steel door and frame product shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.

2. All steel door and frame product shall be warranted against rust perforation for a period of five (5) years when the installed and finish painted with a commercial quality paint to the manufacturers recommendations.

3. Finish paint adhesion on all door and frame product shall be warranted for a period of five (5) years when the product has been properly cleaned and finish painted with a commercial quality paint applied as recommended by the paint manufacturer. This warranty shall not exceed that provided by the paint manufacturer.

PART 2 - PRODUCTS

2.1 Doors

1. **Materials**

.1 Doors shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designation ZF75, known commercially as paintable Galvanneal.

.2 Door Cores:
Honeycomb:
Structural small cell (25.4 mm maximum) kraft paper "honeycomb". Weight: 36.3 kg per ream (minimum), density: 16.5 kg/m^3 (minimum), sanded to the required thickness.
.1 Polystyrene:
Rigid extruded, fire retardant, closed cell board, density 16kg/m^2, thermal values: RSI 1.06 minimum, conforming to ASTM C578.
.2 Temperature Rise Rated (TRR):
Solid slab core of non-combustible, inorganic composite to limit temperature rise on the "unexposed" side of door to 250°C at 30 or 60 minutes, as required by governing building code requirements and determined and scheduled by the Architect.

.3 Adhesives:
.1 Honeycomb Cores and Steel Components:
Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.
.2 Interlocking Edge Seams:
Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.
.3 Polystyrene Cores:
Heat resistant, epoxy based, low viscosity, contact cement.
4. Primer:
Rust inhibitive touch-up only.
5. Exterior Top Caps:
Rigid polyvinylchloride (PVC) extrusion.

2. **Construction**

.1 General:
.1 This section is based on doors and frames as manufactured by Fleming. Doors and frames by other manufacturers are acceptable subject to be similar to the one specified and meeting the terms of this section.
.2 Doors shall be swinging, 44.4 mm thick of the types and sizes indicated on the schedules or drawings.
.3 Exterior doors shall be lock seam, flush.
.4 Face sheets for exterior doors shall be fabricated from (16) gauge steel.

.5 Longitudinal edges of exterior doors shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.
.6 Face sheets of interior doors shall be fabricated from 18 gauge steel, except for heavy traffic doors (noted **HT** in Door Schedule) face sheet to be 16 gauge. **Note HT at all interior and exterior exit stair doors at both levels.**
.7 Longitudinal edge of heavy traffic doors (noted **HT** in Door Schedule) shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.
.8 Interior doors shall be stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.
.9 Stiffened, insulated and sound deadened with core where Temperature Rise Rated (TRR) fire labeled doors are specified.
.10 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams visible.
.11 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
.12 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
.13 Lock and hinge edges shall be beveled 3 mm in 50 mm unless builders' hardware or door swing dictates otherwise.
.14 Top and bottom of doors shall be provided with inverted, recessed, 16 gauge steel end channels, welded to each face sheet at 150 mm on center maximum.
.15 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.
.16 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or hardware Suppliers' schedules or details, fire labeled doors shall be provided for those openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Architect.
.17 Exterior doors shall be internally reinforced with 20 gauge continuous; interlocking steel stiffeners at 150mm O.C. max, with voids between stiffeners filled and insulated with 24kg/m3 density loose batt type fiberglass material to suit fully welded design.

.2 **Hardware Preparations:**
.1 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
.2 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
.3 Doors shall be factory reinforced only for surface mounted hardware.
.4 Templated holes 12.7mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 12.7mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.

.5 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
.6 Hinge and pivot reinforcements shall be 10 gauge steel minimum high frequency type reinforcing.
.7 Hinge reinforcements for acoustic doors and doors in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
.8 Lock, strike and flush bolt reinforcements shall be 12 gauge steel minimum.
.9 Reinforcements for concealed closers and holders shall be 12 gauge steel minimum.
.10 For surface mounted hardware, reinforcements shall be 16 gauge steel minimum.
.11 All pairs of fire labeled doors shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
.12 Pairs of doors up to 2450mm x 2450mm, to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be tacked-welded and ground smooth. All other fire labeled pairs shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
.13 Where electrically or electronically operated hardware is specified on the Architects' schedules or details of the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.
.14 Prepare doors to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.
.15 Doors and Frames shall be prepared for, but not limited to preparations for heavy weight oversized Butt Hinges, Continuous Hinges, Cylindrical Locksets, Concealed Vertical Rod and Mortise Lock Case Exit Devises, Surface Door Closer and concealed Overhead Stops.

.3. Glazing:
.1 Where 6mm thick glazing materials are specified on the Architects schedules or details, doors shall be provided with 20 gauge steel glazing trim and snap-in glazing stops.
.2 Where other that 6mm glazing is specified on the Architect's schedules or details, doors shall receive 20 gauge steel trim and screw fixed glazing stops. Screws shall be #6 x 32mm oval head scrulox (self-drilling) type at 300mm on center maximum.
.3 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.

.4 Louver Preparations:
.1 Where specified on the Architect's schedules or details, non-labeled doors shall be prepared on accordance with the louver manufacturer's details.

.2 Where specified on the Architect's schedules or details, fire labeled doors shall be prepared for UL listed sight-proof fusible link louvers in accordance with the louver manufacturer's details.
.3 Louvers shall be supplied and installed by others.

.5 Finishing:
.1 Remove weld slag and splatter from exposed surfaces.
.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
.3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
.4 Primer shall be fully cured prior to shipment.

2.2 Panels

1. Panels shall be fabricated form the same materials, construction and finished in the same manner as doors as specified in Section 2.1.

2.3 Frame Product

1. **Materials**

.1 Steel:
Frame product shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designated ZF75, known commercially as paintable Galvanneal.

.2 Primer:
Rust inhibitive touch up only.

.3 Miscellaneous:
.1 Door Silencers:
GJ-64, Single Stud rubber/neoprene type
.2 Thermal Breaks:
Rigid polyvinylchloride (PVC) extrusion
.3 Fiberglass:
Loose batt type, density: 24kg/m^3 (minimum), conforming to ASTM C665

2. **Construction**

.1 General:
.1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.
.2 Exterior frames shall be thermally broken, Fleming *Therma-Frame* Series, fabricated from 16 gauge steel.
.3 Exterior frame product shall be supplied profile welded (PW)
.4 Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.
.1 Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners and welds shall not cause

thermal transfers between interior and exterior surfaces of the frame sections.

.2 Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 24kg/m^3 loose batt type fiberglass material.

.5 Insulation of open sections (jambs, heads and sills) on exterior frame product shall be provided and installed by the contractor responsible for installation.

.6 Interior frames shall be Fleming F-Series, fabricated from 16 gauge steel.

.7 Interior frame product shall be supplied profile welded (PW)

.8 Knocked-down and knocked-down drywall frames shall not be acceptable.

.9 Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.

.10 Frame product shall be square, free of defects, wraps or buckles.

.11 Corner joints shall be profile welded (PW) (continuously welded on the inside of the profiles' faces, rabbets, returns and soffit intersections with exposed faces filled and ground to a smooth, uniform, seamless surface)"

.12 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.

.13 All steel mullions will be fabricated from the same materials as specified for the steel frames. Steel mullions will be fabricated as a fully assembled three piece unit consisting of a front, back and full height one piece attachment clip as per Fleming F Series. The attachment clip will completely fill the stop area of the mullion on both sides and span the void between each side forming a grid channel like structure. Mullions used as hinge mullions or strike mullions between doors will be filled with grout by the general contractor either prior to or following installation of the frame. The head of the frame shall have an opening sufficient for the grout to be poured in to the mullion.

.14 Mullions shall be fabricated with continuous 20 gauge galvanneal steel internal reinforcing clips.

.15 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.

.16 Glazing stops shall be formed 20 gauge steel, 16mm height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 32mm oval head scrulox (self-drilling) type screws at 300mm on center maximum.

.17 Where required due to site access, as indicated on the Architects' schedules or details, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.

.1 Field spliced jambs, heads and sills shall be provided with 16 gauge steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.

.2 Field splices at closed sections (mullions or center rails) shall be 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.

.3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.

.18 Each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.

.19 Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor after finish painting.

.20 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings required fire protection ratings as determined and scheduled by the Architect.

.2 Hardware Preparations

.1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templated provided by the hardware supplier.

.2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.

.3 Frame product shall be reinforced only for surface mounted hardware.

.4 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.

.5 Frames shall be prepared for 114.3mm standard weight hinges (minimum).

.6 Hinge and pivot reinforcements shall be 10 gauge steel minimum reinforcing, high frequency type shall be provided.

.7 Hinge reinforcements for acoustic frames and frames in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.

.8 Strike reinforcements shall be 16 gauge steel minimum.

.9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gauge steel minimum.

.10 Mortised cutouts shall be protected with 22 gauge steel minimum guard boxes.

.11 Where electrically or electronically operated hardware is specified on the Architects schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on templates, shall be provided and inter-connected with CSA Approved 12.7mm diameter conduit and connectors.

.12 Prepare frames to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

.3 Anchorage:

.1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.

.2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.
.3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 18 gauge steel adjustable stirrup and strap or "T" type anchors as conditions dictate.
.4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gauge steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb.
.5 Floor anchors for thermally broken exterior frames shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.
.6 Frame product installed in drywall partitions shall be provided with 20 gauge steel snap-in or "Z" type stud type anchor.
.7 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 150mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcings and directly opposite on the strike jamb. Each preparation shall be provided with 16 gauge anchor bolt guides.
.8 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the contractor responsible for installation.
.9 After sufficient tightening of the anchor bolts, the heads shall be welded do as to provide a non-removable application. Welded bolt head and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.
.10 Where indicated on the Architects' schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gauge steel formed channel, mounting angles welded to inside of frame head and adjusting brackets. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.

.4 Finishing:
.1 Remove weld slag and spatter from exposed surfaces.
.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
.3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.
.4 Primer shall be fully cured prior to shipment.

2.4 Sizes and Tolerances

1. All sizes and tolerances shall be in accordance with the Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Commercial Steel Doors and Frames" as follows:

.1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm, -0.8mm.
.2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± 1.2mm.
.3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be ± 1.2mm.
.4 Manufacturing tolerances on formed frame profiles shall be ± 0.8mm for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbet shall be ± 1.6mm and ± 0.4mm respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, -0.

2.5 Hardware Locations

1. Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in 2.4.

2. Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined in 2.4.3. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.

3. Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033mm from finished floor. Strikes for deadlocks shall be centered at 1200mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.

4. Push and/or pulls on doors shall be centered 10701mm from finished floor.

5. Preparations not noted above shall be as per hardware manufacturer's templates.

6. Hardware preparation tolerances shall comply with the ANSI A115 series standards.

PART 3 - EXECUTION

3.1 Site and Protection of Materials

1. The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.
2. All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier. All damage shall be noted on the carriers' Bill of Landing.

3. Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.

4. Contractor shall notify the supplier in writing of any errors or deficiencies in the product itself before initiating any corrective work.

3.2 Installation

1. Install doors and frames in accordance with the Door and Hardware Institute "Installation guide for doors and hardware".

2. Set frame product plumb, square, aligned, without twist at correct elevation.

3. Frame Product Installation Tolerances:

    .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be $\pm$ 1.6mm.
    .2 Squareness tolerance, measured through a line 90^0 from one jamb at the upper corner of the product, to the opposite jamb, shall be $\pm$ 1.6mm.
    .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be $\pm$ 1.6mm.
    .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be $\pm$ 1.6mm.

4. Fire labeled product shall be installed in accordance with NFPA-80.

5. Secure anchorages and connections to adjacent construction.

6. Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid points of frame rabbet height and at floor level to maintain frame widths. Provide vertical support at center of head for openings exceeding 1250mm in width. Remove wood spreaders after product has been built-in.

7. Frame product in unit masonry shall be fully grouted in place.

8. Install doors maintaining clearances outlined in Section 2.4.

9. Install louvers and vents.

10. Adjust operable parts for correct clearances and function.

11. Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.

12. Any grout or other bonding material shall be cleaned from products immediately following installation.

13. Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.

14. Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.

15. Finish paint in accordance with Section 09900.

16. Install glazing materials and door silencers.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Final cleaning: Section 01710
2. Sealants: : Section 07900
3. Glazing: Section 08800
4. Air Vapour Barrier Membrane: Section 07112

1.2 Design Requirements

1. This specification section is based on following aluminum glazing types:

   .1 Bullnose fixed window - typical unit:
   - .1 E.g. Alumicor 970 Series, Kawneer 518 Isoport.
   - .2 Typical for punched openings fixed windows.

   .2 Operators: Kawneer 526 Thermal awning window. 2.25" (58.2mm) deep. Insect screen metal – internal mounting. Max. projection 4" (100mm)

2. Typical window venting: fixed window rotor type ventilator.

3. Design all framing and glazing to withstand design loads as per the Ontario Building Code and regulations of authorities having jurisdiction.

4. Work of this Section must be designed by a Professional Engineer licensed to design structures in the Province of Ontario.

5. Design and locate all sealants, gaskets, air/vapour seals, thermal barriers and separations, drainage slots and holes, as shown or specified or as required to obtain design requirements. Ensure all components and assemblies exterior to air barrier drain to building exterior.

6. Provide aluminum closer angles and trims to suit.

7. Interior Aluminum Screens are non-thermally broken, 45 mm x minimum 100 mm aluminum frame, 6.4 mm single glazed; eg. Alumicor 800 Series with Canadiana Entrance Doors or Kawneer Trifab 400 with standard entrances.

8. Aluminum Exterior Doors - Aluminum Doors and Frames:
   - .1 This specification is based upon Alumicor Limited doors – Canadiana Series 600B
   - .2 Doors to be thermally broken and to have insulated sealed units at exterior location only
   - .3 Acceptable Equal Alternates: Kawneer and Windspec

1.3 Shop Drawings

1. Submit shop drawings in accordance with Section 01340 and to be prepared and stamped by a Professional Engineer licensed to design structures in the Province of Ontario.

2. Clearly indicate materials and large scale details for head, jamb and sill, profiles of components, elevations of unit, fully dimensioned layouts positioning brackets and anchorage details, glazing details, and location of isolation coating, description of related components and exposed finishes and fasteners.

1.4 Certificates

1. Submit manufacturer's certificate, certifying compliance with specification requirements, for:
   .1 windows.
   .2 finishes.
   .3 insect screens.
   .4 infiltration/exfiltration rates.
   .5 thermal transfer resistance of frames.
   .6 locking hardware.

1.5 Performance

1. In addition to all requirements of these specifications, the design of glazing shall take into consideration the characteristics of the mullions and effects of the connection and sealants at the frame junctions. Provide thermal breaks between exterior and interior components and sufficient metal on interior side of glass.

2. Fenestration shall meet CAN/CSA – A440 windows:

   .1 Air Leakage: A3
   .2 Water Leakage: B7
   .3 Wind Load Resistance: C5
   .4 Condensation Resistance: fixed frame: 53 minimum
   glass: 53 minimum
   .5 Window shall also meet the requirements for blocked operation, ease of operation, sash strength, stiffness and resistance to forced entry.

3. Submit manufacturer's certificate, certifying compliance with the above-noted requirements.

1.6 Quality Assurance

1. All design, fabrication and installation of this work to be carried out by qualified workers and trades experienced in the application and erection of the products, systems and assemblies specified.

2. Make provisions to drain to the exterior face any water entering in at joints and any condensation occurring within curtain wall construction while maintaining air seal between interior and exterior. Drain holes shall adequately drain all water.

3. At design conditions, no water penetration to interior side of assembly shall occur.

4. Curtain wall systems shall be designed, fabricated, and installed under deign conditions to be watertight in combination with movements occurring due to wind loads imposed on the system.

5. Formed aluminum components shall be sheet of alloy and temper suitable for their purpose and finish.

1.7 Warranty

1. Provide written warranty stating that aluminum windows are guaranteed against leakage, defects and malfunction under normal usage for a period of ten (10) years from the date of completion.

1.8 Maintenance Material

1. Provide data for maintenance and cleaning in accordance with general conditions.

PART 2 – PRODUCTS

2.1 Manufacturers

1. Equivalent Manufacturers for the work of this sections:
   .1 Kawneer Company Canada
   .2 Alumicor Limited
   .3 Oldcastle Glass
   .4 Sherwood Windows Ltd.
   .5 Windspec

2. Refer to requirements for equivalent products in section 01030.

2.2 Materials

1. Extrusions shall be 6063 T54 alloy and temper.

2. Formed aluminum components shall be sheet of alloy and temper suitable for their purpose and finish.

3. Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.

4. Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.

5. Glazing tapes shall be macro-polyisobutylene, highly adhesive and elastic with built in shim.

6. Exterior Sills: extruded aluminum, minimum 3 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors, anchoring devices. All lower level sills to have exterior corners rounded to 6mm radius.

7. Sealants: in accordance with Section 07900, paragraph 2.1.3. Color to match window frame.

8. Foam Sealants: Urethane expanding foam sealant.

9. Bedding Compound: to CGSB 19-GP-14M.

10. Isolation Coating: alkali resistant bituminous paint.

2.3 Finish

1. Exposed aluminum sections shall be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31. Kawneer #40 Dark Bronzed Anodized

2.4 Fabrication

1. Fabricate framing from extrusions of size and shape shown on shop drawings. Interior and exterior extruded aluminum framing sections shall be integrated with a glass reinforced nylon thermal break to form a rigid composite assembly without the use of fasteners or other thermal bridging elements.

2. Composite frame assembly shall have a minimum of 1100 lbf/4 in. (4815N/ 100 mm) resistance to shear between the aluminum and the thermal break materials.

3. Dry shrinkage of the thermal break shall not exceed 0.10% of the framing member length.

4. Fixed framing shall be designed for screw spline corner construction. 518 ISOPORT frameless vent operating sash extrusions shall be tubular with mitred, clip, adhesive, and stake joint construction.

5. All framing joints shall be accurately machined, assembled, and sealed to provide neat weathertight connections. Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion. Glass stops shall be lock-in screwless type.

6. All glazing pockets shall be vented, pressure equalized and drained to the exterior.

7. Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners wit silicone sealant. Air seal gasket must provide adhesion with silicone sealant.

8. Fabricate Rotator unit from extrusions of size and shape shown on shop drawings. Head and sill sections shall be one part construction with a two part chemically curing high density polyurethane thermal barrier. The thermal integrity shall be maintained by the mechanical removal of bridging element after curing. All joints shall be accurately machined, assembled and sealed to provide neat weathertight connections. The ventilator shall be a two part pivoted component with no operating hardware. Include insect mess.

2.5 Isolation Coating

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

2.6 Glazing

1. Prepare windows to receive 25 mm thick double glazed insulating glass specified under Section 08800.

PART 3 - EXECUTION

3.1 Preparation

1. Protect adjacent surfaces from damage resulting from work under this specification.

3.2 Installation

1. Install the windows in accordance with the manufacturer's instructions. Install the windows plumb, level and true relative to building structure. Do not exceed 3mm in 3050 mm (1/8" in 10'0") variation from plumb and level. Foam insulate between the frame members and the window opening using a single component polyurethane foam, insulating sealant.

3.3 Sill Installation

1. Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces.

3.4 Caulking

1. Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside.

2. Seal joints between windows and windowsills with sealant. Bed sill expansion joint cover plates and drip reflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.

3.5 Clean Up

1. Clean glass at the factory. Final cleaning of glass to remove job site soiling shall be the responsibility of the owner. Leave all surfaces reasonably clean, free from sealants, caulking or other foreign material. Remove all surplus materials and debris resulting from the work of this Trade.

3.6 Protection and Cleaning

1. Aluminum shall be isolated from concrete, mortar, plaster or dissimilar metals with bituminous paint or epoxy solution. Framing shall be protected from other building materials during and after installation until acceptance.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Final Cleaning: Section 01710
2. Commercial Steel Doors and Frames: Section 08100
3. Aluminum Windows: Section 08520

1.2 Submittals

1. Submit a 300 x 300 sample of all glass products in accordance with Section 01340.

1.3 Warranty

1. Contractor hereby warrants glass against defects and failure, including leakage, under normal conditions of use, in accordance with Division 1, but for five (5) years total

PART 2 - PRODUCTS

2.1 Material

1. Exterior Tempered Safety Glass: All exterior Vision Glass to exterior doors, windows and screens to be sealed insulating units conforming to CAN/CGSB-12.8. Exterior lite 6 mm tempered **grey** float glass, 12 mm air filled space, inner lite 6 mm clear tempered float glass conforming to CAN/CGSB-12.3. All units to receive Low Emissivity coating on inner pane (3rd surface).

2. Interior Tempered Safety Glass: 6 mm tempered clear float glass complete with etched tempered glass designation visible.

3. Polished Plate or Float Glass: To CAN/CGSB-12.3 clear.

4. **Wired Glass:** to CAN2-12.11-M76, Georgian-wired, polished, 6 mm, wires running parallel to frames. Locations: all fire rated doors and screens and where indicated on drawings.

5. **Fire Rated Glass**: To CAN 4 S-104 and CAN 4 S-106 to meet ANSI Z97.1. Shall be 3/16” (5mm) thick FireLite-Premium supplied by TechniGlas.

6. Low E Glass: to CAN/CGSB-12.4; tempered clear, sputtered coating; eg. AGC Glass Comfort TI-PB; PPG Sungate 100

7. Setting blocks: neoprene, 80 durometer hardness, 102 mm x 6 mm width to suit glass.

8. Glazing tape: preformed butyl with continuous spacer, 10-15 durometer, hardness, paper release, black color, 3 x 10 mm.

9. Gasket: black neoprene "U" cavity type with lock strip.

PART 3 - EXECUTION

3.1 Installation

1. Double Sealed Units

    .1 Install glass as per aluminum window manufacturer's instruction to provide complete rain screen and air/ water barrier.

2. Other Glass

    .1 Clean and dry surfaces.
    .2 Apply glazing tape to fixed stops. Place setting blocks at 1/3 points.
    .3 Set glass on setting blocks against tape.
    .4 Apply glazing tape to glass.
    .5 Install stops.
    .6 Install glass in doors and screens with neoprene gasket.
    .7 Clean glass prior to building occupancy in accordance with Section 01710.

End of Section

PART 1 - GENERAL

1.1 General Finish Notes

1. The Material and Colour Schedule will be issued by the Consultant after tender. It shall be read in conjunction with the Drawings, Specifications, Room Schedule and Door Schedule. Colour and material references named will be based on one manufacturer, as carried by the Contractor or, in the case that no specific manufacturer is carried, based on the Consultant's choice.

2. Approved alternative manufacturers will be acceptable only as indicated in the specifications. However, approved alternate products submitted must match the products named in the Specification to the Consultant's selection. Alternate products other than those named in the specifications will not be allowed unless previously approved by the Consultant.

3. Consult Architect prior to painting any surface not included in the formulae as listed.

4. Final colour for exterior painted surfaces and prominent interior areas shall be approved on the job site by the Architect.

5. Paint samples: Contractor to submit paint samples for all areas required to "Match Adjacent Finish".

6. All similar paint formulations are to be identical when dry. Variations in tone, texture or sheen shall not be accepted.

7. Submit two 300 mm x 300 mm paint samples of each colour required for approval by the Architect.

8. Exact locations of accent paint called for in the Material and Colour Schedule, to be issued after Contract award, not specifically identified on the drawings are to verified on site with the Architect.

1.2 Exterior Finish Notes

1. All exposed metal (doors, frames, lintels, stairs, handrails, mechanical equipment, etc.) to be painted except for prefinished metal louvres, stainless steel, and aluminum. Mechanical equipment is to be painted whether delivered to the site prepainted or not (exhaust fans, goosenecks, exhaust stacks, supports, HVAC units, HRU units, etc.). Colours to match adjacent material-generally either to match brick or tan to match flashing or siding material. Do not paint exposed white PVC pipe covers on interior. Architect will advise on jobsite which other items mentioned above, if any, do not require painting.

2. All unfinished metal work provided by landscaping is to be painted by Section 09900.

1.3 Interior Finish Notes:

1. All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (except stainless steel or anodized aluminum) to be painted to match the surfaces on which they occur unless noted otherwise on the colour schedule, prefinished in suitable colour or directed by the Architect. If prefinished equipment is damaged, it shall be re-painted. Painting to be by formulations specified in Section 09900.

2. All interior fitments, casework, millwork, etc. to be melamine unless otherwise noted. Refer to Sections for specific requirements regarding materials, construction, finishes and hardware. Note that drawer and cupboard interiors are to be considered as exposed surfaces and will therefore be finished.

3. Do not paint over nameplates, identification tags, etc.

4. Make good all existing surfaces and finishes that are damaged during construction.

1.4 Abbreviations Legend

1. Refer to Room Finish Schedule for abbreviations Legend.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Gypsum Board: Section 09250

1.2 Reference Standards

1. Do work to CSA A82.31, except where specified otherwise.

PART 2 - PRODUCTS

2.1 Materials

1. Non-load bearing channel stud framing: to ASTM C645, roll formed from 0.59 mm thickness electro-galvanized steel sheet for screw attachment of gypsum lath and metal lath. Knock out service holes at 150 mm o.c.

2. Floor and ceiling tracks: to ASTM C645-76 in width to suit stud sizes, 30 mm legs for floor track, 50 mm for ceiling track.

3. Metal channel stiffener: 38 mm size, 2 mm thick cold rolled galvanized steel.

4. Furring channels (channels, hangers, tie wire, insert, anchor): CSA A82.30 (R-1971).

5. Metal Accessories: CSA A82.30-1965 (R-1971).

PART 3 - EXECUTION

3.1 Stud Partitions

1. Align partition tracks at floor and underside of structure above and secure at 600 mm o.c. maximum. All partitions to extend to underside of structure above.

2. Place studs vertically at 400 o.c. and not more than 50 mm from abutting walls and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs, as required, to provide rigid installation to manufacturer's instructions.

3. Erect metal studding to tolerance 1:1000.

4. Attach studs to bottom track using screws.

5. Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs, ensure web openings are aligned.

6. Install steel frames and anchor frames securely to studs using minimum of three (3) anchors per jamb for jambs up to 2100 mm high and a minimum of four (4) anchors per jambs for jambs over 2100 mm high.

7. Provide two (2) studs at each side of openings wider than stud centre specified.

8. Install, cut to length, piece of runner horizontally over door frames and at top and bottom of rough opening in glazed partitions.

9. Provide 38 mm x 89 mm vertical and horizontal wood studs secured between metal studs for attachments of bathroom fixtures, accessories, cabinet work, and other fixtures, including grab bars, towel rails, attached to steel stud partitions.

10. Install steel stud or furring channel between studs for attaching electrical and other boxes.

11. Extend all partitions to underside of deck above for sound and fire separation. Fill deck flutes with rockwool.

12. Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

3.2 Ceiling Furring

1. Install runners level to tolerance of 3 mm over 3.5 m. Provide runners at interruptions of continuity and change in direction.

2. Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, grilles, etc.

3. Furr for bulkheads within or at termination or ceilings.

4. Install furring channels at 400 mm o.c. maximum.

3.3 Wall Furring

1. Install steel furring, as indicated.

2. Frame opening and around built-in equipment on four (4) sides with channels.

3. Box-in beads, columns, pipes, and around exposed services.

3.4 Fire-rated Assemblies

1. If required, install Metal Stud System and Furring in accordance with appropriate ULC Design and with supplement to the National Building Code of Canada 2015.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Masonry: Section 04200
2. Metal Stud System: Section 09111
3. Supply of access doors for mechanical and electrical devices Divisions 15 and 16

1.2 Reference Standards

1. Do work to CSA A82.31-1977, except where specified otherwise.

PART 2 - PRODUCTS

2.1 Gypsum Board

1. Plain: to CSA A82.27-M1977 standard, 16 mm or 19 mm thick or as indicated, tapered edges.
2. Plain: to CSA A82.27-M1977, Fire-rated Type X, 16 mm thick or as indicated, tapered edges.
3. Plain: to CSA A82.27-M1977 standard, 13 mm water resistant, tapered edges. (W.R.G.B. in Finish Schedule)
4. Plain: to CSA A82.27-M1977, walls 5/8” dens-shield or as indicated, tapered edges.

2.2 Fastenings and Adhesives

1. Screws: to CSA A82.31-1977.
2. Adhesive: to CGSB 71 GP 25M.
3. Laminating Compound: to CSA A82.31-1077.
4. Concrete Anchors: Phillips Red Head TW-614 or equivalent. Do not use powder activated fasteners for ceiling support.
5. Tie Wire: #16 ga. galvanized soft annealed steel wire.

2.3 Accessories

1. Casing Beads and Corner Beads: 0.5 mm base thickness commercial sheet steel with G90 zinc finish to ASTM A 525-78 A.
2. Joint compound and tape: Compound to CSA A82.31-1977, asbestos-free. Perforated 50 mm gypsum board joint tape.

3. Caulking: Acoustical sealant.

2.4 Insulation Blanket

1. 38 mm thick mineral wool batts ULC labelled, if indicated on drawings.

PART 3 - EXECUTION

3.1 Gypsum Board Application

1. Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

2. Install metal studs plumb and true to sizes and locations indicated on drawings.

3. Apply single and double layers gypsum board to metal furring or framing, using screw fasteners and laminating adhesive. Maximum spacing of screw 300 mm oc.

4. Apply gypsum board to concrete block surfaces, where indicated, using laminating adhesive.

5. Apply type X gypsum board where indicated, in accordance with U.L.C. requirements and with supplement to the National Building Code of Canada to obtain the required fire protection, fire rating and fire separation.

3.2 Insulation and Blanket Application

1. Where indicated on drawings, staple blanket to wallboard in accordance with ULC design requirements. Blanket shall be continuous and tightly fitted between studs and at perimeter.

3.3 Accessories

1. Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces, where practical. Make joints tight, accurately aligned and rigidly secure. Mitre and fit corners accurately, free from rough edges.

2. Install casing beads around perimeter of suspended ceilings.

3. Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

3.4 Access Doors

1. Install access doors to electrical and mechanical fixtures specified in respective Sections.

2. Rigidly secure frames to furring or framing systems.

3.5 Taping and Filling and Sound Seal

1. Seal with acoustical sealant at ceilings, floors, wall intersections and all penetrations such as electrical outlets.

2. Above partitions fill flutes of steel deck with rock wool and cover with non-sagging sealant on at least one side of the partition.

3. Finish face panel joint and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

4. Finish corner beads, control joints and trim as required with two (2) coats of joint compound and one (1) coat of taping compound, feathered out onto panel faces.

5. Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

6. Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

7. Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Sealants — Section 07900
2. Gypsum Board — Section 09250

1.2 Reference Standards

1. Do tile work to Installation Manual 200-1979, “Ceramic Tile," produced by Terrazzo Tile and Marble Association of Canada (TTMAC).

1.3 Environmental Conditions

1. Main minimum 13 deg. C air temperature at tile installation area for 24 hr. prior to, during and 48 hr. after installation. Do not proceed without the correct tiles or if substrate conditions are not suitable.

1.4 Maintenance Material

1. Provide one full box of each type and color of tile required for project for maintenance use. Store where directed. Clearly identify each box.

2. Maintenance material to be of same production area as installed material.

1.5 Extended Warranty:

1. Submit a warranty for entire wall tile installation, covering materials and labour and the repair or replacement of defective work for a period of three (3) years total.

PART 2 - PRODUCTS

2.1 Thin-Set Mortar

1. Mortarcrete Latex Mortar conforming to ANS1A118.4-1973, manufactured by L & M Ceramo Inc.

2.2 Wall Tile

1. **Ceramic Wall Tile** (**CWT):** to CAN2-75, 1-M77, Type 5, Class MR-4, Colour & Dimension Collection, 75 x 150 x 6 mm size, cushion edges, glazed surface. Colours as selected by consultant up to a maximum of four (4) colours; Olympia Tile.

   .1 Acceptable Materials: Equal as supplied by Centura, Daltile – Semi-Gloss Group 1 and American Oleon equal.

2. Tile walls – see drawings for extent. Patterns and accent stripes to be selected by Architect.

3. Tile colors to be selected by Architect from Standard Color List. Total of four (4) colours. Accent stripes colors to be selected separately by Architect from "Accent Color" List. Total of two (2) colours.

2.3 Shower Floor Tile

1. **Ceramic Floor Tile** (**CT**)**:** to CAN2-75, 1-M77, Type 5, Olympia Tile - Niagara Series unglazed porcelain mosaic tile 25mm x 25mm (305mm x 305mm sheet size), cushion edges, unglazed surface, coved base pattern, allow for two (2) colors as selected including accent colour.

2. **Acceptable Materials:** Equal by Crossville – Cross Color Mosaics from Group 2 and 3. American Olean Unglazed Ceramic Mosaics Group 2 and Centura – Vitri or Miki Mosaic

3. **Shower waterproofing by Schluter Systems** – Kerdi-shower kit system for walls and floors. Slope to drain without shower curb at entrance. Acceptable equal Chloraloy membrane by Noble Co.

2.4 Grout

1. Epoxy Grout: “Latapoxy SP-100” Stainless, chemical resistant epoxy grout by Laticrete International. Colour from manufacturer’s full range.

PART 3 - EXECUTION

3.1 Workmanship

1. Apply tile to clean and sound surfaces.

2. Fit tile around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Cut edges smooth, even and free from chipping. Edges resulting from splitting, not acceptable.

3. Maximum surface tolerance 1:800 for walls, floors.

4. Make joints between tile uniform, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

5. Lay out tiles so perimeter tiles are minimum 1/2 size.

6. Sound tiles after setting and replace hollow-sounding units to obtain full bond.

7. Make internal angles square, external angles rounded.

8. Use round edged tiles at termination of wall tile panels, except where panel butts projecting surface or differing plane.

9. Install soap dishes into block recess. Fit tiles around soap dishes.

10. Allow minimum 24 h after installation of tiles, before grouting.

11. Clean installed tile surfaces after installation and grouting cured.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Sealants: caulking — Section 07900

1.2 Reference Standards

1. Do tile work to Installation Manual 200-1979, "Ceramic Tile," produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

1.3 Maintenance Material

1. Provide maintenance data for tile work for incorporation into Maintenance Manual specified in Section 01720.

2. Provide 12 additional tiles of each type and color of tile required for project for maintenance use. Store where directed. Clearly identify each box.

3. Maintenance material to be of same production area as installed material.

1.4 Environmental Requirements

1. Air temperature and structural base temperature at tile installation area must be above 13 degrees C for 24 hours before, during and 24 hours after installation.

1.5 Extended Warranty:

1. Submit a warranty for entire flooring tile installation, covering materials and labour and the repair or replacement of defective work for three (3) years total.

PART 2 - PRODUCTS

2.1 Tiles

1. Designation **PT**: 300 mm x 300 mm porcelain tile to CAN 2-75-1M77.

   .1 Acceptable material: Dottie Series, distributed by Centura: Size 200 mm x 200 mm, plus trim and 200 mm x 100 mm bullnosed base, slate finish. Allow for up to 4 colours from manufacturer's full line.

   .2 Acceptable Alternates: Cross Colors-porcelain stone by Crossville Group 2 Porcealto Solid and Grani Series Allow for all price groups and (10 % group 3 & 4) By Daltile.
   Savoia Canada – Corindo Series
   Olympia Tile and Stone – Spectra Series

   Non-slip surface for all washrooms.

2.2 Accessories

1. Control Joints – Schluter – Dilex –KSN for floors and walls with Tiles.

2.3 Setting Materials

1. Cement Mortar: Mixture of 1 part Portland cement, 4 parts dry sand and 1/10 hydraulic lime. Materials shall conform to the following:

2. Portland Cement: To CAN3-A, Type 10.

3. Hydrated Lime: To ASTM C-206 or 207, Type 5.

4. Sand: To CSA A82.56, passing 1.6 mm sieve.

5. Water: Potable, containing no contaminants which cause efflorescence.

6. Thin Set Mortar: field mixed, blended sand-Portland cement-latex mortar, “Kerapoxy” by Mapei, distributed by Midgley and West, Hamilton Ontario.

    .1 Acceptable Alternates: “Laticrete 4237 distributed by Ceratec Inc., or Flextile 52 thin set.
    .2 Latex Additive: “Cemtex” by Master Builders, Laticrete 2022” distributed by Ceratec Inc.

2.4 Grout

1. Sanded, Portland cement based with Plastijoints acrylic additive, Kerncolour / Floor by Mapei or similar by Laticrete. Colour as selected by Architect.

PART 3 - EXECUTION

3.1 Workmanship

1. Apply tile to clean and sound surfaces.

2. Fit tile units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Make cut edges smooth, even and free from chipping. Edges resulting from splitting not acceptable.

3. Maximum surface tolerance: 1:800.

4. Make joints between tiles uniform and approximately 3 mm wide, (maximum 4 mm) plumb, straight, true, even and with adjacent units flush. Align patterns.

5. Lay out units so perimeter tile are minimum 1/2 size.

6. Install floor tiles as per pattern. Pattern will be supplied by architect at a later date.

7. Sound tiles after setting and replace hollow sounding units to obtain full bond.

8. Make internal angles square, external angles chamfered at 45° with narrow tile strip.

9. Construct base, as indicated on drawings, with rounded top edge.

10. Use bullnose edged tiles at termination of wall tiles, except where tiles abut projecting surface or differing plane.

11. Seal grouted joints with sealer.

12. Clean installed tile surfaces after installation cured.

13. Keep building expansion joints free of mortar or grout.

14. Tiles must be flush with adjacent dissimilar finishes. Add leveler at lower floor finishes to porcelain tile at all door openings, feather back as required to eliminate visible elevation difference around doorways. Typical at all locations.

15. Install steel floor termination strip at all door openings where porcelain tile meets VCT.

3.2 Setting System

1. Install porcelain floor tiles in accordance with TTMAC applicable thinset detail.

End of Section

PART 1 - GENERAL

1.1 Reference Standards

1. Fabrication: to ASTM 365-78 and CAN/GSB-92.1-M77.

2. Installation: to ASTM C636-76, except where specified otherwise.

1.2 Design Criteria

1. Maximum deflection 1/360 of span to ASTM 365-78 deflection test.

1.3 Samples

1. Submit two each 300 x 300 mm samples of each individual tile and grid type in accordance with Section 01340.

1.4 Warranty

1. Submit an extended warranty covering materials and labour and the repair or replacement of defective work but for two (2) years total.

PART 2 - PRODUCTS

2.1 Materials

1. **Ceiling Type 1 (ACT-1)**: Panels: 610 mm x 610 mm x 15mm, medium textured non directional fissured, square lay-in, Cortega #824 by Armstrong. Suspension system: 15/16" Prelude ML, white, by Armstrong.

   Equivalent ceiling types by CGC, Celotex and CertainTeed are acceptable.

2. **Hangers:** 2.6 mm galvanized soft annealed steel wire.

3. **Accessories:** splices, clips, retainers, etc., to complement suspension system components.

2.2 Installation

1. Co-ordinate suspension system with related components.

2. Install acoustic units parallel to building lines with edge unit not less than 50% or unit width.

3. Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

4. Support suspension system main runners at 1200 oc maximum with hangers from structure. Assembly shall support super-imposed loads. Maximum permissible deflection, 1/360 of span.

5. Attach cross member to main runner to provide rigid assembly.

6. Install suspension assembly to manufacturer's written instructions.

7. Install flush edge moulding at junction of acoustic unit ceiling and other materials around entire length of joint. Secure to construction. Butt joints neatly, square and true in alignment.

8. Set acoustic units in place.

9. Set all ceiling levels by the use of transit or laser level.

10. Provide for Owner one FULL (1) complete carton of each type of ceiling tile.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Cast-in-Place Concrete: concrete floors — Section 03300

1.2 Maintenance Data

1. Provide data for maintenance of resilient flooring for incorporation into Maintenance Manual.

1.3 Environmental Requirements

1. Maintain minimum 20 deg. C air temperature at flooring installation area for three (3) days before, during and for seven (7) days after installation.

PART 2 - PRODUCTS

2.1 Materials

1. **Vinyl composition tile (VCT):** to ASTM F 1066-1995 a, Type A design, asbestos free, 3 mm thick, 300 mm x 300 mm size Standard Excelon, Imperial Texture for field and Multicolour for accent and pattern by Armstrong. Allow for total of three (3) colours from full line. Allow 90% of area in Imperial texture and 10% in Multicolour.
   Acceptable Alternate: Mannington Commercial: Designer Essentials Series. Azrock Collection by Johnsonite

2. **Resilient rubber base (RB):** top set coved, 3 mm thick, rubber, 100 mm high minimum 1200 mm long, including premoulded end stops and external corners. Acceptable materials: non-shrink Rubber Wall Base with toe as manufactured by Johnsonite. Colours: Three (3) from full Johnsonite "Coloright" colour line. Use straight base at carpet flooring.

3. **Base Accessories:** Pre-moulded end stops and external corners, of same material, size, and colour as base.

4. **Transition Strips:** thermoset vulcanized rubber, smooth, purpose made to accommodate wheeled traffic and prevent tripping; tapered designs to suit nature of transition; colour as selected by Consultant.

5. **Primers and adhesives:** waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade. Use Johnsonite 990 Solvent Free Environmentally Safe White Acrylic Cove Base Adhesive for rubber base.

PART 3 - EXECUTION

3.1 Inspection

1. Ensure concrete floors are dry, by using test methods recommended by tile manufacturer, and inspect for negative alkalinity, carbonization or dusting.

2. Commencement of work indicates acceptance of conditions by flooring installer.

3.2 Subfloor Treatment

1. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.

2. Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured.

3. Ensure of smooth transition between any raised surfaces at door ways. Prepare subfloor with leveling compound to ensure smooth transition. Typical where VCT meets PT floors.

3.3 Tile

1. Apply adhesive uniformly using recommended notched trowel in accordance with Flooring Manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

2. Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles - minimum half tile width or as indicated by drawings and Finish Schedule.

4. Cut tile and fit neatly around fixed or excessively heavy objects.

5. Install flooring in pan type floor access covers and all clean out covers, where applicable. Maintain floor pattern.

6. Terminate flooring at center line of door in openings where adjacent floor finish or color is dissimilar.

7. Install metal edge strips at unprotected or exposed edges where flooring terminates.

8. At doorways to incrapack units, extend tile and base fully into door opening to incrapak classroom.

3.4 Base Application

1. Set base in adhesive tightly against wall and floor surfaces. Use lengths as long as practicable and not less than minimum 500 mm long.

2. Install straight and level to variation of 1:1000.

3. Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.

4. Miter internal corners. Use premoulded corner pieces at all external corners and ensure full adhesion through to ends of corner pieces. See detail for termination at door frames.

5. Leave in the building one (1) complete carton of each of two (2) colours of floor tile and twelve (12) tiles of each of the remaining colours. Colours of extra tile to be specified by Architect.

3.5 Initial Maintenance after Installation

1. Broom sweep or vacuum thoroughly.

2. Do not wet mop, wash, scrub, or strip the floor. These procedures will be done by the Owner.

3.6 Protection of Work

1. Following broom sweeping, protect new floors with 0.15 mm thick Polyethylene cover and lay planking in all necessary traffic areas to minimize damage by other trades. Maintain until just before final inspection.

3.7 Preparation for Inspection

1. Only if so notified by Architect, and in the presence of the Owner, scrub the floor using a neutral detergent and a floor machine of 170-250 rpm capability equipped with a scrub brush or a scrubbing pad (3M blue or equal).

2. Lightly rinse and allow to dry. Note: Do not flood the floor with rinse water, scrubbing, or stripping solutions. Final re-washing, if required, and waxing will be done by owner.

End of Section

PART 1 - GENERAL

1.1 Related Documents

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

1. Definitions: Resinous flooring includes penetrating two-component epoxy primer and body coat, curing agent and finely graded quartz silica aggregate, two-component, epoxy undercoat, brightly colored, quartz silica aggregate broadcast and a high performance, two-component, clear epoxy sealer.

1.3 Submittals

1. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.

2. Samples: Submit, for verification purposes, 4-inch square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish indicated.

    .1 For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.

1.4 Quality Assurance

1. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity; Stonhard or approved equal. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.

2. Pre-Installation Meeting:
    .1 General contractor shall arrange a meeting not less than thirty days prior to starting work.
    .2 Attendance
        .1 General Contractor
        .2 Architect/Owner's Representative
        .3 Manufacturer/Installer's Representative

3. ISO 9002: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9002 registered quality system.

1.5 Delivery, Storage and Handling

1. Material shall be delivered to job site and checked by flooring contractor for completeness and shipping damage prior to job start.

2. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

3. Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85^{o}F/16 and 30^{o}C.

1.6 Project Conditions

1. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

2. Utilities, including electric, water, heat (air temperature between 60 and 85^{o}F/16 and 30^{o}C) and finished lighting to be supplied by General Contractor.

3. Job area to be free of other trades during, and for a period of 24 hours, after floor installation.

4. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

1.7 Warranty

1. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation.

PART 2 - PRODUCTS

2.1 Manufacturer

1. Basis-of-Design Manufacturer: Sika Canada Inc. DecoFlake System

2. Alternative Manufacturer: Stonhard Inc.

2.2 System

1. Resinous flooring system: broadcast and sealed decorative epoxy floor, composed of multi-coloured decorative flakes and as follows:

   .1 Compressive Strength: 70 MPa (10,152 psi) at 28 days in accordance with ASTM C579
   .2 Flexural Strength: 83 MPa (12,038 psi) at 28 days in accordance with ASTM C580.
   .3 Hardness: 85 Shore D at 7 days in accordance with ASTM D2240

.4 VOC Content: ≤ 50 g/L in accordance with ASTM D2369
.5 Pull-off Strength: >2.0 MPa (290 psi) with 100% concrete failure in accordance with ASTM D4541
.6 Flammability: Self-extinguishing in accordance with ASTM D635
.7 System Thickness: minimum 3mm
.8 Basis-of-Design system: Sika Canada Inc., Sikafloor Decoflake System.

2.3 Components

1. Primer and Body Coat: two component, solid colour, high solid, silicone free, low viscosity, self-priming, glossy epoxy finish:
   .1 Applied Thickness
      .1 Prime Coat: 203 µm (8 mils) wet film thickness (w.f.t.)
      .2 Body Coat: 726 µm (30 mils) w.f.t.
   .2 Compressive Strength: 56 MPa (8,122 psi) in accordance with ASTM D695
   .3 Tensile Strength: 7.4 MPa (1,073 psi) in accordance with ASTM D638
   .4 Pull-off Strength: 2 MPa (290 psi) in accordance with ASTM D4541
   .5 Hardness: 76 Shore D in accordance with ASTM D2240
   .6 VOC Content: ≤ 50 g/L in accordance with ASTM D2369
   .7 Impact Resistance: 5.88 joules in accordance with ASTM D2794
   .8 Abrasion Resistance: 0.11g loss in accordance with ASTM D4060 (CS17 / 1000 cycles/ 1000g).
   .9 Basis-of-Design Product: Sika Canada Inc., Sikafloor 261.

2. Broadcast Quartz Aggregates: use mono colour quartz aggregates that best match the predominate colour of flake blend
   .1 Basis-of-Design Product: Sika Canada Inc., Sikafloor Broadcast Quartz Aggregate

3. Decorative Colour Flakes: 3MM vinyl chips finished with transparent top coats.

4. Grout Coat and Finish Coat: two component, high solids, low odour, low VOC, high strength, high gloss, clear epoxy resin formulated for improved resistance to clarity change over time.
   .1 Applied Thickness:
      .1 Grout Coat: 254 µm (10 mils) w.f.t.
      .2 Finish Coat: 127µm (5 mils) w.f.t.
   .2 Compressive Strength: 70 MPa (10,521 psi) in accordance with ASTM C579
   .3 Tensile Strength: 28 MPa (4,061 psi) in accordance with ASTM D 638
   .4 Flexural Strength: 83 MPa (12,038 psi) in accordance with ASTM C580
   .5 VOC Content: ≤ 25 g/L in accordance with ASTM D2369
   .6 Modulus of Elasticity: 1287 MPa (186,663 psi) in accordance with ASTM C580
   .7 Elongation: 4% in accordance with ASTM D638
   .8 Hardness: 85 Shore D in accordance with ASTM D2240
   .9 Resistance to Mold Growth: Rated 0 (no growth) in accordance with ASTM D3273
   .10 Resistance to Fungi Growth: Rated 10 (highest resistance) in accordance with ASTM G21.
   .11 Flammability: Self-extinguishing in accordance with ASTM D635
   .12 Basis-of-Design Product: Sika Canada Inc., Sikafloor 2002

5. Finish Coat: Basis-of-Design Product: Sikafloor 510 LPL is a clear two-component, high solids, low VOC, low-viscosity, high strength, fast-curing, UV resistant, polyaspartic urethane coating system with texture applied using Sika Duochem 6 aggregate
   .1 Applied Thickness:
      .1 Prime Coat: 3.9-4.9 m2/L at 0.20-0.25 mm (8-10 mils) w.f.t.
      .2 Wear Coat: 2.6-3.3 m2/L at 0.30-0.38 mm (12-15 mils) w.f.t.
   .2 VOC Content: ≤ 50 g/L in accordance with ASTM D2369
   .3 Abrasion Resistance: Taber Abraser ASTM D4046 (CS-17 wheel, 1,000 cycles / 1,000 g load) ~ 50 mg loss
   .4 Pull-off Strength: >2.7 MPa (>4000 psi) in accordance with ASTM D7234
   .5 Hardness: ~75 Shore D in accordance with ASTM D2240

2.3 Accessories

1. Provide all cleaning agents, cleaning cloths, sanding materials, and clean-up materials required per manufacturer's specifications.

2.4 Colors

1. Colors: As selected by Architect from manufacturer's standard colors.

2. Pattern: As provided by Architect using two standard colors.

PART 3 - EXECUTION

3.1 Preparation

1. Substrate: Concrete preparation shall be by mechanical means and include use of a scabbler, scarifier or shot blast machine for removal of bond inhibiting materials such as curing compounds or laitance.

2. Proper substrate preparation is crucial to ensure adequate bond. Substrate must be dry and free of all wax, grease, oils, fats, soil, loose or foreign materials and laitance. Laitance and unbonded cement particles must be removed by mechanical methods. Other contaminants may be removed by scrubbing with a heavy-duty industrial detergent and rinsing with clean water. The surface must show open pores throughout and have a sandpaper texture.

3. Cove base substrate: existing or new gypsum board to be properly prepared including sanding and priming, to manufacturer's requirement.

3.2 Application

1. General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted except at divider strips, sawn joints or other types of joints (if any), indicated or required.

2. Follow manufacturer's written recommendations on terminations and connections to walls, drains, doorways, columns and floor-to-floor transitions.

3. Do not apply while ambient and substrate temperatures are rising.

4. Apply resinous flooring with care to ensure that no laps, voids, or other marks or irregularities are visible. Apply to achieve appearance of uniform colour, sheen and texture; all within limitations of materials and area concerned.

5. Broadcast: Immediately broadcast quartz silica aggregate into the body coat until saturation. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.

6. Match colours and textures of Consultants accepted samples.

3.3 Field Quality Control

1. The right is reserved to invoke the following material testing procedure at any time, and any number of times during period of flooring application.

2. The Owner will engage service of an independent testing laboratory to sample materials being used on the job site. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.

3. Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.

4. If test results show materials being used do not comply with specified requirements, Contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

3.4 Curing, Protection and Cleaning

1. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

2. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

3. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Shop priming structural steel: Section 05100
2. Shop painting miscellaneous metals: Section 05500
3. Door Schedule refer to drawings
4. Shop priming of ferrous doors and door frames: Section 08100
5. Room Finish Schedule refer to drawings

1.2 Reference Standard

1. CAN/CGSB-85.100-93: Painting.
2. Underwriters Laboratories of Canada: List of Equipment and Materials.
3. Ontario Painting Contractors' Association (OPCA) Architectural Specification Manual.

1.3 Product Data

1. Submit to Architect, for review, product data for all formulas, including manufacturer's trade names.
2. Paint Manufacturer will provide periodic reviews and reports to Architect regarding work in this Section and adherence to manufacturer's product specifications.

1.4 Qualifications

1. Manufacturer: use only paint manufacturers and products listed in the OPCA Architectural Painting Specification Manual – Paint Product Recommendation section.
2. Applicators: company specializing in the work of this Section, and with a minimum of ten years documented experience. Employ only qualified journeymen and apprentices having a provincial Tradesmen Qualification certificate of proficiency.

1.5 Environmental Requirements

1. Do not apply paint finish in areas where dust is being generated.
2. Conform to requirements of OPCA Manual.
3. Comply with the requirements of Section 01570 Health and Environmental Specifications.

1.6 Extent of painting

1. For new construction, for rooms shown in room finish schedule to have painted walls, paint all non prefinished surfaces unless indicated otherwise, and repaint prefinished surfaces where indicated.

1.7 Finishes and Colours

1. Allow for 10 colours total from all formulations for this project. Doors, door frames, walls and ceilings will have different colors. Colors may change from room to room.

1.8 Warranty

1. Provide a two (2) year warranty on completion stating that the work has been performed with respect to the standards and requirements incorporated in the OPCA specification manual latest edition.

PART 2 - PRODUCTS

2.1 Materials

1. Acceptable products: Per Chapter 5 OPCA Manual as listed.

2. Paint materials for each paint system to be products of a single manufacturer.

3. Use low-VOC and low-odour paints only.

PART 3 - EXECUTION

3.1 Preparation of Surfaces in new Construction

1. Prepare surfaces to receive paint per Chapter 3 OPCA Manual.

2. Prepare wood surfaces to CGSB 85-GP-1M.

    .1 Use CGSB 1-GP-126M vinyl sealers over knots resinous areas.
    .2 Apply wood paste filler to nail holes and cracks.
    .3 Tint filler to match stains for stained woodwork.

3. Touch up shop paint primer on steel with CGSB 1-GP-40M to CGSB 85-GP-14M.

4. Prepare galvanized steel and zinc coated surface to CGSB 85-GP-16.

5. Prepare wallboard surfaces to CGSB 85-GP-33M. Fill minor cracks with plaster patching compound.

3.2 Application

1. Sand and dust between each coat to remove defects visible from distance up to 1.5 m.

2. Finish closets and alcoves as specified for adjoining rooms.

3. Apply each coat at the proper consistency. Each coat of finish should be fully dry and hard before applying the next coat, unless the manufacturer's instructions state otherwise.

3.3 Mechanical and Electrical Equipment

1. Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas as well as inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except as noted otherwise. Coordinate with mechanical trades applying banding and labeling after pipes have been painted. Do not paint white PVC covers on exposed mechanical water, drain and other lines

2. Paint gas piping standard yellow where visible on roof or in service spaces.

3. Paint surfaces inside of ductwork and elsewhere behind grilles where visible using primer and one coat of matte black paint.

4. Paint both sides and edges of plywood backboards for equipment before installation.

5. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.4 Paint Systems

1. System references listed are based on Chapters 4A and 4B of OPCA Manual and are OPCA Premium Grade, unless noted otherwise.

3.5 Interior Finishes

1. Wood, where applicable: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade.

2. Wood, where applicable, INT-1E, lacquer finish semi gloss.

3. Gypsum board - Ceilings and bulkheads - INT. 4-B, Latex Flat Finish, Premium Grade.

4. Gypsum board – partitions INT-4B latex semi-gloss, Premium Grade.

5. Gypsum board – partitions where noted GF in room finish schedule. INT 4A, alkyd gloss finish, Premium Grade.

6. Concrete Block: INT. 8-A, Latex Semi-Gloss Finish, Premium Grade.

7. Concrete Block – Where noted GF in room finish schedule: INT.8B, Alkyd Gloss finish, Premium grade.

8. Structural Steel and Miscellaneous Metal:

    .1 Primed: INT. 12-A, Alkyd Semi-Gloss Finish, Premium Grade, four coats.

.2 Galvanized: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade, four coats.

9. Galvanized metal: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade, four coats.

10. Galvanized steel deck: INT 13E, Alkyd dry fall.

3.6 Exterior Finishes

1. Wood: EXT. 1-A-Gloss, Premium Grade.

2. Metal:

.1 Primed: EXT. 11-A-Glos, Premium Grade.
.2 Galvanized: EXT. 12-A-Gloss, Premium Grade.

End of Section

PART 1 - GENERAL

1. Not applicable.

PART 2 - PRODUCTS

2.1 Fixtures

1. **Corner Guards**
   Surface-Mounted, Metal Corner Guards: Fabricated from 1-piece, formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
   - .1 Available Manufacturers:
     - .1 ARDEN Architectural Specialties, Inc.
     - .2 Construction Specialties, Inc.
     - .3 Pawling Corporation.
   - .2 Material: Stainless steel, Type 304.
     - .1 Thickness: Minimum 0.0500 inch.
     - .2 Finish: Directional satin, No. 4.
   - .3 Wing Size: Nominal 3-1/2 by 3-1/2 inches x 48 inches high.
   - .4 Corner Radius: 1/8 inch.
   - .5 Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.

2. **White Board (WB)** - “Vit-Rite: Rite on, Wipe off” model as manufactured by Architectural School Products, Mississauga.
   - .1 Color: White. Flush trim No. 205, chalk tray No. 212, 89 mm deep, minimum, Display Rail No. 200, KWIK Grip.
   - .2 Provide all hardware and fasteners suitable for secure recessed mounting.
   - .3 Size: as per drawings.
   - .4 Acceptable alternate: Martack Specialties Limited.

3. **Clocks** – Electric Time Company Inc. Model Style 2460 – 60” Dia Flush Backighted Numerical digits, complete with controller and remote control adjusting. Service access must be through front.
   - .1 Quantities: Two (2) as per drawings
   - .2 Acceptable Alternate: 42” Dia - Lumichron Commerical Clocks

4. **Tactile Urban Braille Dome Plate:**
   Location: at depressed concrete ramp see site plan.
   Size to be 600mm wide x 1200mm long by Access Tactile Systems
   Intelligent design cast in place replaceable - Part # ACC-R24x48-XX
   Colour – Federal Yellow YW FED 33538 / RAL 1003

PART 3 – EXECUTION

3.1 Installation

1. Install where indicated on drawings and as per manufacturer’s instructions.

End of Section

PART 1 - GENERAL

1.1 General Requirements

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

1.2 Related Work

1. Washroom and Shower Accessories: Section 10800

1.3 Submittals

1. Shop Drawings: Submit shop drawings in accordance with Section 01340, for Consultant's review before fabrication, indicating material, finish, dimensions, details of connections and fastenings, elevations, plans, sections, thicknesses, hardware and other pertinent information.

2. Samples: Submit samples of finish hardware and powder-coated sample in selected colour and finish in accordance with Section 01340, for approval of Consultant.

PART 2 - PRODUCTS

2.1 Material Description

1. Manufacturers of toilet partitions having product considered acceptable for use: Specifications based on Buddsteel – Model 3000TB.

2. Acceptable equal by:
    a. Bradley Corporation
    b. Global Steel Products Corporation
    c. Hadrian Manufacturing
    d. ASI Group Watrous

    .1 Type 1 Vandal Resistant Solid Phenolic Toilet Partition, floor mounted and overhead braced. ALL Doors, stiles and panels: min. 19 mm thick solid phenolic core with plastic laminate facing and black beveled edges. Doors to be 610 mm wide and swing in. Barrier-free stall doors to be min. 900 mm wide and swing out.

    .2 Hardware: .67 institutional extra heavy duty, type 304 satin finish anodized alum, angle brackets, U-channels and spring-loaded, self-closing hinge run full height of panel and door; for emergency access, door lift from outside. Vandal resistant doorstops at top and bottom. All fasteners to be pin-head Torx screws. One piece shoe to conceal stile leveling device. Slide latch and Keeper at each door. Slide latch to allow for emergency access from both in and out swing doors. Coat hook-not be installed, in place install rubber bumpon for door to open onto. Install two door stops at each door at top and bottom of door.

PART 3 – EXECUTION

3.1 Installation

1. Install compartments in accordance with reviewed shop drawings and in a neat, rigid manner free of defects.

2. Install units secure, accurately positioned, plumb, level, square and free from sag and distortion.

3. Perform drilling of steel, masonry and concrete necessary to install this work.

4. Ensure spaces between panels and pilasters, between panels and walls and between pilasters and walls are of uniform consistent width and sized to ensure it is not possible to see persons using the compartments.

5. Coordinate installation with the work of trades providing ceilings, wall and floor finishes, shower accessories and other adjacent components and construction.

3.2 Adjustment

1. Upon completion of the work or when directed, remove all traces of protective coating or paper.

2. Clean exposed surfaces and fittings.

3. Test hinges, locks and hatches and where necessary, adjust and lubricate. Set hinges so that doors stand open maximum 30 degrees when compartment is not in use. Ensure that partitions are in working order.

End of Section

PART 1 - GENERAL

1.1 General Requirements

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

1.2 Related Work Specified Elsewhere

1. Electrical conduit and wiring to junction boxes and hand dryers: refer to Electrical

1.3 Referenced Standards

1. ASTM A167-87: Specification for Stainless and Heat Resisting Chromium -Nickel Steel Plate, Sheet and Strip

2. ASTM A525: Standard Specification for General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process (Metric)

3. CAN/CSA-G164-M92: Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340, for Consultant's review before fabrication. Shop drawings of units for use by the handicapped shall be distinctly marked and cross-referenced to the corresponding article in the specifications.

1.5 Quality Standard

1. This specification section is based generally on Bobrick equipment. Similar equipment and accessories by ASI Group Watrous Inc. and American Specialties Inc. are also acceptable.

PART 2 - PRODUCTS

2.1 Materials - Generally

1. Ferrous Steel: Sheet, cold-rolled furniture steel, double annealed, mill stretched and leveled, and fully pickled. Otherwise, steel shall be hot-rolled or cold-rolled of alloy to suit needs of fabrication, use, and appearance.

2. Stainless Steel: Type 304, conforming to ASTM A167-87, No. 4 finish.

3. Galvanized Steel: For sheet, Z275 zinc coating designation in accordance with ASTM Specification A525. For irregular sections, hot dip galvanized to comply with CSA G164.

4. Anchors and Fastenings: Where exposed, use stainless steel and otherwise to match metal anchored. Where non-exposed, use the same as that specified for exposed, or

use galvanized steel. Anchors and fastenings shall be of the type appropriate for the substrate to which accessory unit is secured.

2.2 Products

1. **Mirrors**
   .1 Handicapped mirror **(M2):** B-293 series by Bobrick, tilt mirror, stainless steel. Size: 600 x 910 mm. Quantity: Refer to drawings.
   Quantity: refer to drawings.
   .2 **(M1)** B-293 series by Bobrick, stainless steel frame, vandal resistant mounting, 6 mm glass mirror with 15 year guarantee against silver spoilage.
   Size: 600 x 1220 mm. Quantity: refer to drawings

2. **Handicapped Grab Bars (GB)**: Series B-5806 by Bobrick
   .1 GB-1: B-5898 x 750 mm x 750 mm "L" shaped grab bar beside water closet mounted as per OBC requirements.
   GB-2: B-5806 x 600 mm long bar behind water closet. Installed as per drawing.
   GB-3: B-5806 x 600 mm long bar beside urinal. Installed as per drawing.
   GB-4: B4998 735 mm swing up type grab bar beside universal washroom water closet.
   .2 All bars to have concealed mounting hardware.
   .3 Quantity: refer to drawings.
   .4 All bars to withstand horizontal and vertical pull of 2.2 kN

3. **Vandal Resistant Clothes Hooks (CH)**: Model B-983
   .1 Stainless steel
   .2 Quantity: 1 Per universal washroom and barrier-free stall. Mounting height to be 1200 max.

4. **Stainless Steel Shelf (WSH)**: Bobrick B-295 x 400mm
   Location: Universal Washroom.

5. **Toilet Tissue Dispenser (TPD)**: install only – Allow for installation of Owner supplied units.

6. **Paper Towel Dispensers (PTD)**: Install only - Allow for installation of Owner supplied units.

7. **Soap Dispensers**: Not in Contract (NIC) - Allow for installation of Owner supplied units

8. **Sanitary Napkin Disposal (ND)**: Model B-270 by Bobrick
   .1 Stainless steel, recessed.
   .2 Quantity: 2, refer to drawings

9. **Mop and Broom Holder (MH)**: Model B-223 x 24
   .1 Quantity: 1

10. **Folding Shower Seats (FS):** Model 517 by Bobrick

.1 One for handicapped shower stall, with stainless steel retaining clips
.2 Quantity: 1
.3 Location: as per drawing

11. **Hand Dryers (HD)**: refer to Electrical specifications.

12. **Shower Soap Dishes (SSD):** Model B439 by Bobrick, Quantity: 1 required

13. **Shower Rod and Curtain (SR-C):**
    .1 Rod: No. B6047 extra heavy duty, by Bobrick, 18 gauge stainless steel
    .2 Curtain: 8 gauge vinyl fabric No. 204-3 by Bobrick and 12 hooks No. 204-1; 1830 mm high, 1780 mm wide.
    .3 Location: Universal Washroom.

14. **Baby Change Station (BCS):** Koala Kare Products KB200-SS Horizontal Wall Mounted Baby Changing Station with Stainless Steel Veneer. Model KB200-01SS Grey. Location: Refer to plans. Approved equal by others.

2.3 Component Minimum Requirements

1. **Construction:** Fabricate with materials, component sizes, metal gauges, reinforcing, anchors and fasteners of adequate strength to withstand intended use.

2. Where specified as frameless, provide stainless steel accessories with one-piece fronts having 90 degree formed returns at their edges and openings.

3. Where accessory fronts are framed, frame edges, both inside and outside, with 90 degree formed returns continuously welded and ground smooth at the corners. Doors shall also have 90 degree formed returns as specified.

4. Unless otherwise specified, hinges shall be semi-concealed stainless steel piano hinges extending full-length of hinged element. Provide hinged elements with concealed, mechanically-retained rubber bumpers for silent closing, and shall close flush with faces of fronts or frames.

5. Ensure that work will remain free of warping, buckling, opening of joints and seams, distortion and permanent deformation.

6. No exposed fixings permitted. Cut edges and openings square and smooth. Chamfer corners of edges and cut-outs 1.6 mm.

7. **Assembly:** Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.

8. Fasten work with concealed methods, unless otherwise indicated on Drawings.

9. Weld all connections where possible, bolt where not possible and cut off bolts flush with nuts. Countersunk bolt heads, and provide method to prevent loosening of nuts. Ream holes drilled for fastening.

10. Welded joints shall be tight, flush, and in true planes with base metals. Make welds continuous at joints where entry of water into voids of members or assemblies is possible.

11. Provide for differential movements within assemblies and at junctions of assemblies with surrounding work.

12. Welds in exposed locations shall be ground and polished smooth.

13. **Finish Work**: Provide holes and connections for related work installed under other Sections of this specification, if applicable.

14. Cleanly and smoothly finish exposed edges of materials, including holes.

PART 3 - EXECUTION

3.1 Inspection of Site

1. Take site measurements to ensure that work is fabricated to fit surrounding construction around obstructions and projects in place, or as shown on drawings, and to suit service locations.

3.2 Installation

1. Install all accessories in accordance with manufacturers' instructions at their recommended mounting heights unless noted otherwise on drawings.

2. Securely fasten accessories plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work. Install in locations shown and specified herein. Mounting heights as shown or in accordance with the OBC in the case of barrier-free accessories.

3. Work shall include anchor bolts, bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeve brackets, clips, and other items necessary for secure installation, as required by loading and by Jurisdictional Authorities.

4. Attach work at wood by screws through countersunk holes in metal.

5. Attach work to masonry with lead plugs and non-corrosive fastenings, to support load with a safety factor of 3. Perform all drilling necessary to install the work.

6. Insulate between dissimilar metals or between metals and masonry or concrete with bituminous paint, to prevent electrolysis.

7. Coordinate installation with the work of other trades adjacent to accessories to achieve the reveals or other edge conditions shown, where their front faces are flush with the finished wall surfaces.

8. Owner to supply and install remainder of washroom accessories not specified here (toilet paper dispensers, etc.). Cooperate with Owner as required.

3.3 Cleaning Up and Adjustment

1. Upon completion of the work, or when directed, remove all traces of protective coatings or paper.

2. Test mechanisms, hinges, locks and latches, and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

End of Section

THE TOWN OF PELHAM

EVENT FACILITY ADDITION

HALLEX PROJECT: # 220321

Mechanical Specifications

Division 15

Revision 1

June 7th, 2022

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HALLEX ENGINEERING LTD.

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PART 1 - GENERAL

1.1 General

.1 General Requirements

(a) Instructions to Bidders, Form of Tender, Form of Contract and Division 1 form part of this Section.

(b) This Section 15010 applies to and governs the work of all sections of Division 15.

(c) The Contractor shall visit the site and become thoroughly familiar with all conditions to be met in carrying out the work covered by these specifications, prior to submitting bid. No extras will be allowed for failure to properly evaluate conditions which affect the scope of work included in this Division.

(d) Where a contradiction or discrepancy is found in the specifications or drawings, the Engineer shall be notified prior to tender closing. An addendum may be issued to clarify the intent of the drawings or specification. If the contractor fails to notify the Engineer prior to tender closing, the Engineer reserves the right to interpret the intent of the tender documents at any time.

(e) All equipment and materials shall be new, undamaged and free from defects.

(f) This is a Base Bid specification, see section 2.1.

1.2 Description

.1 Scope of Work

(a) The Mechanical specification and drawings specify complete systems. Include all labour and material required to make them so.

(b) The intent is to provide the Owner complete systems and while no attempt has been made to detail or list each individual part required, include all parts and furnish all labour reasonably implied by these documents in order to deliver to the Owner the complete systems ready for operation.

(c) Provide mechanical components and accessories which may not be specifically shown on the Drawings or stipulated in the Specifications, but are required to ensure complete and operational systems.

(d) Plans and specifications augment each other, and any item reasonably implied in one but omitted in the other is interpreted as sufficiently covered, and must be provided.

(e) Furnish all required labour and materials, machinery, scaffolding, tools, implements, or other appliances together with all proper and required facilities for moving and transporting same, so that the contract and all work to be done under it, can and will be carried on in a workmanlike manner, properly, satisfactorily, continuously, and expeditiously, to completion, in all respects, to the satisfaction of the Owner

(f) The following sections shall comprise this specification:

- 15075 Mechanical Identification
- 15081 Thermal Insulation
- 15400 Plumbing
- 15742 Multi VRF Heat Pump
- 15781 Heat Reclaim Devices
- 15811 Ductwork - Low Pressure Metallic to 500 Pa
- 15950 Testing, Adjusting and Balancing for HVAC

1.3 Requirements of Regulatory Agencies and Codes

.1 Permits, Tests, Regulations, Etc.:

(a) Before tendering, become fully acquainted with by-laws of any local or other authority having jurisdiction.

(b) Carry out all changes and alterations required by the authority inspector of any authority having jurisdiction without delay to the progress of the work and without extra cost.

(c) Upon completion of the contract, issue to the Owner a formal certification of completion of work before final payment for work may be considered due.

(d) Pay for all permits required for completion of this work.

.2 Quality Assurance:

(a) All equipment supplied by this Contractor shall only be by manufacturer's having a current ISO 9001, Quality Management System certification.

(b) Material and workmanship of the highest quality, conforming to the rules and regulations of the latest revisions of the following regulatory agencies and codes:

.1 Ontario Regulation 350/06 (Ontario Building Code)
.2 Natural Gas Installation Code CAN/CGA B149.1
.3 ASHRAE 90.1-2010 Energy Standard
.4 Canadian Standards Association
.5 Local Fire Codes
.6 The Construction Lien Act, R.S.O. 1990, c. C.30, as amended.
.7 The Occupational Health and Safety Act, R.S.O. 1990, c. 0.1, as amended.
.8 Workplace Safety and Insurance Act, S.O. 1997 C16, as amended.

(c) The Code, Regulation, Statute, By-Law, or this specification having the most stringent requirement applies. Before tendering, the Contractor shall make himself fully acquainted with by-laws of any local or other Authority Having Jurisdiction and all changes and alterations required by the authorized inspector of any Authority Having Jurisdiction shall be carried out without charge or expense to the Owner.

(d) All changes and alterations required by the Authorities Having Jurisdiction shall be carried out without delay to the progress of the work.

1.4 Issuance of Contract

The Owner reserves the right to accept or reject any or all Tenders for any reason whatsoever, and to accept any Tender considered in their best interests. The lowest or any Tender will not necessarily be accepted.

1.5 Failure to Execute Contract

Failure to execute the contract and to file satisfactory documentation, as required herein within the specified time period shall be just cause for the cancellation of the contract award.

1.6 Errors in Tender

Owner will not entertain requests for gratuitous payments arising from errors alleged to have been made in Tender which Owner has accepted.

1.7 Minor Field Variations

The location, arrangement and connection of equipment and material as shown on the drawings represent a close approximation to the intent and requirements of the contract. The right is reserved by the Engineer to make reasonable changes required to accommodate conditions arising during the progress of the work. Such changes shall be done at no extra cost to the Owner unless the location, arrangement or connection is more than 5'-0" from that shown.

1.8 Intent

1.8.1. Mention in the Specifications or indication on the Drawings of equipment, materials, operation and methods, requires provision of the quality noted, the quantity required, and the systems complete in every respect.

1.8.2. The Specifications are an integral part of the accompanying Drawings. Any item or subject omitted from one or the other, but which is either mentioned or reasonably implied, shall be considered as properly and sufficiently specified.

1.8.3. The contractor shall be completely responsible for the acceptable condition and operation of all systems, equipment and components forming part of the installation or directly associated with it. The Contractor shall promptly replace defective material, equipment and part of equipment and repair related damages.

1.9 Examination of Site

1.9.1. Before submitting Bids, each trade shall examine the site to determine the conditions which may affect the proposed work. No claims for extra payment will be considered because of failure to fulfill this condition.

1.10 Contemplated Changes

When a change to the work is contemplated, the Engineer will issue a “Supplemental Instruction” outlining the proposed variation in the works. The Contractor shall, as promptly as possible, estimate the cost implications of the proposed change (extra or

credit) for materials, labour and incidentals, HST Tax, overhead and profit and return a detailed breakdown for each item to the Engineer for review. Upon approval by the Engineer a “Change Order” will be issued and the change in price will be added to or deducted from the contract price.

1.11 Allowances

.1 Cash allowances as called for in this specification shall represent the full amount of monies (including HST) included in the contract for the item which they are earmarked. The Contractor shall add to this amount his mark-up for overhead and profit and carry that amount in his tender price.

.2 Expenditures from the allowances will be deducted using supplier invoices including HST but not including Contractor mark-ups. (Mark-ups being deemed to be included in the tender price.)

.3 At the completion of the project the balance remaining in the allowance(s) will be deducted from the contract price.

.4 The Town of Pelham controls contractor is E.H.M. Solutions and the contact info is as follows:

Contact: Mark Arnold
E.H.M. Solutions
Phone: 226-808-4465

.5 This contractor shall carry the following allowances in his tender price;

a. BAS control allowance of $22,000.00
- Scope of work for BAS: To provide monitor and control as required as per the Town of Pelham. Provide commissioning for BAS system.

1.12 Job Conditions

.1 Site Visit
Visit the site and become thoroughly familiarly with existing site conditions so as not to overlook any condition which may affect the scope of the work. For any such item which could be foreseen, no extra will be allowed.

.2 Services
Refer to Division 1 concerning the provision of temporary water, light, power and heat. Supply all extensions cords, lamps, hose, etc.

.3 Shops
Provide own office, workshops, tools and materials storage if necessary, and be responsible for any loss or damage thereto.

.4 Storage and Site Operating Facilities
(a) Provide own office, workshops, tools and materials storage if necessary, and be responsible for any loss or damage thereto.

(b) At all times keep the Owner’s property in clean and tidy condition and properly store and stack all materials neatly upon the site so as not to litter the premises.

(c) Store packaged materials and equipment in original undamaged condition with manufacturer’s labels and seals intact or properly crated where such applies.

Prevent damage to materials during handling and storage. Keep storage area dry and secure from pilfering. Protect pipe ends, valves and other parts of the system from damage and from intrusion of foreign matter by means of caps, plugs, blind flanges etc.

(d) The Mechanical Contractor shall be responsible for the security of all his materials, tools and equipment stored on the site.

(e) Upon completion of the contract the Mechanical Contractor shall remove from the site all waste materials, clean all equipment, and leave all items in perfect operating condition.

.5 Health & Safety
It is the responsibility of the Mechanical Contractor to understand and to meet or exceed the Ontario Health & Safety Act and Regulations as well as the Health & Safety Policies at the location of the project.

1.13 Submittals

.1 Manufacturer's Shop Drawings

(a) Comply with the provisions listed herein.

(b) Before fabrication of any materials or equipment, submit six (6) copies of detailed drawings of equipment and apparatus to the Engineer for review. Do not order materials until review has been given. Check the drawings and note comments, date and signature before submitting.

(c) Shop drawings must apply to the equipment under consideration. Advertising literature and comprehensive data sheets are not acceptable. The drawings must contain the actual dimensions of unit and dimensioned location and size of all outlets and connections, model range, capacity, hp, voltage, etc., of all accessories listed in the specifications, and/or being provided, and the operating points of the proposed equipment.

(d) Do not consider review rendered on shop drawings as a guarantee of measurements for building conditions. Where drawings are reviewed, said review does not mean that drawings have been checked in detail. The review does not in any way relieve this contractor from his responsibility or necessity of furnishing material to meet the performance of equipment specified and/or as shown on the contract drawings.

(e) Mechanical items for which shop drawings are specifically requested are listed in each section of the Specification.

.2 Record Drawings

(a) On two (2) sets of prints of this project, mark all changes and deviations from the original plans. Correctly mark all changes in red ink.

(b) On completion of the project, turn these plans over to the Owner for the Owner's record of the exact location of all piping and equipment.

(c) Certify these plans, "as-built". Plans are not considered certified unless they are signed and sealed by an officer of this contractor's company.

(d) Where piping is buried, dimension locations with respect to building walls and

mark levels with respect to the elevation of finished floor below which piping is buried.

.3 Maintenance Data and Operating Instructions

(a) Collect and assemble manufacturer's data and operating and maintenance instructions.

(b) Print name of project and Owner's, Architect's and Engineer's names on the title sheet and cover, and return over two (2) sets of manuals to the Architect for approval before completion of the work.

(c) Assemble all data in logical order and insert in as suitable hard cover, black, three-ring loose leaf binder. Mark each Section with a labeled tab protected with a celluloid cover.

(d) Protect schedules, lists and directories with plastic covers.

(e) Type all notes. Printed literature may be used.

(f) Neatly assemble data complete with a list of contents.

(g) Include a complete list of mechanical equipment supplied and installed under this contract.

(h) Instructions shall include specific warning of maintenance and operation practices or materials which may damage or disfigure the particular material or equipment.

1.14 Final Documents

.1 Issue to the Owner, through the Engineer

(a) Two (2) copies "As-built" drawings.

(b) Two (2) copies "Operation and Maintenance Brochures".

(c) Final completion and guarantee certificates.

(d) The Engineer's final acceptance of the work is contingent upon these being received.

(e) The above submissions are subject to final Engineer approval.

1.15 Warranty

.1 Guarantee in writing that all materials and workmanship used on the project are in strict accordance with the specifications and will give proper and efficient operation and are free from mechanical or electrical defects. Repair and/or replace any defects which may appear in any of the work within one year after written acceptance by the Owner (except due to ordinary wear and tear) without additional expense to the Owner. Note that the one year period referred to above may exceed the equipment guarantee appreciably, and allowance must be made for this fact.

1.16 System Turnover

.1 Upon completion of the installation, the Contractor shall start up the system, perform all

necessary tests, and run diagnostics to ensure proper operation. A full operational test of the heating and control systems shall be performed in the presence of the Owner's representative and the Engineer. They shall be required to be in attendance as long as necessary and shall be prepared to make any necessary adjustments and corrections at their own expense to make the system operational in the manner designated by the Engineer. When the system performance is deemed satisfactory by these observers, the system parts will be accepted for beneficial use, and placed under warranty.

.2 Provide training for maintenance staff on the operation of the installed systems.

.3 Contractor shall provide a Declaration of Completion signed by a responsible officer of the Company indicating that the following procedures and tests have been performed in accordance with the drawings and specifications:

(a) All approvals and permits obtained.

(b) All debris and construction materials removed from mechanical system.

(c) Major equipment identified and installed.

(d) Plumbing system installed, tested and approved.

(e) Final documents approved and submitted.

(f) Operating and maintenance on site instructions provided.

(g) Guarantee submitted and accepted by Owner

(h) Provide new filters for all air handling equipment

1.17 Provision for Seismic Design

a. Building structural components have been designed to accommodate seismic loads imparted by elements of structures, non-structural components and equipment per O.B.C. 2006 sentence 4.1.8.17. It is the responsibility of the contractor to ensure all mechanical systems and components connecting to the building structure including but not limited to mechanical units, piping, ducting and services meet both O.B.C. 2006 and CAN/CSA-S832-06 (R2011) - Seismic Risk Reduction of Operational and Functional Components (OFCs) of Buildings

b. Contractor to submit shop drawings for equipment and/or a letter sealed by a Professional Engineer currently licensed in the Province of Ontario clearly indicating that all mechanical systems and components connected to the building meet the requirements of O.B.C. 2006 sentence 4.1.8.19 and any local seismic design requirements.

c. Seismic design parameters are provided on the structural drawings. Contractor to use this information for seismic design purposes.

PART 2 - PRODUCTS

2.1 Base Bid and Alternative Equipment

.1 This is a base bid specification. Items on the Drawings and subsequent divisions of these specifications are listed with the names of a specific manufacturer, the first of which is a base bid and has been used in the design and is the equipment shown on the Drawings. The price submitted for this contract shall be based on the use of materials

and equipment specified. No alternatives shall be accepted in the base bid unless written approval has been obtained from the Engineer.

.2 Contractor may offer alternative equipment where based on the Contractor's experience and knowledge the alternative equipment provides equal performance and is built to the same quality standards as the base bid equipment. The Contractor shall supply a break out price adjustment for the use of the alternate equipment. The Contractor shall state in his tender:

(a) the name of the manufacturer

(b) adjustment in price

(c) equipment model number and capacity

(d) Provide verification that the manufacturer of the alternative equipment has been regularly engaged in the production of such equipment and with a minimum of fifteen continuous years of proven production experience.

.3 The final price selected, base bid with alternatives (if any), will dictate the scope of equipment supply from the Contractor.

.4 Any additional work associated with the installation of alternate equipment (including back charges from other Contractors) shall be the responsibility of the Contractor.

.5 Any alternative equipment submitted must not exceed space requirements allocated on the Drawings.

.6 All of the materials required for the performance of the work shall be new and the best of their respective kind and be of uniform pattern throughout the work.

PART 3 - EXECUTION

3.1 Preparation

.1 Coordination

(a) Start work and proceed as soon as possible after the contract has been let and in accordance with the construction of the building.

(b) Confer and cooperate with other trades in order to eliminate any unnecessary delays to the construction schedule. Where doubt exists regarding other trades, confer with the Project Manager without delay for detailed instructions concerning how to proceed with the work. Expedite delivery of all equipment and materials to meet the construction schedule.

.2 Layout and Planning

(a) The Mechanical Contractor shall be responsible for laying out, planning, and locating all systems, equipment, ductwork and piping based on accurate field measurements and shop drawings or certified prints as required to properly install, maintain, repair and operate all systems and equipment. Drawings shall not be scaled to locate equipment, ductwork or piping. The drawings are diagrammatic, and indicate the general arrangement and routing only. The Contractor shall plan the work to avoid interferences, minimize offsets, and to

provide for a neat and proper installation.

(b) The runs of piping, position of apparatus, etc., specified or shown on the drawings, indicate general arrangements of the equipment. This Contractor shall be required to make without charge, any necessary changes or additions to the runs to accommodate structural or other conditions.

(c) All exposed piping shall be installed neatly and closely to the structure. Pipes which are not installed as they should be, in the opinion of the Engineer, shall be corrected without cost to owner.

(d) Pipes and duct runs shall be installed in such a way as to interfere as little as possible with the free use of the space through which they pass.

(e) The Mechanical Contractor shall test, adjust, startup, and place into proper operational equipment and systems installed under this contract. Prior to the startup of any equipment or system, the Contractor shall make certain that all equipment is clean, free or foreign matter, all bearings are lubricated and all precautions have been followed in accordance with the equipment manufacturer's instructions.

(f) Contractor shall take due care during the installation and ensure no damage shall result to any of the building due to the installation work. Contractor shall only use specified access paths.

.3 Scaling Drawings

(a) All drawings are in general made to scale and where figured dimensions are not given, obtain approximate distance by scaling plans. It is however, distinctly understood that the Contractor does so entirely on his own responsibility as the accuracy of the drawings is not guaranteed.

(b) The drawings upon which this contract is based show the arrangements, general design and extend of the duct and piping and other systems. These systems are suitably outlined on the drawings with regard to sizes, locations, general arrangements

(c) The mains and connections thereto are shown more or less in diagram, except where in certain cases the drawings may include details giving the exact locations and arrangements required. Any necessary change or additions to the runs to accommodate structural conditions are done without additional charge or expense to the Owner. Conceal all ductwork and piping unless shown otherwise. Notify the Engineer immediately and secure his authority in writing for such revisions before proceeding with the work.

3.2 Installation

.1 Excavating and Backfilling

(a) Excavating and backfilling for mechanical work: bases, curbs, pads, trenches, thrust blocks, etc., inside and outside the building where required for mechanical installations, provided by this Contractor.

(b) Trench Excavation

Excavate to alignment and grade required for placing of underground services. Brace and dewater trench so that workmen can work safely and efficiently.

(c) Pipe Bedding

Prepare bottom of trench by removing unsuitable material, debris and other irregularities which may interfere with a proper installation. Compact loose or disturbed areas to ensure continuous support for pipe.

Cover bottom of trench with granular bedding material (Class B) to a depth of 5' -0" (1.52m), compacted to 95% of max. density at optimum moisture content as determined by Modified Proctor Test to provide even bearing under pipe. Leave recesses at joints.

All piping must be inspected and approved by the Plumbing Inspector and Engineer prior to covering or piping.

(d) Backfilling

Do not commence backfilling until work to be covered has been inspected by the Plumbing Inspector and Engineer.

.2 Cutting and Patching

Cutting of holes and related patching, in floors, roof or walls where required for mechanical installations, shall be provided by this Contractor. Coordinate with General Contractor for openings to be left for mechanical equipment or air circulation. Hire the services of the necessary trade to perform any cutting, core drilling, patching and making good to all materials and surfaces affected by the work disturbed or tampered with, in order that his portion of the contract can be completed satisfactory

.3 Access Doors in Building Construction

(a) Provide access doors in floors, wall, ceilings, etc. to give access to mechanical lubrication points, controls, duct hardware, cleanouts, fire dampers, isolating and balancing valves, air vents, etc.

(b) Appropriate size and type to suit the individual application, and similar to adjoining construction.

(c) 12 gauge prime coated steel access door with heavy duty fully concealed hinges and positive locking and master keyed cylinder lock. Size: 18" x 18" (450mm x 450mm) as manufactured by Mifab.

(d) Fire rated access door has 16 gauge steel frame, 20 gauge insulated steel door attached to frame with continuous hinge with stainless steel in. Self-latching key operated cylinder lock. Size 16" x 167" (400mm x 400mm) as manufactured by Mifab.

(e) Access doors are not necessary where inverted "T" lay-on ceiling tile construction is used.

(f) Supply access doors to the appropriate sub-trade for installation.

(g) Individually specified access doors occurring directly on exposed mechanical items need not be coordinated in the above manner.

.4 Sleeves and Escutcheons

(a) Provide sleeves for piping and ducts, and provide lintels for openings for grilles, fans and similar equipment. Installation by General Contractor.

(b) Do not set pipes in contact with concrete, masonry, wood, steel or similar materials. Pipes must be free to expand, contract or otherwise move without wear or noise.

(c) Pipe insulation shall be carried uninterrupted through pipe sleeves except where otherwise noted or required by Ontario building code or local authority. Where space will not permit application of sectional insulation on pipes in sleeves, pack sleeves with insulation.

(d) Pipe sleeves shall be of the same material and wall thickness series as the pipe. For piping passing through partition walls #22 gauge galvanized steel sleeves are acceptable. Insulation on pipes passing through fire walls to be fit tight to the fire stop material and shall not pass through.

(e) Where exposed pipes pass through floors, walls, etc., finish with solid type escutcheon plates held in place with set screws where necessary. Paint escutcheons to match the walls except when used with chrome piping, when they are chrome plated to match. When pipes are insulated, escutcheons may be omitted, provided the insulation is butted neatly to the wall and completely covered by its finish jacket in a manner acceptable to the Engineer.

.5 Supports

(a) This Contractor shall supply and erect all special structural or concrete work required for the installation of the mechanical equipment. He shall supply and install all anchor bolts and other fastenings. Where apparatus is required to be mounted on concrete pads, this Contractor shall locate the pads accurately and with neatly chamfered edges and corners.

(b) This Contractor shall supply and install all necessary steel beams, channels, angle iron for supporting the equipment, pipes, apparatus, etc.

(c) Welding to, cutting or burning of structural members by Contractor will not be permitted, except where approved. No holes will be punched or drilled in structural members without the prior consent of the Engineer. Where such permission is not given, all attachments to steel members shall be done with suitable clamps or clips.

.6 Fire Stopping and Smoke Seals

(b) Provide fire stopping and smoke seals where ducts, pipes or conduits penetrate rated fire separations to maintain integrity of fire separations. Fire stopping materials to meet ULC CAN S115 and be ULC listed.

(c) Firestopping to be manufactured by 3M.

(d) Installations to conform to approved ULC details and standards. Seal space between penetrating service and sleeve or opening in slab with firestop and smoke sealing system in accordance with terms and conditions of original ULC approval and manufacturers recommended procedures. Contractor to submit firestopping system details to Engineer for approval prior to installation.

(e) Select firestopping system to allow insulation and vapour barrier to pass un-broken through assembly, as required.

(f) Follow Manufacturer's published installation instructions precisely including field quality control after installation. Surfaces to be clean, dry and free from dust, oil, grease, loose or flaking paint and foreign materials at time of application of materials.

(g) Submit to Consultant, suitable document signed by Manufacturer's local representative, stating:

.1 Div. 15 sub-contractor received sufficient installation instruction from Manufacturer's representative.

.2 Manufacturer's representative witnessed installation procedures on site.

(h) Remove firestopping assembly for random inspection by Consultant and replace at no extra cost to Owner.

.7 Painting

(a) Carefully brush and clean all iron work after installation in order that it may be in proper condition for paint. Paint all metal, unless galvanized or shop primed, with one coat of metal priming paint.

(b) Clean any equipment defaced during construction to restore original finish. All mechanical equipment which comes on the site pained, rusty or otherwise defaced due to construction and installation is to be pained with one coat of paint, oil base type, of the original colour.

(c) Paint all inside surfaces of all duct black, back at least 2' -0" (600mm) from all grilles and registers.

(d) Unless otherwise noted, finish painting will be performed by General Contractor. Provide assistance in the form of supervision to General Contractor to ensure that painting and colour coding of the work of this Division is done correctly.

.8 Electrical Wiring and Starters of Mechanical Devices

(a) All electrical power wiring and non-integral motor starters shall be provided and installed by Division 16.

(b) Advise Division 16 Contractor of the appropriate designations of all starters to enable the Division 16 contractor to label same.

(c) Install motorized equipment. Some of the said equipment contains packaged wiring, etc. such that Division 16 Sub-Contractor will only have to bring power to an electrical connection point.

(d) All devices must bear CSA approval stamp. Verify that the power characteristics

specified herein agree with the requirements of the installation before any equipment is ordered.

3.3 Field Quality Control

.1 Efficiency and Capacity Tests

(a) When the systems called for under these specifications are ready to be turned over, subject these systems to continuous runs of 24 hours for the purpose of demonstrating that all heating, ventilating and air conditioning units are operating properly and that the systems are balanced and provide uniform temperature inside the building.

Perform these tests under the direction of the Engineer's representative and if the systems fail to perform the duties a herein specified, and if the apparatus and equipment are not in good condition and do not meet the requirements of the specifications, rectify these defects at no cost to the Owner.

(b) Thoroughly lubricate all bearings and advise the Owner or his representative in regard to the proper maintenance and operation of all equipment. Equipment and systems must be free from objectionable noise. This is a requirement of this Contact.

.2 Hydrostatic Test

(a) Test piping for the domestic water supply and sanitary drainage systems to the required extent and duration as required by the Plumbing Inspector. Make such tests with his representative in attendance, and perform any other tests in conjunction with such hydrostatic tests required by him without extra cost to the Contract in accordance with the Ontario Building Code.

(b) Submit written test results to the Engineer.

(c) Before testing, remove all equipment which is not designed to withstand the test pressures.

End of this Section

1.0 **Manufacturer's Nameplates**

.1 Provide metal nameplate on each piece of equipment, mechanically fastened complete with raised or recessed letters.
.2 Indicate size, equipment model, manufacturer's name, serial number, voltage, cycle, phase and power of motors.
.3 Locate in conspicuous location to facilitate easy reading from operating floor and to properly identify equipment and/or system.
.4 Provide stand-offs for nameplates on insulated surfaces.
.5 Do not insulate or paint over plates.

2.0 **Ductwork**

.1 50 mm high black stenciled letters and directional flow arrows 150 mm long x 50 mm high. Provide at points of access.

3.0 **Piping**

.1 Label all piping in at access points.
.2 Label all piping to indicated content and direction of flow.
.3 All markings/identification shall be painted on with stencil.
.4 Locate identification where it may be easily seen from floor. Locate as follows:
  .1 At least once in each room
  .2 At each piece of equipment
  .3 At each branch close to connecting point to main
  .4 At entry and exit point of chases or other concealed spaces
  .5 Both sides where piping passes through walls, partitions, or floors
  .6 Behind each access door and panel
  .7 At valves
.5 Where outside diameter of pipe (or insulation) exceeds 3" provide labels with a minimum width of 2.5" and 2" high letters. Where outside diameter of pipe (or insulation) is 3" or less, provide labels of 1" minimum width and 1" high lettering.
.6 Conform with ASHRAE and ANSI/ASME Standards for primary label colour and with legend and direction arrows in black. Print legend in full wherever feasible, or a recognized abbreviation of the service involved.

4.0 **Valves**

.1 Supply and attach to each valve, a brass tag 1" (25 mm) in diameter with black numbers embossed on it, numbered in consecutive order. These tags shall be of approved neat design and shall be attached to valves by means of a brass chain.

5.0 **Controls Identification**

.1 Identify all systems, equipment, components, controls and sensors.
.2 Inscription to identify function and, where applicable, fail-safe position.

6.0 **Execution**

.1 Do identification work in accordance with ASHRAE and ANSI/ASME Standards except where specified otherwise.

End of this Section

PART 1 - GENERAL

1.1. WORK INCLUDED

.1 Comply with General Requirements and all documents referred to therein.

.2 Provide all labour, materials, products, equipment and services to supply and install thermal insulation, vapour barriers and finishes for mechanical work as indicated on the Drawings and specified in this Section of these Specifications.

.3 Insulation requirements shall comply with Part 5 of the Model National Energy Code of Canada, latest version and insulation thickness shown are the minimum acceptable.

.4 Meet NFPA 90A and NFPA 90B. Maximum flames spread rating of 25 and maximum smoke developed rating of 50 in accordance with NFPA 255-1984 and CAN4-S102-M83 for all components of insulation system. Materials tested in accordance with ASTM C411.

.5 Insulation thickness and conductivity shall meet or exceed the minimum standards of ASHRAE 90.1 as listed in table included herein.

.6 “Concealed” – insulated mechanical services and equipment in hung ceiling and non-accessible chases and furred spaces.

.7 “Exposed” – will mean not concealed as defined herein.

.8 The following systems shall be insulated.

a. Domestic cold water
b. Domestic hot water
c. Domestic Recirculating Water
d. Rainwater leaders (horizontal runs) and hopper sumps
e. Hot water piping, equipment and specialties
f. Chilled water piping, equipment and specialties
g. Condensate drains in ceiling spaces and occupied spaces
h. Refrigeration suction lines of condensing units.
i. Fire protection systems in unheated areas.
j. Outdoor air intake air plenums/ducts.
k. Exhaust air plenums/ducts within 10 feet of exiting building.
l. Supply air ducts.
m. Return air ducts exposed in mechanical rooms.

.9 The following items shall not be insulated:

a. Ductwork with internal acoustic insulation. But overlap the lined duct by 1 foot with thermal insulation

b. Return air ducts inside the building structure.

c. Supply air duct exposed in the room it serve.

1.2. SUBMITTALS

.1 Submit samples and specification sheets of all types of insulation materials specified in this Section of the Specifications. Include manufacturer’s installation instructions.

1.3. ENVIRONMENTAL REQUIREMENTS

.1 Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics and insulating cements.

1.4. QUALITY ASSURANCE

.1 Insulation materials must be manufactured at facilities certified and registered with an approved Registrar to conform to ISO 9000 quality standard.

PART 2 - PRODUCTS

2.1 MATERIALS – GENERAL

.2 Acceptable insulation manufacturers are Owens Corning Canada, Johns Manville, Manson Insulation Inc., Knauf Fiber Glass and Certainteed.

.3 Provide insulation and covers in strict accordance with authorities governing combustibility and fireproofing of materials and in accordance with manufacturer's recommendations.

.4 Rigid insulation board shall be used on ducts in mechanical rooms and where insulation is exposed to view. A minimum of 2 rows of fasteners per side shall be used. Butt all joints tightly and seal all break and joints by adhering a 4” wide tape with Foster 81-99 safetee Ductfas to cover all breaks, joints and holding pins.

.5 Provide non-combustible insulation, jackets and finishes having a Flame Spread/Smoke Developed rating of 25/50 or less, meeting CAN/ULC S-102 requirements.

.6 Attain a complete and continuous vapour barrier over insulation applied to cold and dual temperature piping, sheet metal and equipment. Use either factory applied vapour barrier jacket or field applied Reinforced Foil Flame Resistant Kraft vapour barrier jacket. Apply to piping, fittings, valves and inline components, sheet metal and fittings and equipment. Seal longitudinal and circumferential laps with Childers CP82 or Bakor 230-39 adhesive. If vapour barrier jacket is not lapped, seal joints with self-adhering {100mm} [4"] wide plain aluminum foil tape, or adhere {100mm} [4"] wide aluminum foil tape with Childers CP82 or Bakor 230-39 adhesive. Jacketing with self-adhesive laps and self-adhesive vapour barrier tape will be an acceptable alternative closure system.

.7 Recover all exposed insulation and insulation finishes with minimum {0.20kg/squaremetre} [6oz.] canvas, and two applications of Childers CP50 or Bakor 120-09 white fire resistant coating. An acceptable alternative recovering will be PVC fitting covers and jacketing, installed as per manufacturer's instructions, and conforming to the specified Flame Spread/Smoke Developed Rating.

.8 Recover insulation and insulation finishes outside the building or exposed to the weather with one {1.5mm} [1/16"] thick layer of Childers Encacel X or Bakor 110-26 fire retardant black mastic vapour barrier coating. Embed a layer of woven glass reinforcing fabric into the wet coating, lapping ends and edges at least {75mm} [3"]. Apply a top coating of {1.5mm} [1/16"] thick Encacel X or Bakor 110-26 over the entire surface of the fabric. Seal the entire covering to achieve a watertight assembly.

.9 In lieu of above recovering of insulation and insulation finishes outside the building, aluminum jacket with aluminum fittings may be substituted. Band all transverse seams with waterproof

mastic tape and caulk all longitudinal seams with silicone caulking. Seal the entire covering to achieve a watertight assembly.

2.2 PIPE INSULATION

2.2.1 Provide insulation materials with a minimum thermal conductivity of:

{0.036 W/m.ºC} [0.24 BTU.in/(hr.ft^{2}ºF] at {38ºC} [100ºF] mean temperature.

{0.042 W/m.ºC} [0.28 BTU.in/(hr.ft^{2}ºF] at {65.5ºC} [150ºF] mean temperature.

{0.049 W/m.ºC} [0.33 BTU.in/(hr.ft^{2}ºF] at {121ºC} [250ºF] mean temperature

2.2.2 On hot piping applications, hold insulation in place with flare type staples (outward clinch).

2.2.3 Apply pipe insulation over {40mm} [1-1/2"] in thickness in two layers with joints staggered.

2.2.4 Insulate fittings with fabricated mitered or preformed sections of specified insulation.

2.2.5 Insulate over flanges and mechanical couplings with specified insulation and thickness, sized to suit flange diameters. Fill spaces between insulation and adjoining pipe insulation with similar material.

2.2.6 Insulate valves and inline components with flexible insulation density {12kg/cubicmetre} [3/4lbs./cu.ft.] compressed not more than 50% of original thickness. Build up to specified thickness with approved asbestos free finishing cement.

2.2.7 Do not insulate terminal unit automatic control valves installed in hot piping. Do not insulate terminal unit automatic control valves which are installed in cold and dual temperature piping and which are located over condensate drain pans.

2.2.8 Provide removable {1.31mm} [18gauge] galvanized sheet metal enclosures lined with Armaflex II sheet insulation {25mm} [1"] thickness on pipeline strainers to facilitate screen access.

2.2.9 Under all hangers used on dual temperature water and domestic cold water, provide an insert between support shield and piping for piping {38 mm} [1½"] or larger. Fabricate using T-12 calcium silicate or other high density insulating material suitable for temperature application. Insulation inserts shall not be less than the following lengths:

Pipe Size	Length
{40 mm - 60 mm} [1½" – 2½"]	{250 mm} [10"]
{75 mm - 150 mm} [3" - 6"]	{300 mm} [12"]
{200 mm - 250 mm} [8" - 10"]	{400 mm} [16"]
{300 mm and over} [12" and over]	{550 mm} [22"]

2.2.10 Provide one of the following pipe insulation types, and as scheduled in the Pipe Insulation Table.

.1 Type P1: Owens Corning 850 Pipe Insulation, Johns Manville Micro-Lok AP-T PLUS Fiberglas Pipe Insulation, Manson Fiberglas Pipe Insulation or Knauf Pipe Insulation with factory applied all purpose vapour barrier jacket where scheduled.

.2 Type P2: Johns Manville Thermo 12 Gold throughout molded hydrous calcium silicate type, indicating asbestos free pipe insulation. Density shall be not less than

{224kg/cubicmetre} [14lbs./cu.ft.]. Insulation shall be banded securely in place with {20mmx0.5mm} [3/4"x.020"] stainless steel bands on maximum {300mm} [12"] centres.

.3 Type P3: Owens Corning Flex-Wrap Pipe Insulation, Johns Manville Pipe & Tank, Manson Multi-Flex or Knauf Flex-Wrap with protective reinforced foil scrim, {48 kg /cubic metre} [3.0 lbs /cu.ft.] density.

2.2.11 Pipe Insulation Table:

No	Duty	Insulation Type	Thickness	Vapour Barrier
1	Domestic cold water			
	{38mm} [1 ½"] and less	P-1	{12mm} [1/2"]	Yes
	{38mm} [1 ½"] and larger	P-1	{25mm} [1"]	Yes
2	Domestic hot and domestic tempered water, and domestic hot water and tempered water recirculation			
	Less than {40mm} [1 ½ "]	P-1	{25mm} [1"]	No
	{40mm} [1 ½ "] and larger	P-1	{40mm} [1-1/2"]	No
3	Handicap Lavatory			
	domestic cold water supply	P-1	{12mm} [1/2"]	Yes
	domestic hot water supply	P-1	{25mm} [1"]	No
	sanitary waste piping	P-1	{25mm} [1"]	Yes
4	Primary heated water supply and return, and secondary heated water supply and return (Below {94ºC} [201ºF])			
	Less than {40mm} [1 ½ "]	P-1	{40mm} [1-1/2"]	No
	{40mm} [1 ½ "] and larger	P-1	{50mm} [2"]	No
5	Horizontal condensate drains except with fan coil unit enclosure			
	all pipe sizes	P-1	{12mm} [1/2"]	Yes
No	**Duty**	**Insulation Type**	**Thickness**	**Vapour Barrier**
6	Makeup, overflow, drain and equalizer lines for cooling tower			
	all pipe sizes	P-1	{25mm} [1"]	Yes
20	Heat traced pipe for freeze protection			
	{12mm} [½"] to {75mm} [3"]	P1	{25mm} [1"]	No
	{100mm} [4"]	P1	{40mm} [1-1/2"]	No

No	Duty	Insulation Type	Thickness	Vapour Barrier
	{125mm} [5"] and above	P1	{40mm} [1-1/2"]	No

Minimum Pipe Insulation Thickness/Performance Table for Reference:
Minimum Pipe Insulation - in. (mm)

Fluid Design Operating Temperature Range deg.F (deg.C)	Insulation Conductivity		Nominal Pipe Diameter – in. (mm)				
	Conductivity Btu-in./ (h-ft3-deg.F [W/9m-K0]	Mean Rating Temperature deg.F (deg.C)	Less than 1(25)	1(25) & less than 1-1/2(38)	1-1/2(38) & less than 4 (100)	4 (100) & less than 8 (200)	8 (200) and Larger
Heating Systems (Steam, Steam Condensate, Hot Water Heating and Domestic Water Systems)							
			Pipe Insulation Thickness – in. (mm)				
Above 350 (177) 251-350 (122-177) 201-250 (94-121) 141-200 (61-93) 105-140 (41-60)	0.34 (.049) 0.31 (.045) 0.30 (.043) 0.29 (.042) 0.28 (.041)	250 (121) 200 (93) 150 (66) 125 (52) 100 (38)	4.5 (115) 3 (75) 2.5 (65) 1.5 (38) 1.0 (25)	5 (125) 4 (100) 2.5 (65) 1.5 (38) 1.0 (25)	5 (125) 4.5(115) 2.5 (65) 2 (50) 1.5 (38)	5 (125) 4.5(115) 3 (75) 2 (50) 1.5 (38)	5 (125) 4.5(115) 3 (75) 2 (50) 1.5 (38)
Cooling Systems (Chilled Water, Chilled Glycol, Brine, and Refrigerant)							
			Pipe Insulation Thickness – in. (mm)				
40-60(4.4-15.5) Below 40 (4.4)	0.27 (.039) 0.27 (.039)	75 (24) 50 (10)	0.5(12.5) 0.5(12.5)	0.5(12.5) 1.0 (25)	1.0 (25) 1.5 (38)	1.0 (25) 1.5 (38)	1.0 (25) 1.5 (38)

2.3 SHEET METAL INSULATION

2.3.1 Provide insulation with a minimum thermal resistance of {0.036 W/m.ºC} [0.25 BTU.in/(hr.ft^{2}ºF)] at {24ºC} [75ºF] mean temperature.

2.3.2 Prior to finishing of insulation of hot and cold exposed rectangular ductwork, provide corner beads similar to Roll-on Type.

2.3.3 Apply vapour barrier over insulation on cold and dual temperature ducts.

2.3.4 Circular silencers and acoustic plenums need not be externally insulated.

2.3.5 Ductwork and casings lined with acoustic insulation {25mm} [1"] or more in thickness need not be externally insulated. Refer to Section 15890 for Acoustic Insulation.

2.3.6 Provide one of the following external sheet metal insulation types, and as scheduled in the Sheet Metal Insulation Table.

.4 Type D1: Owens Corning Rigid Duct Insulation, Johns Manville 814 Spin-Glas, Manson 800 Series Spin-Glas Rigid Insulation Board or Knauf Rigid Insulation Board, not less than {48kg/cubicmetre} [3lbs./cu.ft.] density. Impale insulation on mechanically fastened pins located at not greater than {300mm} [12"] centres. Secure insulation with speed washers.

.5 Type D2: Owens Corning Flexible Duct Insulation, Johns Manville Microlite type 75 Duct Wrap, Manson Microlite Duct Wrap or Knauf Duct Wrap, {12kg/cubicmetre} [3/4lbs./cu.ft.] density. Adhere insulation to duct surface with Childers CP82 or Bakelite 230-39 adhesive, which shall be applied in strips {150mm} [6"] wide at not greater than {300mm} [12"] centres. Lap all edges at least {50mm} [2"] and secure insulation with fire resistant tying cord, similar to Fiberglas EC9-4-T. Take care that insulation is not compressed to less than specified thickness. It is recognized that some compression of insulation will take place immediately under tying cord, but in no case shall the thickness of the compressed material be less than 75% of original specified thickness.

.6 Type D3: Owens Corning Rigid Vapour Seal Duct Insulation, Johns Manville 814 Spin-Glas with FSK Facing, Manson Spin-Glas Rigid Insulating Board with reinforced foil facing, or Knauf Rigid Insulation Board with FSK facing. Density shall be not less than {48kg/cubic metre} [3lbs./cu.ft.]. Impale on mechanically fastened pins located at not greater than {300mm} [12"] centres. Secure with speed washers. Butt joints tightly together and seal washers, breaks and joints with self-adhering {100mm} [4"] wide plain aluminum tape, or adhere foil with Childers CP82 or Bakelite 230-39 adhesive.

.7 Type D4: Owens Corning Flexible Duct Insulation, Johns Manville Microlite Type 75 Duct Wrap, Manson Microlite Insulation or Knauf Duct Wrap, {12kg/cubic metre} [3/4lb./cu.ft.] density with factory applied reinforced foil facing. Adhere insulation to duct surface with Childers CP82 or Bakelite 230-39 adhesive, which shall be applied in strips {150mm} [6"] wide at not greater than {300mm} [12"] centres. Butt edges of insulation tightly together, and seal breaks and joints of facing with self-adhering {100mm} [4"] wide aluminum tape or adhere foil with Childers CP82 or Bakelite 230-39 adhesive.

2.3.7 **All Sheet Metal Insulation "R" values and thickness to comply with ASHRAE 90.1-2010 table 6.8.2A**.

Sheet Metal Insulation Table.

No	Duty	Insulation Type	Thickness	Vapour Barrier
1	Panels behind unused portion of louvres	D3	{50mm} [2"]	Yes
2	Outside air plenums and ducts Outside air supply fans	D3	{50mm} [2"]	Yes
3	Mixed air plenums and ducts	D3	{40mm} [1-1/2"]	Yes
4	Relief and exhaust air plenums	D3	{40mm} [1-1/2"]	Yes

No	Duty	Insulation Type	Thickness	Vapour Barrier
5	Exhaust ducts between motorized dampers and building exterior or final {3m} [10 ft] of exhaust air ducts whichever is greater	D3	{25mm} [1"]	Yes
6	Rectangular hot supply ducts	D1	{25mm} [1"]	No
7	Round hot supply ducts	D2	{40mm} [1½"]	No
8	Exposed rectangular cold and dual temperature supply ducts	D3	{25mm} [1"]	Yes
9	Exposed round cold and dual temperature supply ducts	D3	{25mm} [1"]	Yes
10	Supply and return ductwork outside the building or exposed to the weather	D3	{50 mm} [2"]	Yes
11	Concealed supply air, (including ducts in shafts) to air terminal control units, excluding flexible ducts	D4	{25mm} [1"]	Yes
12	Concealed supply air ducts from air terminal control unit discharge to air terminals excluding flexible ducts.	D4	{25mm} [1"]	Yes
13	Heating and ventilating unit casings	D3	{25mm} [1"]	Yes

PART 3 - EXECUTION

2.4 PROTECTION

2.4.1 Protect the work of other trades with tarpaulins.

2.4.2 Protect the work of this trade from being defaced by other trades. Make good any damage and leave in perfect condition, ready for final painting.

2.5 INSTALLATION

2.5.1 Apply insulation over clean dry surfaces, firmly butting all sections together.

2.5.2 Apply insulation, vapour barriers and insulation finishes in strict accordance with manufacturer's recommendations.

2.5.3 Store insulation as per manufacturer instructions.

2.5.4 Apply insulation following pressure testing and inspection of piping and duct systems.

2.5.5 Stagger longitudinal and horizontal joints on multi layered insulation.

2.5.6 Use stand-offs for all duct mounted control accessories.

2.5.7 Butt all edges of insulation and seal all joints with tape adhered over the joint. Fiberglass tying cord shall be used to secure insulation until the adhesive is set. Tape and seal all joints with a vapour barrier tape adhered in place with vapour barrier adhesive.

2.5.8 Insulate valves, fittings, and all other components of each pipe system. Insulation to be mitred sections of pre-formed insulation of a thickness equal to the adjoining pipe insulation. Cover with canvas or PVC jacket. In ceiling spaces PVC jacket is not required. Insulate fittings with fabricated mitred or preformed sections of specified insulations. Insulate over flanges and mechanical couplings with specified insulations and thickness sized to suit flange diameters. Fill spaces between insulation and adjoining pipe insulation with similar material.

2.5.9 PVC elbows are permitted when filled with fiberglass insulation and canvassed to adjacent pipe insulation.

2.5.10 Pipe insulation shall be carried uninterrupted through pipe sleeves, partitions, walls and floors, except where otherwise noted or required by Ontario building code or local authority.

2.5.11 Where space will not permit application of sectional insulation on pipes in sleeves, pack sleeves with insulation.

2.5.12 Secure concealed pipe and duct insulation using ½” aluminum bands spaced on 16" centers. Provide minimum 2 bands per length of each insulation section. Banding shall bedone for each individual run of piping.

2.5.13 Double or group banding will not be accepted.

2.5.14 Do not cover equipment nameplates with insulation.

2.5.15 Coordinate related work with other Divisions.

END OF SECTION

PART 1 - GENERAL

1.1 Description

.1 Description of Work

Provide labor, material and services required for the installation of complete and satisfactorily operable plumbing system, including extensions of, modifications and connections to existing work. Work shown on the drawings and specified herein. The Work includes, but is not limited to the following:

(a) Complete soil, waste, rain water leaders and vent piping systems, including connection to existing infrastructure.
(b) Plumbing fixtures, all necessary trim and accessories.
(c) Excavation and backfill necessary for work and restoration of damaged surfaces as required.
(d) Demolition and removal of existing materials and equipment rendered useless by new Work.
(e) Cutting, patching, sleeves, chases, hangers, testing, and other items required for complete plumbing systems.
(f) Rough-in and final connection to all equipment.

.2 Examination of Site

(a) Contractor shall examine the construction site and existing conditions and to compare field condition with the Drawings and Specifications.
(b) Verify Conditions: Verify measurements and elevations in field as required for work fabricated and elevations in field as required for work fabricated to fit job conditions. Before starting Work, give written notification of any existing deficiencies detrimental to proper and timely installation of Work.

.3 Related Work Specified Elsewhere:

- 15010 Mechanical General Requirements
- 15081 Thermal Insulation for Piping

1.2 Quality Assurance

.1 Requirements of Regulatory Agencies

(a) Local and district by-laws and regulations.
(b) The Ontario Building Code, latest edition.
(c) CAN/CGA B149.1, Natural Gas Installation Code

.2 Work Force

Use sufficient journeyman plumbers and competent supervisors in the execution of this portion of the work to ensure proper and adequate installation throughout. In the acceptance or rejection of installed plumbing, no allowance is made for lack of skill on the part of the workmen.

1.3 Submittals

.1 Shop Drawings

(a) Comply with the provisions of Section 15010.

(b) Submit shop drawings for the following:

i) Piping material
ii) Plumbing fixtures and trim
iii) Plumbing specialties
iv) Drainage products
v) Valves
vi) Floor and roof drains

PART 2 - PRODUCTS

2.1 Piping and Fittings

.1 Buried Sanitary and Storm Below Grade
a) ABS-DWV Plastic pipe certified to CAN/CSA standard B181.1
b) IPEX BDS PVC Sewer Pipe certified to CSA standard B182.1, SDR35 wall

.2 Sanitary Sewer, Storm Drainage and Vents Above Grade
a) IPEX System 15 PVC DWV pipe to CSA B181.2 and CAN/ULC S102.2 except for return air plenum space. For return air plenum space, use IPEX System XFR 15-50 PVC DWV pipe to CSA B181.2 and CAN/ULC S102.2.

.3 Domestic Hot , Hot Water Recirculation and Cold Water for Distribution Above Grade
Type "L" hard copper tubing, wrought copper fittings, lead free solder joints with 95-5 tin antimony. Buried piping in or below floor slab shall be type "K" copper, silver solder or brazed joints, 300 psi test.

2.2 Hangers and Supports - All Piping

.1 Carbon steel clevis type hangers with supporting nut and upper lock nut. Anvil Fig. 260, or equal.
.2 Anvil Fig. 261, or equal, riser clamps.
.3 Inserts for pipe hangers must be used below poured concrete. Inserts shall be as HangerMate as manufactured by Elco or equivalent.

2.3 Valves

.1 All valves shall be by one manufacturer.
.2 Gate (size 2-1/2 inch and smaller) - Bronze, Class 125, screwed bonnet, non-rising stem, wedge disc, 125 SWP, 200 WOG, screwed ends.
.3 Globe - Bronze, Class 150, union bonnet, disc for 250 degree F hot water service, 150 SWP, 200 WOG, screwed ends.
.4 Isolating Ball Valves 2" (50mm) and smaller - 150 lb solder joint, bronze, full port, ball valves with lever handle. Crane No. 9322, Jenkins, Red White/Toyo or Grinnell

.5 Isolating Butterfly Valves 2.5" (65mm) and larger - Full lug type bronze body, bronze disc, alloy or stainless steel shaft, EDPM seat, with notched top plate and lever locked handle for valves up to 6", and worm gear operator with handwheel for valves 8" and larger. Bubble tight service. Crane, Jenkins, Red White/Toyo, Centerline or Grinnell

.6 Check Valve 3" (75mm) and smaller - 150 lb solder joint, bronze, swing type, self-closing in horizontal and vertical position. Crane No. 1342, Jenkins No 92-P, Red White/Toyo, Kitz

.7 Drain Valves - Hose end sediment faucet with wheel handle and brass cap and chain. Crane No. 8-342-½, Emco No. 10240, Jenkins, Crane, Red White Toyo.

.8 Gas Cocks - DeZurik or equal, bronze or semi-steel body, level handle, lubricated 125 WOG, ULC listed screwed ends. Sizes 3-inch and larger shall have flanged ends.

2.4 Clean out (CO)

.4 Same size as the pipe up to 4" (100 mm) diameter, and not less than 4" (100 mm) diameter on larger sizes. Supply clean out located in waterproof areas with flashing flanges and clamping collars.

.5 Floors - Dura-coated cast iron body with nickel bronze serrated top, Zurn Z-1602.

.6 Vertical Piping - Dura-coated cast iron body clean out tee with cast iron countersink plug. Zurn Z-1445.

2.5 Dielectric Couplings

.1 Wherever pipes of dissimilar metals are joined maintain dielectric isolation with suitable couplings, unions, insulating flanges or insulating gaskets between flanges.

.2 Insulating unions for sizes 2" and less. Epco - Dielectric, Watts, Central Plastic Distribution, Corrosion Services Ltd.

.3 Insulating flanges for sizes2 ½" and greater. Watts No. 3100 or 3200

2.6 Access Doors

.1 Wherever plumbing valves or clean out are concealed in walls or ceilings, provide suitable access.

.2 Verify ceiling construction for proper assessment or for quantity of type required.

.3 Access doors and frames in block, concrete and wallboard to be Type M as manufactured by Universal Metal Molding. To be 12" x 18" (30mm x 45mm) for ordinary locations and 24" x 24" (600mm x 600mm) for locations large enough for a man to enter. Frame to be 16 gauge. Door to be 14 gauge.

.4 Access doors and frames in plastered walls and ceilings to be Type K or L by Universal Metal Molding. To be 12" x 18" (300 mm x 450 mm) for ordinary locations and 24" x 24" (600 mm x 600 mm) for spaces large enough for a man to enter. Frame to be 16 gauge. Door to be 14 gauge. Finish with baked-on primer.

2.7 Automatic Trap Seal Primer

.1 Cast bronze, removable gasketed cover, replaceable valve seat. Zurn Z-1022A Sani Gard Automatic Trap Primer. At each trap primer provide gate valve and access door.

2.8 Drain Valves

.1 Furnish NPS ½ brass sediment faucets with hose outlets, at low points of water piping

systems in order to completely drain each system, and also in any other location noted on Drawings. Acceptable Manufacturer: AMCO

2.9 Plumbing Vent Flashing:

.1 Furnish 2 piece, 4 lbs lead flashing with a 4" flange, manufactured per SMACNA Manual, Plate 66, Fig.B. Lead shall extend a minimum of 8" above roof deck. Lead cap shall turn down over lead flashing.

2.10 Standard Plumbing Fixtures

.1 General:
- a) As shown on drawing schedules.
- b) Best of their respective kind, free from all defects. Remove and replace any fixture which in the opinion of the Architect and/or Engineer is defective or damaged.
- c) Include all trim, traps and waste water connections, tanks, etc. usually classed as fittings and required to make the fixture complete in every respect.
- d) Heavily chrome plate exposed parts of fixture trim including faucets, escutcheons, wastes, strainers, traps supplied stops and similar items.
- e) Manufacturers listed in Plumbing equipment schedule are the base bid. Alternate manufacturers may be considered with products and performance of equal or better characteristics of those listed on the drawings and in the specifications.

PART 3 - EXECUTION

3.1 Installation

.1 Drainage Piping and fittings.

(a) Lay drains to true and even falls as nearly as possible to Ontario Building Code (OBC) specified minimum grades unless otherwise specified on the Drawings.

(b) Support piping laid on fill or other stable foundation in accordance with the requirements of the OBC.

(c) All exposed pipe drops in finished areas shall be enclosed with a 20 gauge sheet metal enclosure fastened to the adjacent wall(s).

(d) No pipe shall be laid or roughed-in, unless and until all details and elevations of the storm and sanitary sewer have been established and agreed upon before work is commenced. This Contractor shall be responsible for any and all changes to work of this division because of failure to do this.

(e) Lay pipe to line and grade on Class B bedding shaped to accommodate hubs and fittings as shown and backfill in accordance with method specified in Excavation & Backfill, Section 15000.

(f) Provide minimum cover of (1.2m) 4ft. over top of piping to and from manholes.

(g) Pay all inspection charges for sanitary and storm drains.

.2 Combustible Drainage Piping

(a) “Sanitary Drainage System”

Pipe and fittings above grade in a “Sanitary Drainage System” shall be IPEX “System 15” PVC-DWV or equal alternate. In compliance with the Ontario Building Code

7.2.5.12.(1), this pipe and fitting system shall be Tested and Certified to CAN/CSA-B181.2 for Drain, Waste and Vent applications. In addition, in compliance with the requirements outlined in the O.B.C. 3.1.5.16.(1)(a), when installed in buildings Classified as "**Low-rise Noncombustible"**, this pipe and fitting system shall be Tested and Listed to CAN/ULC-S102.2-M and have a "*flame-spread rating*" not greater than "25".

(b) "Storm Drainage System"

Pipe and fittings above grade in a "Storm Drainage System" shall be IPEX "System 15" PVC-DWV or equal alternate. In compliance with the Ontario Building Code 7.2.5.12.(2), this pipe and fitting system shall be Tested and Certified to CAN/CSA-B181.2 for Drain, Waste and Vent applications. In addition, in compliance with the requirements outlined in the O.B.C. 3.1.5.16.(1)(a), when used in buildings Classified as "**Low-rise Noncombustible"**, this pipe and fitting system shall be Tested and Listed to CAN/ULC-S102.2-M and have a "*flame-spread rating*" not greater than "25".

(c) Plenum Requirements
(O.B.C. 3.6.4.3.)

Combustible Pipe and Fitting Requirements:

All combustible pipe and fittings located within a concealed space described in the O.B.C., 3.6.4.3.(1)(a) used as a Plenum shall be IPEX "System XFR 15/50" or equal alternate and shall be Tested and Listed to CAN/ULC-S102.2-M and have a "*flame-spread rating*" not greater than "25" and a "*smoke developed classification*" not greater than "50".

(d) Combustible Piping Penetrations
(O.B.C. 3.1.9.4.)

Requirements:

All combustible piping penetrations through Vertical or Horizontal "*Fire Separations"* shall comply with the requirements described in the O.B.C., 3.1.9.4.(1) though (8) and provide a firestop system that has been Tested and Listed to the test Standard CAN/ULC-S115-M with a pressure differential of 50 Pa. In addition, the manufacturer shall provide documentation confirming compliance to the required Standard. (It should be noted that Sentence (4),(b) and Sentence (6) restricts the use of all combustible piping within an area designated as a "*Vertical Shaft*"). Documentation shall be submitted to Engineer for approval.

(e) Solvent Welding

It is the responsibility of the selected trade contractor to contact the manufacturer (IPEX Inc.) prior to installation and arrange a demonstration for proper solvent welding procedures as well as recommended solvent cement types.

(f) Expansion / Contraction

Compensation shall be provided to accommodate expansion / contraction on the drainage system. It is recommended that there be compensation on every second floor (opposite the riser clamp) for the vertical piping system. Consult pipe system

manufacturer for specific details regarding approved compensation methods.

Note:

The above Ontario Building Code (O.B.C.) references are taken from the 2006 Edition and should be verified by the trade contractor before proceeding.

In addition, to ensure compatibility, performance and material quality, it is recommended that the pipe and fitting drainage system shall be produced by the same manufacturer.

Furthermore, the manufacturer of the pipe and fitting system shall be contacted by the trade contractor prior to the installation to obtain precise installation instructions. As well, site meetings shall be arranged and include, the Contractor, Manufacturer and Building Inspector.

.3 Vent Piping

(a) Vent all fixture traps and install a vent pipe system in accordance with the OBC and the requirements of local authorities having jurisdiction.
(b) Increase the vent stacks in size below the underside of the roof so that the vent extension through and above the roof is not smaller than 3".

.4 Domestic Water Piping

(a) Grade all horizontal lines of hot and cold water to ensure complete drainage of lines through risers, fixtures and drips. Install sediment faucets in accessible locations to work as drain valves at low points and arrange for convenience connection to floor drains.
(b) Where required, install hot and cold water pipes at least 6" (150 mm) apart in pipe spaces and elsewhere to permit insulation installation.
(c) Allow for expansion and contraction of hot pipes by means of elbows, bends, etc. Do not bind pipe in any way.
(d) Support piping at OBC specified intervals.
(e) Install joints between copper tubing and steel made with cast brass adapters, and between flanged valves and equipment made with cast bronze companion flanges.

.5 Hangers and supports

(a) Pipe hangers, shall fit around the outside of the pipe.
(b) Where concrete inserts are to be used, firmly secure inserts to the forms before the concrete is poured.
(c) Support hangers from structural members by use of additional steelwork or beam clamps. Do not drill structural members and do not weld steel work to structural members unless written permission has been obtained from the Engineer. Do not support pipe work from other pipes.
(d) Install hangers and supports as required by manufacturer’s instructions.

.6 Valves

(a) Install ball valves at all branches from mains and where shown on the Drawings.
(b) Do not solder or braze joints immediately adjacent to valves. Connect adapters to the copper tubing before connecting the valve.
(c) Valves are line size unless otherwise specified.
(d) Install valves in readily accessible locations.

(e) Provide isolating valves on all equipment (& fixtures) so that it may be isolated from the system and removed without interrupting the operation of the rest of the system.

.7 Clean out

(a) Place clean out to have ample room for operating snake rodding equipment. The distance between clean out and any object that may obstruct the cleaning process is 18" minimum.

(b) Install clean out at the upper terminal of all horizontal waste or soil lines; at not more than 50'-0" intervals in piping up to 4" nominal diameter; at all changes in the direction of flow in waste and soil lines; and at or near the base of each vertical waste stack, soil stack, rainwater leader and vent stack. Where more than one change in direction occurs within any 10'-0" of pipe length, one clean out shall suffice.

.8 Plumbing fixtures

(a) Supply, install and connect plumbing fixtures and equipment to the water supply, waste and vent system in accordance with the OBC.

(b) Set fixture level, square and centered with relation to floors, walls and partitions. Standard height from floor to rim, unless otherwise show on the Drawings, and/or as directed by the Engineer.

(c) Attach plumbing fixtures in an approved manner with bolts and wall plates.

(d) All exposed pipes, fittings and stop valves of the fixtures shall be chromium plated and tubing shall be iron pipe size chromium plated.

.9 The following functions are to be performed by the this contractor:

1. Equipment assembly and installation
2. Control Wiring

.10 The following functions are to be performed by others:

a) Separate 208 and 120 VAC power connections – Division 16

3.2 Commissioning – General

.1 Adjust and prove operation as indicated, to suit site conditions such as:

(a) Clean out strainers periodically until clear.

(b) Clean out and prime all floor drain traps using trap seal primers or other means acceptable to the OBC.

(c) Clean out roof drains.

(d) Prove freedom of movement of cleanouts.

.2 Test drainage, vent and potable water system in accordance with the OBC.

(a) Provide all labor, equipment and supervision required for the tests.

(b) Provide a minimum of 24 hours notice to the Engineer.

(c) Before testing, remove all equipment which is not designed to withstand the test pressure.

(d) Submit written test results to the Engineer.

(e) The work of this section is not considered to be complete until all systems and

component parts have been tested and found to be in satisfactory operating condition.

3.3 Cleaning, Preservation and Sterilization

.1 Plumbing piping, fixtures, and equipment shall be thoroughly cleaned of scale, rust, labels, prior to enclosing and placing in operation.
.2 Leave all exposed metal and insulation surfaces clean and ready to receive paint.
.3 Sterilization/chlorination of domestic water system: Upon completion of the work, the entire new domestic hot and cold water piping systems downstream of the connection to the existing system shall be flushed and sterilized before use per code.

3.4 Completion

.1 At completion of work and just before occupancy, plumbing fixtures, and exposed connections, and interior of traps, shall be cleaned.

.2 Repair or replace any damaged fixtures, regulate fixture supplies to give proper supply of water, and leave in first class condition.

.3 When work is completed, remove surplus equipment, materials, and rubbish resulting from this work, and leave building in satisfactory condition acceptable to the Architect.

End of this Section

1.0 General

1.1 System Description

.1 Outdoor condenser unit shall be a RXYQ72XATJA, VRF (variable refrigerant flow) multi split air conditioning system. The system will utilize air cooled condensing unit supplying a number of indoor units. The system will be capable of heating or cooling. All connected indoor units will follow one mode of operation i.e. Cooling or Heating.

.2 Outdoor Unit is designed to operate at outdoor ambient temperatures as high as 23 F. Cooling capacities matched with a wide selection of indoor units. The Unit and the system shall be cUL listed. Exterior must be designed for outdoor application.

1.2 Related Sections

- 15010 Mechanical General Requirements

1.3 Quality Assurance

.1 Unit designed and tested in compliance with the unitary Air-Conditioner equipment program which is based on AHRI standard 210/240.

1.4 Submittals

.1 Submit unit performance data including: capacity, nominal and operating performance.

.2 Submit Mechanical Specifications for unit and accessories describing construction, components and options.

.3 Submit shop drawings indicating overall dimensions as well as installation, operation and service clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.

.4 Submit data on electrical requirements. Include safety and start-up instructions.

1.5 Delivery, Storage and Handling

.1 Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.6 Warranty

.1 The equipment manufacturer shall provide, at no additional cost, a STANDARD PARTS WARRANTY that covers a period of one year from unit start-up or 18 months from shipment, whichever occurs first. This warrants that all products are free from defects in material and workmanship and shall meet the capacities and ratings set forth in the equipment manufacturer's catalog and bulletins.

.2 Warranty is one year for parts and 5 year for the compressor provided that maintenance is carried out to a proven satisfactory level.

2.0 **Products**

2.1 General:

.1 Outdoor Unit Base bid: Daikin Model: RXYQ72XATJA
.2 Indoor Unit Base bid: Daikin Model: see drawing schedule
.3 Alternates to base bid: Refer to section 15010 -2.1

2.2 Outdoor Unit Description:

The outdoor unit will be constructed from steel plate and painted with acrylic paint Munsel 3Y 7.8/1.1.

The outdoor unit will have air-cooled heat exchanger coils constructed from copper tubing with aluminum fins. The coil will be set in an “L” formation with air being drawn in through back of unit and discharge out of the front of the unit. The outdoor unit will have two fans each mounted on the front of the coil.

The outdoor unit will have one inverter controlled hermetic scroll compressor capable of controlling the compressor frequency in 1Hz increments.

The refrigeration process of the outdoor unit will be maintained by pressure and temperature sensors controlling solenoid valves check valves and bypass valves. The heating or cooling mode of the outdoor unit will be controlled by a 4 way valve which will reverse the cycle of the refrigerant to change the mode of operation of the outdoor unit.

The outdoor unit will have one liquid discharge pipe which will supply high pressure liquid to the indoor units in cooling mode and a medium pressure gas/liquid to the outdoor unit in the heating mode. Refrigerant return to the outdoor unit will be via one suction pipe.

The suction pipe shall become the discharge pipe during heating mode. Both pipes shall be separately insulated.

The system will be capable of total pipe runs of up to 150m (492 feet)

The system(s) will have the following nominal capacity and Outdoor unit pipe sizes:-

Model	Heating BTU/h (kW)	Cooling BTU/ h (kW)	Pipe sizes	max. Indoor qty
RXYQ72XATJA	73,000 (21.4)	66,000 (19.3)	3/8" 3/4"	6

The outdoor unit will require a 208-230VAC single phase power supply and have a starting current of no more than 10 amps. Control will be via a 30vdc signal generated by the outdoor unit. This signal will be sent to the indoor units via a 16 AWG 2 core non polar screened cable.

2.3 Indoor Units Description
It will be possible for the total capacity of the connected indoor units to be between 50% and 130% of the capacity of the outdoor unit.

Each indoor unit will have a heat exchanger which shall be constructed from copper tubing with aluminium fins. The flow of refrigerant through the heat exchanger will be controlled by a linear expansion valve. This valve will be controlled by two pipe thermistors and a return air thermistor and shall be capable of controlling the variable capacity of the indoor unit between 25% and 100%.
Each indoor unit will require a 208-230VAC power supply. Control will be via the 30vdc M-net data control signal from the outdoor unit.

2.4 Indoor units Model:

4 Way Discharge Cassette (Models FXZQ12TAVJU and FXZQ12TAVJU)
The units will be manufactured from galvanised steel plate insulated with closed cell expanded polyurethane foam. The ceiling panel will be manufactured from ABS plastic and painted Munsel 0.70Y8.59/0.97.
Air will be discharged by an aerofoil bladed centrifugal turbo fan through four outlets on the perimeter of the ceiling panel. The four outlets shall each include electronically adjustable vanes to alter the angle of the airflow. The room air will be returned to the unit through one grille in the centre of the panel. The return air to the unit will be filtered through a synthetic fibre washable filter installed in the unit.
The unit will have a drain lift up mechanism fitted as standard. The unit will have a fresh air connection knock out and branch duct knock out panel.

Wall Mounted Unit (Models FXAQ12PVJU; FXAQ12PVJU; FXAQ12PVJU)
The unit will be manufactured from ABS plastic and be painted either Munsel 2.60Y 8.66/0.69 or Munsel 0.70Y 8.59/0.97.
Air will discharged by a tangential line flow fan through an outlet in the bottom front edge of the unit. The outlet will have electronically adjustable vanes to enable variable air discharge through the horizontal to vertical downward planes. The outlet shall also include manually adjustable guide vanes to alter the airflow pattern in the horizontal directional plane.
Air will be returned to the unit through grilles mounted in the front face of the unit above the outlet. The return air will filtered by synthetic fibre washable filters mounted behind the return air grilles.

2.5 Local Controls
It will be possible to use a range of different controllers to control the indoor fan coil units. These controllers will be capable of being connected on any part of the non polar 16 AWG two core screened control cable from the outdoor unit. The controls options will be as follow:

BRC1E73
This controller shall be wall mounted and hard wired to the indoor fan coil units. It will be manufactured in ABS plastic with an LCD display and will be the manufacturer's standard colour.
The controller will have a backlight and be capable of switching on/off and altering the set point and mode of operation and vane angle for up to sixteen indoor fan coil units. The controller will also display unit fault codes.

2.6 Central Control

Control Wiring
The contractor shall be responsible for supplying and connecting the interconnecting control wiring between the indoor and outdoor units and control wiring between remote controllers, centralized control and relevant components.

This work shall be co-ordinated with the Electrical / Controls Contractor for the rooting and trunking of the cables.

All control wiring are to be carried out with 2 core 16 AWG shielded cabling with colour coding and tagged with ID number at 3 meter intervals as per schematics for ease of identification and maintenance.

Control wiring shall not be run next to power wiring. A minimum space of 100mm between both control and power cables shall apply.

3.0 Execution

3.1 Mount units as per manufacturer's instructions, and in strict conformance to the details

The fixing of all air conditioning equipment, installation of all refrigerant pipework and full commissioning shall be performed by a specialist refrigerant installer who shall be authorized to install Daikin VRF equipment.
The Manufacturer will provide on site commissioning and start up assistance.
The installation of all internal and external units, refrigerant pipework, inter-connecting wiring, commissioning and testing shall be carried out by an approved refrigerant systems installers.
Full access shall be afforded to site during the installations stage of the project to allow them to verify that installation methods are fully in accordance with Daikin requirements and that the equipment warranties will not be invalidated.

3.2 Refrigerant Pipework

Supply, install, test and commission all interconnecting refrigeration pipework between the outdoor and indoor units.

All pipework to be carried out in refrigerant approved quality copper tubing and complete with the appropriate headers and joints. All pipework must be suitable for R410A.

Longest possible lengths of copper pipe should be utilized to minimize joints on site.

Appropriate refrigeration installation tools must be utilized. Dry Nitrogen must be utilized at all times in the system during brazing.

All pipework (suction and liquid lines) to be insulated with slip on close cell elastomeric pipe insulation (as manufactured by Armaflex or equal and approved) having a wall thickness of not less that ½".

After installation of pipework, and prior to sealing of insulation joints and starting of equipment, pipework should be pressure tested. 44 PSIG test for 3 minutes minimum, then 217 PSIG for 3 minimum, then 478 PSIG for 3 minutes minimum, then strength test to 600 PSIG check the system for leaks and deformation, then lower the pressure back to 478 PSIG and pressure test for 24 hours and checked for leaks. Vacuumed/dehydrated to 300 microns, and hold at that vacuum for 12 hours (minimum)

Refrigerant (R410A) charge weight must be calculated, to the actual installed length of pipe work in accordance to Daikin recommendations.

The charging should be carried out with an appropriate charging station.

Pipework to be properly fixed and supported at a minimum of 1.5 metres (5 feet) centres or as specified by local code and where required should be run on galvanised trays. All pipework to be labelled with ID number (condensing units ref.) at 3 metre (9 feet) intervals.

Joints in copper pipe shall be brazed. Brazing shall be carried out to the requirements of the local code and as per the Canadian copper & brass development association recommendations.

3.3 Condensate Pipework

A condensate line shall be installed to each fan coil unit. This shall be installed and insulated all as per the standard specification. Minimum size of condensate pipes to be 25mm (1 inch) copper or plastic, insulated and pumped or by gravity from each fan coil/cassette, drains to run 1:80 min falls as indicated on drawings.

3.4 Electrical Disconnects

Electrical disconnects are not supplied with the equipment, and the electrical contractor will be responsible to provide electrical disconnects for all outdoor units, indoor units and other components requiring disconnects.

3.5 Examination

.1 Verify that surfaces are ready to receive work and opening dimensions are as Indicated on shop drawings.

3.6 Installation

.1 Install in accordance with manufacturer's instructions.

3.7 Cleaning

.1 Clean work.
.2 After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.

3.8 Log Books

.1 Full commissioning Logs shall be supplied by the manufacturer’s local distributor. These shall be completed fully and included with the main Installation and

Operation Manuals prior to hand over.

.2 In addition, copy pages shall be returned to manufacturer ‘s sales Canada in order that the installation is logged and warranty honoured.

End of Section

PART 1 - GENERAL

1.1. Description of Work

a) Furnish all labour, equipment, materials and accessories, and perform all operations necessary for the installation of energy recovery ventilator unit designated as ERV as shown in drawing set and specified on mechanical equipment schedule in accordance with full intent and meaning of Drawing and Specifications.

b) Scope of Work includes

- Provide all labour, materials, products, equipment and services to install Energy Recovery Ventilator unit indicated on drawings and specified in this Section of the Specification.

1.2. Related Work Specified Elsewhere:

- 15010 Mechanical General Requirements
- 15075 Mechanical Identification
- 15950 Testing Adjusting and Balancing for HVAC
- 15081 Thermal Insulation
- 15811 Metal Ducts – Low Pressure to 500 Pa

1.3. Reference Standards

.1 References, latest editions of the following:

(a) ARI 430 - Standard for Central Station Air Handling Systems.
(b) NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems.
(c) ARI 270, Standard for Sound Rating of Outdoor Unitary Equipment.
(d) CSA B52, Mechanical Refrigeration Code.
(e) CSA C22.1, Canadian Electrical Code, Part 1.
(f) ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
(g) Ontario Energy Efficiency Act.
(h) Ontario Building Code (OBC)
(i) ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment.
(j) ANSI/ASHRAE/IESNA 90.1-2010 - Energy Standard for New Buildings Except Low-Rise Residential Buildings.
(k) ARI 260P - Method for Rating Air Handling Units for Sound.
(l) SMACNA - HVAC Duct Construction Standards.
(m) ANSI/NFPA 70-1995 - National Electric Code.

1.4. Quality Assurance

.1 The energy recovery cores used in these products shall be third party Certified by AHRI under its Standard 1060 for Energy Recovery Ventilators. AHRI published certifications shall confirm manufacture's published performance for airflow, static pressure, temperature and total effectiveness, purge air (OACF) and exhaust air leakage (EATR).

Products that are not currently AHRI Certified will not be accepted.

.2 Manufacturer shall be able to provide evidence of independent testing of the core by Underwriters Laboratory (UL), verifying a maximum flame spread index (FSI) of 25 and a maximum smoke developed index (SDI) of 50 thereby meeting NFPA 90A and NFPA 90B requirements for materials in a compartment handling air intended for circulation through a duct system. The method of test shall be UL Standard 723.

.3 Unit shall be Listed under UL 1812 Standard for Ducted Air to Air Heat Exchangers. Some exceptions to UL Listing may apply. Units intended for “Outdoor Use” shall be listed using the specific UL requirements for rain penetration, corrosion protection and seal durability and shall be so labeled.

.4 The ERV core shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of ten years from the date of purchase. The balance-of-unit shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of two years from the date of purchase.

1.5. Performance

.1 Energy Transfer

The ERV shall be capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air.

.2 Passive Frost Control

The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10°F and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.

.3 Continuous Ventilation

Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters or defrost cycles under normal operating conditions.

.4 Positive Airstream Separation

Water vapor transfer shall be through molecular transport by hydroscopic resin and shall not be accomplished by “porous plate” mechanisms. Exhaust and fresh airstreams shall travel at all times in separate passages, and airstreams shall not mix.

.5 Laminar Flow

Airflow through the ERV core shall be laminar over the products entire

operating airflow range, avoiding deposition of particulates on the interior of the energy exchange plate material.

PART 2 - PRODUCTS

1.1. Summary

.1 Energy Recovery Ventilator (ERV) shall be a packaged unit as manufactured by RenewAire and shall transfer both heat and humidity using static plate core technology.

.2 The contractor shall furnish and install energy recovery unit as shown and scheduled on the contract documents. The Unit shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

.3 Approved Manufacturers:
RenewAire : HE1.5RXT - ECM

1.2. Construction

.1 The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts.

.2 No condensate drain pans or drains shall be allowed and unit shall be capable of operating in both winter and summer conditions without generating condensate.

.3 The unit case shall be constructed of G90 galvanized, 20-gauge steel, with lapped corners and zinc plated screw fasteners. The unit roof shall be one piece or have watertight standing seam joints and shall overlap wall panels and doors in order to positively shed water.

.4 Access doors shall provide easy access to blowers, ERV cores, and filters. Doors shall have an airtight compression seal using closed cell foam gaskets. Pressure taps, with captive plugs, shall be provided allowing cross-core pressure measurement allowing for accurate airflow measurement.

.5 Weatherhoods shall be screened to exclude birds and animals. Inlet weatherhoods shall be sized to maintain inlet velocities below 500 fpm, and equipped with rain excluder baffles.

.6 Case walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high-density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with minimum R-value of 4.3 (hr·ft2·°F/BTU).

.7 The ERV cores shall be protected by a MERV-8 rated, 2” nominal, pleated, disposable filter in both airstreams.

.8 Unit shall have single-point power connection and a single-point 24 VAC contactor control connection.

.9 Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed motor starters (HE6X and HE8X 208-230/460V models are open drip-proof). Direct drive models (EV450 and HE1X models) shall be EISA-compliant for energy efficiency with open drip proof design and integral thermal protection.

.10 Blowers shall be quiet running, forward curve type and be either direct drive (EV450 and HE1X only) or belt drive. HE1.5X shall be backward incline, motorized impeller type packages. HE6X and HE8X units use backward incline, belt drive blower packages. Belt drive motors shall be provided with adjustable pulleys and motor mounts allowing for blower speed adjustment, proper motor shaft orientation and proper belt tensioning.

.11 The unit electrical box shall include a factory installed, non-fused disconnect switch and a 24 VAC, Class II transformer/relay package.

.12 The ERV shall be provided “inverter-ready” allowing for applications of inverters supplied and installed by others.

1.3. Options

.1 Provide unit and duct connection orientation per project schedule.

.2 Provide double wall construction with 24-gauge galvanized steel liner.

.3 Units are available single at a full range of operating voltages. See project schedule.

.4 Provide motor horsepower as specified in project schedule.

.5 Provide factory installed disconnect fuses.

.6 Provide factory installed filter monitors for each airstream.

.7 Provide ECM controlled motors allowing for preset speeds or variable speed operation with a 0-10 volt DC control signal.

.8 Provide factory installed isolation dampers for fresh air. The insulated dampers shall be of a low leakage design and shall not restrict the airstream, reducing airflow, in any way. The dampers shall be opened with a motor actuator powered by the standard unit transformer package and have a spring return for low off- position power consumption.

.9 Provide 14 inch high, vibration curbs, seismic curbs

Part 2 – Installation

1.4. Unit Location

.1 Locate and orient unit to provide the shortest and most straight duct connections. Provide service clearances as indicated on the plans. Locate units distant from sound critical occupancies.

.2 Install a structurally sound, weathertight, level and properly insulated roof curb with nailers, curb gasket and tie-downs to meet local wind load requirements.

.3 Insure roof decking penetrations inside curb are properly positioned and sized for ducts. Seal all penetrations and gaps between ducts and decking with appropriate fire, weather and acoustic sealant system.

.4 Install fiberglass batt insulation over the decking inside the curb. Insulation thickness to be determined by local thermal requirements.

.5 Use proper rigging, including spreader bars, for safe lifting and placement.

1.5. Vibration Isolation

.1 Provide rubber or spring type isolators appropriately sized for corner weights of the specific unit.

.2 Provide flexible duct connections at unit duct flanges.

1.6. Duct Design

.1 All ductwork shall be designed, constructed, supported and sealed in accordance with SMACNA HVAC Duct Construction Standards and pressure classifications.

.2 Ductwork shall be installed to the curb duct adaptors before unit is set in place.

.3 Both the return and the supply ducts shall be thermally insulated at levels appropriate to the local climate from the unit through the curb and continuous until at least the first elbow or tee. A continuous vapor barrier shall also be provided on warm surface of the insulation.

1.7. Sound Control

.1 To control sound associated with the two blower outlets:

i. Provide straight, gradual transition ductwork for a minimum of 2-1/2 duct diameters downstream from the blower outlet for air velocities of less than 2,500 feet per minute.

ii. Provide continuous acoustic insulation treatment of the duct until after the first elbow or tee.

iii. Provide engineered sound attenuation ductwork to meet noise criteria (NC) requirements. To control sound radiated from the unit:

1.8. Test and Balancing

.1 Test and Balancing may not begin until 100% of the installation is complete and fully functional.

End of this Section

PART 1 – GENERAL

1.1. General

.1 Section 15000 forms part of this Section as though written out herein in full, and is to be read in conjunction with this section.
.2 This specification describes the minimum performance and basic requirements.

1.2. Submittals

.1 Flexible Duct. Internal duct liner.
.2 Diffusers, Grilles, Registers and Louvers.
.3 Back Draft Dampers, Fire Dampers, Motorized Dampers,
.4 Fans, VAV boxes
.5 Provide rated capacities, weights, accessories, fan curves, electrical nameplate data, and wiring diagrams
.6 Manufacturer's Installation Instructions, indicate support, connection requirements, and isolation for servicing, clearances.
.7 As-built Drawings. Maintenance and operation instructions.
.8 Warranty certificates.

1.3 Description of Work

.1 Ductwork refers to all air conveying conduits from rooftop units, commercial kitchen ventilation system, fresh air ducts and exhaust fans to/from the conditioned space.
.2 This work shall include all labour, materials, products, and equipment necessary to install the complete systems of ventilating, and / or air conditioning in accordance with the drawings and the specifications.
.3 The intent of these specifications is to provide complete systems as listed above, and while no attempt has been made to detail or list each individual part required, it is the intent of these specifications to include all parts and the furnishing of all labour reasonably implied by these documents, and which are required to deliver to the Owners, the systems described herein, complete in every detail and ready for operation.
.4 The Contractor shall verify duct routing requirements in the field before fabricating any ductwork. No extras are to be entertained for nominal changes in new duct offsets or cross section Height x Width as required to circumvent obstacles.

1.4 Related Work Specified Elsewhere:

- 15010 Mechanical General Requirements
- 15950 Testing Adjusting and Balancing for HVAC

1.5 Reference Standards

.1 Standards for this section for material and workmanship shall conform to the latest edition of the Ontario Building Code, the Canadian Standards Association, ASHRAE Guide and SMACNA, the strictest of which shall govern in case of disagreement.

.2 References, latest editions of:

(a) ASHRAE

(b) ASTM A653 Specification for General Requirements for Steel Sheet, Zinc-coated (galvanized) by the Hot-Dip Process
(c) CSA
(d) NFPA 90A, Installation of Air Conditioning and Ventilating Systems
(e) SMACNA Duct Construction Standards
(f) Underwriters' Laboratories of Canada
(g) Ontario Building Code, latest edition (OBC).
(h) AMCA Standard 500-D, "Laboratory Methods of Testing Dampers For Rating"
(i) AMCA Standard 500-L, "Laboratory Methods of Testing Louvers For Rating"

1.6 Quality Assurance:

.1 Shop Drawings
(a) Submit shop drawings and product data sheets including performance data, fan curves and sound power levels at the specified operation point, with the flow, static pressure and horsepower clearly plotted.

.2 Quality Assurance:
(a) All materials shall be new, undamaged and of the respective types specified for each specific applications.

.3 Regulatory Requirements:
(a) Comply with requirements of local and provincial authorities having jurisdiction, Ontario Building Code, Underwriters' Laboratories of Canada and applicable NFPA standards.

PART 2 - PRODUCTS

2.1 Duct Work

.1 Flexible ductwork shall not be used.

.2 Duct construction shall conform to ASHRAE and SMACNA standards, SMACNA pressure class < 2" (low pressure):

.3 Ductwork shall be smooth on the inside and free of obstructions, vibration and rattle.

.4 Fabricate ductwork, except as described in the next item, according to the following classifications:

i) Class 1: All ducting subject to positive or negative static pressure of {250 Pa} [1 in wg] or less with maximum velocities of {13 m/s} [2500 fpm] shall be constructed in accordance with SMACNA construction standards for {250 Pa} [1 in wg] duct.

ii) Class 2: All ducting subject to positive or negative static pressure of more than {250 Pa} [1 in wg] up to {500 Pa} [2 in wg] with maximum velocity of {13 m/s} [2500 fpm] shall be constructed in accordance with SMACNA construction standards for {500 Pa} [2 in wg] duct.

.5 Ducts shall have ULC labels for appropriate pressure.

.6 All branches shall have a 45 degree entry.

.7 Interior/exterior ductwork shall be of galvanized steel sheet with Z-275 (G90) or ZF075 (A25) designation zinc coating to ASTM A525M (A525).

2.2 Duct Gage

.1 Low pressure ducts shall conform to “SMACNA HVAC Duct Construction Standards, Metal and Flexible”.

2.3 Duct Work Supports

.1 Supply and install ductwork supports in conformance with “SMACNA HVAC Duct Construction Standards, Metal and Flexible”.

.2 Ducts over 40”mm shall rest on a 1" x 1" x 1/8" galvanized angle iron which shall be supported by a 3/8" diameter threaded iron rod securely anchored by structural members of deck.

.3 Ducts less than 40” shall be supported with 1" 16 gauge galvanized steel strap hangers with two screws on side of duct and one screw on bottom of each strap. Hangers shall be at each joint and no more than 80” on center.

.4 All round ducts shall be supported with 1" 18 gauge galvanized steel hanger ring and strap at no more than 80” centres.

.5 Use double nuts and lock washers on threaded rod supports.

2.4 Acoustic Duct Lining

.1 Supply and install 25mm (1”) Fiberglass rigid coated acoustic duct insulation in the first 12’ of the supply and return air plenum of each rooftop unit and where designated on the drawings by cross-hatching. Adhere the liner with adhesive and use mechanical fasteners.

.2 Rectangular Duct Liner: Johns Manville Linacoustic RC meeting ASTM C 1071 with air surface coated with acrylic coating treated with EPA registered anti-microbial agent proven to resist microbial growth as determined by ASTM G 21 and G22.

b) Duct Liner conforming to NFPA 90A, of 25mm (1") thickness.
c) Noise reduction coefficient: 0.70 or higher based on Type A mounting and tested in accordance with ASTM C 423.
d) Adhesive: Meeting ASTM C 916.
e) Fasteners: Duct liner galvanized steel pins, welded or mechanically fastened.
f) Greenguard Certified

.3 Round Duct Liner: John Mansville Permacote Spiracoustic Plus, rigid preformed round liner, with air surface coated with acrylic treated with EPA register anti-microbial agent proven to resist microbial growth as determined by ASTM G 21 and G22.

a) Duct Liner conforming to NFPA 90A, of 25mm (1") thickness.
b) Noise reduction coefficient: 0.70 or higher based on Type A mounting and tested in accordance with ASTM C 423.

c) Adhesive: Meeting ASTM C 916.
d) Seal all joints with Foster No. 30-36 or Bakor No. 120-09 mastic sealant.
g) Greenguard Certified
h) Seal any damaged insulation (fibers not to be exposed to air stream).
i) Leading edges of insulation shall be capped with sheet metal or covered antimicrobial acrylic mastic equal to duct surface.

2.5 Access Doors

.1 Supply and install openings in ducts wherever required for access to motorized dampers, fire dampers, splitter dampers, coils and filters.
.2 Provide on each opening, a tight fitting access door equipped with heavy locking clamps, double-acting handles, and neoprene rubber gasket “Controlled Air” Model ADR-7.

2.6 Registers Grilles & Diffusers

.1 Diffuser and grill models shall be as shown on the drawing schedule.
.2 Diffuser / grill frame shall be chosen to suit ceiling style.
.3 Color shall be off-white baked enamel unless shown otherwise on drawing schedule.

2.7 Fire Dampers

.1 Supply and install fire dampers in accordance with the Ontario Building Code, in accordance with NFPA 90A and in accordance with conditions of its ULC listing.
.2 Fire damper assemblies to be fire tested in accordance with CAN4-S112.
.3 Fire stop flap assemblies to be fire tested in accordance with CAN4-S112.
.4 Refer to architectural plans for ratings and locations.
.5 Maintain integrity of fire separations by protecting openings.
.6 After completion and prior to concealment obtain approvals of complete installation from authority having jurisdiction.
.7 Install access door adjacent to each damper.
.8 Combination fire and smoke dampers and fire dampers shall be ULC listed and labeled, and meet requirements of Ontario Fire Marshall and NFPA-90A.

2.8 Wall Boxes

.1 Supply and install single, double and triple wall boxes as required where exterior duct terminations are called for on drawings.
.2 Supply and install exhaust wall boxes for sidewall exhausting. Provide single, double or triple wall box, as appropriate to match grouped exhaust terminations complete with top baffle, backdraft damper and extruded aluminum grille. Water shall drain from box and not penetrate the building.
.3 Colour by the architect.

2.9 Volume Control Dampers

.1 Junctions in supply ducts to be fitted with splitter dampers and where shown on drawings.
.2 Branch duct to be fitted with volume control balancing dampers.
.3 Splitter Dampers

a. Install splitter dampers such that the operating mechanism is positioned for easy operation, and that the dampers cannot move or rattle.

.4 Balancing Dampers

a. Ducts over 24" in width and larger (or 4 sqft) or in main ducts shall be opposed blade, Tamco model 1000, non-insulated with channel frame flanged to duct rated for system pressure. Linkage shall be installed in frame and be constructed of corrosion resistant materials. Dampers shall be complete with locking quadrants with open close indication.

b. Ducts under 24" width (or 4 sqft) may be single blade or opposed blade complete with locking quadrants and open close indication.

.5 Motorized Dampers

a. Supply and install Tamco Series low leakage, insulated air-foil dampers series 9000. Dampers to be parallel blade type sizes as indicated on the Drawings with flanged to duct connections, accessible linkage, thermally insulated blades, channel frame insulated on all four sides.

b. Actuator shall be located indoors out of weather.

c. Actuators shall be of appropriate torque and to suit control signal. Coordinate with controls trade.

d. Equal Manufacturers: Tamco, Ruskin, Arrow

2.10 Felexible Duct - Low Pressure

.1 Provide Alpha-Flex rigid aluminum flexible duct. Maximum pressure rating of 20 in wg positive and 1 " wg negative.

.2 Maximum length of flex duct shall be five (5) feet.

.3 Fire rating shall be equal to ULC Class 1 air duct standard 18d. Flame spread rating not to exceed 25. Smoke developed classification not to exceed 50.

.4 Connections shall be mastic sealed and taped with Benjamin Foster #30-02 sealant.

2.11 Exhaust Fans – Roof Mounted

.1 Install exhaust fans located and sized as scheduled and shown on the drawings.

.2 The housing shall be weatherproof, heavy-gauge spun aluminum construction, round aluminum base, rigid galvanized steel internal support structures. Units shall be equipped with an oversized electrical conduit chase through the base and into the motor compartment. Units shall be pre-wired to a junction box mounted in the motor compartment & equipped with an electrical disconnect device.

.3 Balanced backward inclined, centrifugal wheels shall be aluminum, spark-resistant, nonoverloading. Motors shall be continuous duty, permanently lubricated, multi-speed (for applicable models), have thermal overload protection, mounted out of the main airstream, be easily accessible for service, & furnished at the specified voltage, phase.

.4 Each fan shall bear the AMCA Licensed Ratings Seal for Air and Sound Performance, and shall be UL and CSA listed.

.5 18.5. Fans shall be supplied with pre-fabricated curbs and/or mounting system for sidewall mounting complete with motorized damper and heavy gauge corrosion resistant bird guard.

.6 Manufacturers: Pennbarry, Cook, Greenheck, Leader

2.12 Exhaust Fans – Ceiling and Cabinet

.1 Install direct drive ceiling and cabinet exhaust fans located and sized as scheduled and shown on the drawings.
.2 Fan housings shall be acoustically insulated, galvanized steel, & include integral backdraft damper which shall be chatter proof. Face grille shall be of aerodynamic white egg crate design and provide 85% free area. Fans shall be provided with cord, plug, and receptacle inside the housing. Entire fan, motor and wheel assembly shall be removable.
.3 Fans shall have forward curved centrifugal wheel(s). Fan motors shall be multi-speed, positively cooled, have thermal overload protection, be suitably grounded, & mounted on vibration isolators.
.4 Each fan shall be CSA Listed.
.5 Manufacturers: Broan, Reversomatic, Pennbarry, Cook, Greenheck, Leader

2.13 Fan Installation

.1 Install fans in accordance with manufacturer's installation and maintenance instructions.
.2 Provide vibration isolators and flex duct between fan housing and ductwork.
.3 Provide access door in ductwork to allow servicing of motor, damper and fan blade

PART 3 - EXECUTION

1.2 Installation

.1 Seal all joints in low, medium and high pressure ductwork with Transcontinental MP for low and medium pressure or DuroDyne S2 duct sealer for high pressure. Joints shall be sealed to conform to SMACNA standards as follows:

Seal Class	Sealing Required	Static Pressure Construction Class
A	Transverse joints and longitudinal	Up to {500 Pa} [2" w.g.]

Duct Location	Duct Type			
	Supply		Exhaust	Return
	≤ 2in. w.c.[b]	>2 in. w.c. [b]		
Outdoors	A	A	C	A
Unconditioned Spaces	B	A	C	B
Conditioned Spaces[c]	B	B	B	C

a See Table (definition of Duct Seal Level).
b Duct design static pressure classification.
c Includes indirectly conditioned spaces such as return air Plenums.

Duct Seal Levels

Seal Level	Sealing Requirements[a]
A	All transverse joints, longitudinal seams, and duct wall penetrations. Pressure-sensitive tape shall not be used as the primary sealant.
B	All transverse joints and longitudinal seams. Pressure-sensitive tape shall not be used as the primary sealant.
C	Transverse joints only.

a Longitudinal seams are joints oriented in the direction of airflow. Transverse joints are connections of two duct sections oriented perpendicular to airflow. Duct wall penetrations are openings made by any screw fastener, pipe, rod, or wire. Spiral lock seams in round and flat oval duct need not be sealed. All other connections are considered transverse joints, including but not limited to spin-ins, taps and other branch connections, access door frames and jambs, duct connections to equipment, etc.

.2 Ducts shall be of the exact size as indicated on the drawings. Duct dimensions shown on Drawings are net, inside insulation and acoustic duct lining.

.3 All laps shall be in the direction of flow. No sheet metal screws shall be used in the ducts where it is possible to use rivets and bolts. All edges and clips shall be hammered down, so as to have smooth finished surface inside the ducts.

.4 Isolate all equipment with DuroDyne (or approved equivalent) neoprene 0.32" thick flexible connectors with finished fabric width not less than 6". Provide transition joint from duct to fan of a seamless, constant diameter, inert, corrosion and UV-resistant materials. Provide the duct alignment within ½ inch at the hood collar and fan.

.5 All elbows, tees, or bends shall be made with an inside radius of not less than the width of the duct where space conditions permit. Where space does not permit a radius at least equal to the width of the duct, the turn shall be made square with turning vanes, set in the elbow.

.6 Changes in duct shapes must be gradual, not exceeding 1" lateral change in 8" travel along the duct.

.7 All ductwork shall be proven airtight to SMACNA standards before ceiling is installed and ductwork covered.

.8 All ducts shall be "Crossbroken" by bending a break across both corners on both directions. All ductwork shall be complete in itself and no single partition between ducts will be accepted unless specifically shown or otherwise noted.

.9 Frame and install motorized dampers. Unless otherwise shown, attach each motorized damper module to the channel framing.

.10 Seal and weatherproof ducts passing through roof. Solder all joints and seams. Degrease and prime paint any ferrous counter flashings.

.11 Make joints suitably air tight with laps in direction of air flow. Wherever possible, sizes

of ducts shall conform to those indicated. Where building conditions require shape be modified, ducts must have same cross-sectional area indicated and width of duct shall not exceed four times depth except without special approval.

.12 Ductwork shall be pressure tested in accordance with ASHRAE. Duct leakage shall not exceed 3% of air volume at 500 Pa S.P.

.13 Install in ductwork where shown or required, controls, thermometers, motorized dampers, coils, filters, smoke, fire and freeze detectors, etc., in accordance with setting instructions supplied by equipment supplier.

.14 Open end ducts (OED) that do not have a grille/diffuser shall have a protective screen mounted in a suitable frame covering the inlet.

.15 If changes in location of duct are required because of building construction, review withEngineer before the location is changed in any way.

.16 Connect terminal units to supply ducts with 5 foot maximum length of flexible duct. Do not use flexible duct to change direction.

.17 Provide backdraft dampers on exhaust fans or ducts nearest to outside and as indicated.

.18 During construction provide temporary closures of metal or taped polyethylene on open duct work to prevent construction dust from entering duct work system.

1.3 Acoustic Duct Lining Installation

.1 Seal all leading and trailing edges and repair all rips or tears of acoustic duct liner with a suitable sealing compound similar to Johns-Manville Superseal.

.2 Provide a tapered sheet metal nose piece to hold the leading edge of acoustic duct liner and direct the air over the edge.

1.4 Clean Up

.1 Vacuum clean the inside of all air handling systems, including fans, plenums, ducts, coils and terminal units to ensure that they are free from debris and dust.

1.5 Operation Test

.1 The Mechanical Contractor, in cooperation with the other divisions shall be prepared to conduct a full operational test of the heating, ventilating, and air conditioning systems in the presence of the Engineer. They shall be required to be in attendance as long as necessary, and shall be prepared to make any necessary adjustments and corrections at their own expense, to make the systems operational in the manner designated by the Engineer. The manufacturer's representative is to be present during the test.

End of this Section

PART 1 - GENERAL

1.1 Section 15010 forms part of this Section and is to be read in conjunction with this section.

1.2 The balancing of air systems is to be done by an independent balancing contractor specializing in this work. The Mechanical Contractor shall include in his tender price when tendered, the sum of charges made to him for this work.

1.3 This Section includes the testing, adjusting and balancing of air systems to obtain the design conditions. Work shall be repeated until the required conditions have been met.

1.4 Test verification summary reports with all pertinent information, are to be filled out for all tests. The reports shall be signed by the mechanical and balancing contractors to verify the data. Three (3) typewritten reports shall be submitted to the Engineer for approval, noting the tests and adjustments made to each piece of equipment. The reports shall contain system flow rates, pressures, temperatures, motor data, motor operating data, voltages, current draw etc. Reports shall be complete with index pages and index tabs.

1.5 Identify system terminals and distribution on legible plan or schematic drawings depicting actual system arrangement. Label pitot tube traverse locations, terminal identification and equipment identification in a manner consistent with the contract documents.

1.6 The testing equipment shall be itemized in the test reports and shall be approved before any tests are undertaken.

1.7 In the event the report is rejected, re-balance all systems, submit new certified reports and make a re-inspection, all at no additional cost to the Owner

1.8 The balancing contractor shall provide a schedule for all testing and balancing to the Engineer.

1.9 The Mechanical Contractor shall make available staff, as required by the balancing contractor to correct any deficiencies in the mechanical systems which prevent the balancing of the systems.

1.10 Related Work Specified Elsewhere:

.1 15010 Mechanical General Requirements
.2 15764 Heat Reclaim Devices
.3 15811 Ductwork – Low Pressure to 500 Pa and Ancillary Equipment

PART 2 – PRELIMINARY TESTING

2.1 In the event preliminary testing reveals a deficiency in the system which cannot be corrected through the balancing process, advise the Consultant in writing describing the conditions and suggested corrective action.

PART 3 – BALANCING OF HYDRONIC SYSTEMS

3.1 Hydronic Pumps

.1 Test and adjust Zone 1 pump to achieve design flows. Pumps shall be free of cavitation and vibration.

.2 Confirm impeller size by dead head testing.

.3 Plot, on the manufacturer's performance curve, the final operating point. Where pump balancing valves are used to obtain specified water flow, indicate balancing valve final position and recommend impeller size change where applicable.

.4 Test and record motor voltage and amperage. Compare data with nameplate limits.

.5 Test and record system operating pressure at strainer inlet, pump inlet and pump discharge.

.6 Test and record settings of motor thermal overload devices. Adjust settings where required.

3.2 Hydronic Equipment

.1 Test and adjust water flow to hydronic terminal units to obtain the specified flow. Compare actual equipment water side pressure drops with manufacturer's published data.

.2 Where equipment is used in heat transfer (ie. Air/Water Coils), measure entering and leaving liquid/gas conditions and compare to manufacturer's published data.

.3 Where possible, simulate design conditions for testing. If simulation is not practical, perform seasonal testing when design conditions can be achieved.

3.3 Hydronic Piping and Distribution

.1 Adjust water flow in distribution system to obtain specified flows. Balancing contractor shall ensure current flows to existing terminal units are not destabilized during the balancing process. Balancing contractor to obtain the necessary readings on the existing system to establish existing system/zone operation.

.2 Test and record flow and differential pressure systems to establish references for satisfactory operation.

.3 Test and adjust system feeders to ensure adequate system static pressure is available under all operating conditions.

.4 Test and adjust hydronic terminals to obtain specified flow.

.5 Where insulation is damaged, it shall be repaired including the vapour barrier in an approved manner.

.6 In cases where measurements show failure to comply with the drawings and specifications, the mechanical contractor shall pump impeller, etc., as required and new balancing measurements shall be made by the balancing contractor.

PART 4 – MINIMUM BALANCING ACCURACIES

4.1	Terminal Equipment	plus or minus 5%
4.2	Hydronic Mains	plus or minus 5%

PART 5 - REPORTS

5.1 Provide four (4) copies of the TAB report for Consultant review.

5.2 Summarize all testing into logical sections, tabulated and summarized.

5.3 Identify system terminals and distribution on legible plan or schematic drawings depicting actual system arrangement. Label test locations, terminal identification and equipment identification in a manner consistent with the contract documents.

PART 6 – SYSTEM CHECKS

6.1 Provide spot checks of systems where called for by Consultant. If capacities pump speeds, rating, etc. do not agree with submitted balance report, rebalance system or systems in questions, until satisfactory results are received.

6.2 A random sample of report data may be selected for verification. Unless otherwise noted, this shall include air velocity, air or water flow rates, pressure differential, electrical or sound measurement, or other sampling performed under this contract. Sufficient verifications will be performed to satisfy the Consultant that the reports accurately represent the actual system conditions.

PART 7 – BALANCING OF AIR SYSTEMS

7.1 Systems shall be adjusted so that fans operate at lowest static pressure possible.

7.2 The balancing contractor shall measure, make final adjustments and report upon the air volume at each diffuser, register and grille. The static pressure upstream and downstream of the fan, the fan speed and the motor current. Also to be reported are the air flows at each supply grille on each floor.

7.3 Coil working conditions shall only be taken in conjunction with the fluid flow working conditions for the coil.

7.4 Air volumes measure shall be within plus or minus 5% of those shown on drawings for diffusers, grilles, registers, and fans, at both maximum and minimum volumes shown.

7.5 Duct traverse readings shall be taken through the access ports provided. Where no access ports have been provided new holes shall be made as required. These holes shall be resealed after final readings with sheet metal cover plates and sealant. Duct tape is not acceptable.

7.6 Where insulation is damaged, it shall be repaired including the vapour barrier in an approved manner. Duct tape is not acceptable.

7.7 In cases where measurements show failure to comply with the drawings and specifications, the mechanical contractor shall change fan sheaves, etc., as required and new balancing measurements shall be made by the balancing contractor.

7.8 At the time of verification measure space temperature and humidity in a representative number of rooms to verify performance. Tabulate these results and include in certified report as an appendix.

End of this Section

THE TOWN OF PELHAM
EVENT FACILITY ADDITION
HALLEX PROJECT: # 220321

Electrical Specifications

Division 16

Revision 1

June 7th, 2022

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PART 1 – GENERAL PROVISIONS

1 GENERAL

.1 This section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Division 1 - General Requirements - and all documents referred to therein.

.3 The General Conditions of the Contract, the Supplementary General Conditions, and General Requirements shall form part of this Specification as though written out in full herein.

.4 Failure to execute the contract and to file satisfactory documentation, as required herein within the specified time period shall be just cause for the cancellation of the contract award.

.5 Coordinate the electrical work with other trades. Provide an adequate work force and supervision to meet the construction schedule.

2 DEFINITIONS

.1 Wherever the words *indicated*, *designated*, *shown*, *noted*, *listed* or similar words or phrases are used in the Specifications, they shall be understood, unless the context otherwise provides, to mean that material(s) or item(s) referred to shall be read as *indicated on*, *designated on*, *shown on*, *noted on* or *listed on* the Drawings.

.2 Wherever the words *approved*, *satisfactory*, *as directed*, *submit*, *permitted*, *inspected* or similar words or phrases are used in the Specifications they shall be understood, unless the context otherwise provides, to mean that material(s) or item(s) referred to shall be *approved by*, *satisfactory to*, *as directed by*, *submitted to*, *permitted by* or *inspected by* the Consultant.

.3 The term *provide* where used shall be understood to include labour, materials and services necessary to supply the Work and/or and install the item(s) referred to.

3 SPECIFIED, EQUIVALENT AND ALTERNATIVE APPARATUS AND MATERIALS

.1 Tenders shall be prepared and submitted only on the basis of specified material and equipment. Supply all items, articles, materials using methods, operations or techniques mentioned, shown, scheduled or reasonably implied by the drawings and specifications. This shall include all labour, equipment, tools, apparatus and incidentals required to provide a complete and operable electrical system or electrical systems. The plans and specifications are intended to complement one another. Materials and operations shown or implied on one and not the other shall be deemed to be required and must be included in the contract.

.2 If materials or apparatus manufactured and/or specified by a manufacturer named as equivalent are used in lieu of the manufacturer specified, this Contractor shall be responsible for ensuring that the substituted material or apparatus is equivalent in performance and operating characteristics to the specified materials or apparatus, and it shall be further understood that all costs for larger starters, additional space, larger power feeders and any other changes to associated or adjacent work will be borne by the Contractor offering the substitution. In addition, in Equipment Rooms where apparatus named as equivalent is used in lieu of specified apparatus and the dimensions of such apparatus differs from the specified apparatus, prepare and submit for approval before purchase, accurately dimensioned layouts of rooms affected.

.3 In addition to the manufacturers specified or named as equivalent, this Contractor may propose alternative manufacturers of equipment and/or apparatus to the Client for acceptance, listing in each case a corresponding credit for each alternative proposed. The tender price must be based on apparatus or materials specified or named as equivalent. Certify in writing to the Consultant that the alternative meets space, power, design and all other requirements of the specified or equivalent material or apparatus. In addition, it shall be understood that costs for larger starters, space, power feeders, and any other changes to associated equipment, mechanical and/or electrical, required by acceptance of proposed alternatives, will be borne by the party making the proposal.

.4 Unless otherwise noted, all materials and apparatus shall be new.

4 DOCUMENTS

.1 All work shall be in accordance with the Ontario Electrical Safety Code (Latest Edition), the Ontario Building Code (Latest Edition), Canadian Standards Association (CSA), ASHRAE 90.1 Energy Standard, any other Authorities having jurisdiction and to the Owner's requirements.

.2 The sentence in the General Conditions: "Specifications shall govern over Drawings" shall not apply to this Division. Where conflict does occur between codes, Specifications and Drawings, the most stringent stipulation shall govern, and the Tender shall be based on whichever indicates the greater cost.

5 INSPECTIONS AND CERTIFICATIONS AND PAYMENTS

.1 This Contractor shall apply for all required Electrical Inspections and submit a final inspection certificate on completion of the work.

.2 Arrange and pay for permits, tests, certificates of inspection and utility charges required for the Work. Submit applications requiring Owner's signature before commencing Work.

.3 Do Work in compliance with laws, rules, ordinances and regulations of authorities having jurisdiction

6 INSTALLATION DRAWINGS AND INSTRUCTIONS

.1 Provide sleeving drawings showing all openings in the structure and between fire separations with all required dimensions. Provide all changes necessitated by the submission of incorrect or late information.

.2 Provide installation drawings of all Work with dimensions, drawn to scale, and coordinate with all Trades and Divisions. These drawings shall show the actual equipment installed including all switches, outlets and conduit runs. Completely dimension all devices, openings, recesses and sleeves where practical.

.3 Submit all drawings prior to commencement of the Work. Submit copies of drawings to all Divisions for co-ordination.

.4 Submit notification of locations where installation of fixtures, fittings, and equipment would interfere with interior treatment and use of building.

.5 Submit drawings as part of as-built documentation at completion of project.

7 SHOP DRAWINGS

.1 Submit shop drawings, unless otherwise specified, electronically or in the form of hard, original copies for each major item of equipment such as panels, light fixtures, fire alarm and special systems.

.2 Manufacturer's printed data sheets for standard items are acceptable providing pertinent characteristics and specific model numbers are clearly identified and related to specified items. Submit one digital copy of data sheets except where specified otherwise.

.3 Shop drawings shall be clearly marked with project name, identification, materials and/or equipment actually to be supplied, dimensions, weights, capacities, electrical performance characteristics.

.4 Each shop drawing shall be checked and stamped as being correct by the Contractor submitting the drawing before it is submitted. If the above requirements are not complied with, shop drawings will be rejected and returned forthwith.

.5 Where applicable, provide wiring details, schematics, single line drawings, and wiring diagrams showing interconnection with work of other Trades.

.6 Shop drawings for non-catalogue items shall be specifically prepared for this project.

.7 Verify and check dimensions to ensure proper installation of equipment in available space and without interference to work of other Trades. Ensure that electrical and all other coordination is complete prior to submission of shop drawings.

.8 Provide data sheets and samples for all wiring devices and wall plates prior to installation. Device and plate colours/finishes are to be confirmed prior to ordering.

.9 Do not have equipment delivered to site until a shop drawing for the item has been reviewed, approved, stamped and returned.

.10 For lighting fixtures, submit for approval the fixture cuts and catalogue numbers of the fixtures being supplied in the same sequence as the specified fixture list with clear indication of the item designation on the fixture list.

8 PROTECTION OF WORK AND PROPERTY

.1 Each trade shall protect its own and other trade’s finished and unfinished work from damage, due to the carrying out of its work.

.2 Cover floors and other work with tarpaulins, if required, for this purpose. Each trade shall assume responsibility for repairing damage to floor and wall surfaces resulting from its failure to provide such protection. Carry out such repairs in a satisfactory manner without expense to Owner.

9 CLEANING UP

.1 Assume responsibility for removing tools and waste materials during the Work and maintain in clean and perfect condition.

10 EXAMINATION

.1 Carefully examine the local conditions affecting the Work and building site, together with the Architectural, Structural and Mechanical Drawings to make sure that Work under Specification and as shown on Drawings can be satisfactorily carried out without changes. Work for all trade Divisions shall be examined, before commencing Work, and any defect or interference affecting Work shall be reported at once.

.2 No allowances will be made for any expense incurred through failure to make these examinations or on account of any condition of site or any growth or item existing thereon which was visible or known to exist at time Tender for Work was submitted.

11 OFFICE AND STORAGE

.1 Provide temporary office, workshop and tools and material storage space for the Work and assume responsibility for any loss or damage thereto. Buildings erected for this purpose shall conform in appearance to those erected for similar purposes under other Divisions of Specification. Provide heat, light and telephone for the buildings.

12 CO-ORDINATION WITH CEILING AND WALL PATTERNS

.1 Locate wall and ceiling components in exact accordance with dimensions furnished by the ceiling installer, wall finish installer and masonry installer. Make any necessary adjustments in same to allow switches, receptacles, detectors and other devices to coincide with ceiling and wall patterns.

13 SCAFFOLDING, SHORING, RIGGING & HOISTING

.1 Provide scaffolding and shoring necessary for work of this Division. Scaffolding and shoring shall be adequate to protect the workmen according to Provincial and Local Regulations.

.2 Provide labour and equipment necessary for the Work of this Division. Employ only workmen well experienced and skilled in such Trades for this portion of the Work.

.3 Provide hoisting machinery, operators, labour and materials necessary to lift and place equipment supplied under this Division.

14 DRAWINGS

.1 Drawings showing the Work do not show every detail and are diagrammatic only. Record on the As-Built drawings any obtained information involving accurate measurements of building from physical conditions and Architectural drawings.

.2 Provide intermediate supports in walls, ceilings etc as necessary to locate items exactly as directed.

.3 Coordinate locations with other Trades prior to installation.

15 CONTRADICTIONS AND DISCREPANCIES

.1 Prior to the closing of tenders, report any contradiction or discrepancies found in the drawings to the Engineer for clarification.

.2 The Engineer will interpret the intent of the article in question and may issue an addendum to clarify the intent.

.3 Failure by the Contractor to report contradictions or discrepancies until after the tenders close will give the Engineer the right to interpret the intent of the article in question and render a binding decision without having it affect the tendered bids.

16 MINOR FIELD CHANGES

.1 The location, arrangement and connection of equipment and material as shown on the drawings represent a close approximation to the intent and requirements of the contract. The right is reserved by the Architects to make reasonable changes required to accommodate conditions arising during the progress of the work. Such changes shall be done at no extra cost to the Owner, unless the location, arrangement or connection is more than ten feet from that shown.

17 EXECUTION

.1 Start work and proceed as soon as possible after the contract has been let and in accordance with the construction of the building.

.2 Confer and cooperate with other trades in order to eliminate any unnecessary delays to the construction schedule. Where doubt exists regarding other trades, confer with the Architect without delay for detailed instructions concerning how to proceed with the work. Expedite delivery of all equipment and materials to meet the construction schedule.

.3 All drawings are in general made to scale and where figured dimensions are not given, obtain approximate distance by scaling plans. It is however, distinctly understood that the Contractor does so entirely on his own responsibility as the accuracy of the drawings is not guaranteed.

.4 The drawings upon which this contract is based show the arrangements, general design and extent of the conduit, wiring and other systems. These systems are suitably outlined on the drawings with regard to sizes, locations and general arrangements.

.5 The mains and connections thereto are shown more or less in diagram, except where in certain cases the drawings may include details giving the exact locations and arrangements required. Any necessary change or additions to the runs to accommodate structural conditions are done without additional charge or expense to the Owner. Notify the Engineer immediately and secure his authority in writing for such revisions before proceeding with the work.

18 RECORD DRAWINGS

.1 An extra set of white prints of Drawings for Work must be supplied by this Contractor. Mark on these Drawings in red ink, every change and deviation from runs of cable tray, conduit, junction boxes and any other services as originally shown so that, on completion of the job, they will constitute a record of exact locations of those services as installed. Keep these Drawings in the site office and keep them up-to-date. Final certificate of job acceptance will not be issued until these Drawings are completed and submitted.

.2 Dimension locations of junction boxes, pull-boxes, conduits, cable tray and any other items, with respect to building column centers. Mark levels with respect to elevation which will be provided.

DATA BOOK

.1 Submit three complete sets of manufacturer's operating and maintenance instructions, bound in vinyl covered hard backed, 8½ x 11 size, three-ring binders at completion, and before final acceptance of Work. Contents of books shall not include handwritten data.

.2 Title sheet, in each book, shall be labeled "**Manufacturers' Data Book**" and shall bear the following:

.1 Project Name
.2 Date
.3 List of Contents

.3 Each book shall contain the following:

.4 Manufacturer's literature, parts list, approved shop drawing, and name and address of closest service organization and spare parts source, for each item of equipment.
.5 Voltage and ampere rating for each item of electrical equipment.
.6 Suitably fold shop drawings larger than 8½ x 11 and place in a manila envelope, 3-hole punched, for inclusion in book.
.7 Copy of all panel schedules / directories as build with actual Room numbers.

19 COMMISSIONING

.1 Commissioning is the activation of the completed installation to complete working order at the specified requirements as certified by the Consultant.

.2 Be responsible for the installation and performance of all Work provided under this Division.

.3 This Division shall cooperate and provide assistance to the Consultant & Owner as required to perform commissioning. Make labour available for the duration of the commissioning work.

.4 The Contractors shall submit all test and verification forms. The Consultant will use these forms to calculate percentage complete.

END OF SECTION 16010

PART 1 – BASIC MATERIALS AND METHODS

1 GENERAL

.1 This section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Division 1 - General Requirements - and all documents referred to therein.

.3 Conform to the requirements of Section 16010 ELECTRICAL GENERAL PROVISIONS.

2 WORK INCLUDED

.1 Work to be done under this Section shall include furnishings of labour, materials, and equipment required for installation, testing and putting into proper operation complete Electrical systems as shown, as specified and as otherwise required. Complete systems shall be left ready for continuous and efficient satisfactory operation.

3 STANDARD OF MATERIALS

.1 Where materials and equipment are specifically described and named in either the Drawings or these Specifications, it is done so in order to establish a standard of material and workmanship.

.2 Materials required for performance of work shall be new and the best of their respective kinds and of uniform pattern throughout the work.

.3 Materials shall be of Canadian manufacturer where obtainable. Materials of foreign manufacture, unless specified, shall require approval before being used.

.4 Equipment items shall be standard products of approved manufacture. Identical units of equipment shall be of same manufacture. In any unit of equipment, identical component parts shall be of same manufacture, but the various component parts comprising the unit need not be of one manufacturer.

.5 Chemical and physical properties of materials and design performance characteristics and methods of construction and installation of items of equipment, specified herein, shall be in accordance with latest issue of applicable Standards or Authorities when such are either mentioned herein, or have jurisdiction over such materials or items of equipment.

.6 Materials shall bear approval labels as required by Code and/or Inspection Authorities.

.7 Install materials in strict accordance with manufacturer's recommendations.

.8 Include items of material and equipment not specifically noted on drawings or mentioned in Specification but which are necessary to make a complete and operating installation.

.9 Remove materials, condemned as not approved for use, from job site and deliver and install suitable approved materials in their place.

.10 Unless otherwise noted, all materials and apparatus shall be new.

4 CUTTING AND PATCHING

.1 All cutting and patching performed by Division 16 shall be in accordance with Division 2,

Cutting and Patching. Layout such work for approval before undertaking same.

.2 Cutting shall be kept to an absolute minimum and performed in a neat and workmanlike manner using the proper tools and equipment. Caution shall be exercised in all cutting and procedures to ensure that concealed services are not affected. **Do not cut if in doubt.** Request Consultant's presence to determine if concealed services exist.

.3 Assume responsibility for prompt installation of work in advance of concrete pouring or similar work. Should any cutting or repairing of finished/unfinished work be required because such installation was not done, employ the particular trade whose work is involved to do such cutting and patching. Pay for any resulting costs. Layout such work for approval before undertaking same.

5 PAINTING

.1 Primary and final painting for work, other than items specified as factory primed or finished, will be done under Finish Division 9.

.2 Repair and finish factory finished equipment, damaged or scratched during installation, in an approved manner.

.3 All structural steel including hangers, brackets, supports and other ferrous metals shall be shop or factory prime painted wherever practicable. Wherever structural steel including hangers, brackets, supports, and other ferrous metals cannot be shop or factory prime painted, wire brush to remove all traces of rust, clean off all traces of dirt, oil, and grease, and apply one coat of an approved rust inhibiting primer in accordance with CGSB-GB-40d and leave ready to receive finish paint.

6 EXCAVATING AND BACKFILLING

.1 Excavate and backfill as required for the work, both inside and outside the building in accordance with applicable Section in General Division.

.2 Existing underground sewers and other services are indicated on the Site Services Plan, the location of which has been taken from all available information and is assumed to be correct. Carefully check such locations and report any serious discrepancy before proceeding with any work. The services of local Public Utilities Commission, Hydro, Telephone and Gas Authorities shall be engaged to accurately determine location of any underground piping.

.3 Prepare excavation for underground services of required depth and dimension as required so that no portion of any conduit or duct bank bears directly against any rock or other hard surface.

.4 Form bottoms of trenches in earth inside building so that conduits or ducts are supported on a solid bed of undisturbed earth. Care shall be taken to relieve conduits of undue strain.

.5 Support conduits and duct banks passing through building foundation walls.

.6 Thoroughly tamp sand around ducts and over conduits in 150 mm layers to a height of at least 600 mm above top of pipes, conduits and banks and water as necessary. Fill remainder of trench and consolidate in 300 mm layers with approved excavated material, free from stone and water, as required.

.7 Backfill trenches under building floors, roads and paved areas with coarse sand placed in layers in an approved manner. Use clean earth fill for other backfilling.

7 EQUIPMENT IDENTIFICATION

.1 Labels for feeder conduits and cables to indicate their content shall comprise pressure sensitive tape. Labels shall be printed on plastic coated tape, 2" x 6" size with black printing on yellow background indicating applicable voltage, i.e. “208Vac”.

.2 Labels shall be manufactured by:

- W.M. Brady Co. of Canada Limited
- Ideal Electric Canada Ltd.

.3 Provide nameplates on each piece of electrical equipment, namely power panels, distribution panels, lighting panels, disconnect switches, contactors and miscellaneous systems panels.

.4 Nameplates for Disconnect Switches and Contactors shall indicate equipment being controlled and voltage.

.5 Nameplates shall be white lamacoid with beveled edges and black engraved letters. Fasten nameplates to equipment in a conspicuous location. Locate nameplate on flush mounted panels on front of panel behind hinged door.

.6 Modify panel schedules for all lighting and power panels to suit revised layout.

.7 Identify control conductors for motors and equipment by pressure sensitive tape markers at each main terminal point and wherever they are introduced into ducts or equipment.

.8 Maintain a schedule of numbers with corresponding machine numbers and locations and include with Record Drawings.

.9 Label feeder conduits and cables.

.10 Locate labels as follows:

- At every end of every conduit, duct or cable run, adjacent to item of equipment serviced.
- On each exposed conduit, duct or cable passing through a wall, partition or floor (one on each side of such wall partition or floor).
- At intervals of 50'-0" along every exposed conduit, duct or cable run exceeding 50'-0" in length.
- At every access point on concealed conduit duct or cable.

.11 Labels shall be visible from 5'-0" above adjacent floor platform.

8 TESTING

.1 Perform tests of equipment and wiring at times requested.

.2 Tests shall include meggered insulation values, voltage and current readings to determine balance of panels and feeders under full load, and operation of each piece of equipment for correct operation.

.3 Supply meters, materials and personnel as required to carry out these tests.

.4 Test electrical work to standards and function of Specification and applicable codes in an approved manner. Replace defective equipment and wiring with new material and leave entire system in complete, first-class operating condition.

.5 Connect single phase loads so that there is the least possible unbalance of the supply phases.

.6 Submit all test results in report format.

9 CONDUIT SLEEVES AND CURBS

.1 Provide conduit sleeves of galvanized steel for conduit and cable runs passing through concrete walls, beams, slabs and floor.

.2 Extend galvanized conduit sleeves for conduit rising through slabs 4" minimum above finished floors. Provide sleeves, passing through floors having a waterproof membrane, with an integral flashing clamp.

10 SUPPORTS AND BASES

.1 Submit proposed method of attachment of hangers and beam clamps, to cellular steel deck for approval before proceeding with work

.2 Supply and erect special structural work required for the installation of electrical equipment.

.3 Provide anchor bolts and other fastenings unless noted otherwise. Mount equipment required to be suspended above floor level, where details are not shown, on a frame or platform bracketed from the wall or suspended from the ceiling. Carry supports to either the ceiling or the floor, or both as required, at locations where, because wall thickness is inadequate, it is not permitted to use such brackets.

.4 Electrical panels, switches or other electrical equipment shall be complete with suitable bases or mounting brackets.

.5 Provide channel or other metal supports where necessary, to adequately support lighting fixtures. Do not use wood unless wood forms part of the building structure. All light fixtures shall be adequately supported from the roof structure.

.6 Support hangers, in general, from inserts in concrete construction or from building structural steel beams, using beam clamps. Provide additional angle or channel steel members, required between beams for supporting conduits and cables.

.7 Provide any additional supports required from concrete construction for any piping or equipment, by drilling same and installing expansion bolt cinch anchors.

.8 Do not use explosive drive pins in any section of work without obtaining prior approval.

11 HANGERS

.1 Hangers for electrical conduit shall be galvanized after fabrication.

.2 Conduit hangers shall be as manufactured by:

- Burndy Canada Ltd.
- Canadian Strut Products Ltd.
- E. Myatt & Co. Ltd.
- Steel City Electric Co.
- Pilgrim
- Thomas & Betts
- B-line

.3 Do not use perforated strapping (grappler bars).

12 GROUNDING

.1 Ground electrical equipment and wiring in accordance with these Specifications, the Drawings, the Ontario Electrical Safety Code and Local Inspection Authority's Rules and Regulations.

.2 Install grounding conductors, outside Electric Rooms in conduit and conceal where possible. Make connections to water mains, all metallic piping systems, neutral and equipment with brass, copper or bronze bolts and connectors or weld using Cadweld or Thermoweld processes.

.3 Provide grounding conductors, sized as per Code, and connect to grounding bus or water main wherever non-raceways are installed.

13 WIRING OF MECHANICAL TRADES' MOTORS

.1 To limit responsibility and to specifically define the work under this Division, use the following procedure with regard to motors provided under Mechanical Division 15.

.2 The Contractor under Mechanical Division 15 will be responsible for the supply of motors and starters, specific to equipment supplied by their Division.

.3 In every instance whether pertaining to Plumbing, Air Conditioning, Refrigeration, Heating or Ventilating equipment, install starter and wire to line side of the starter or motor. Extend wiring from starter to motor as indicated.

.4 Where individual starters and controls are grouped together, provide a panel for mounting this equipment. Provide a feeder, main fused disconnect and a splitter of adequate size and capacity and wire to line side of the starters on this panel and from starters to motors.

.5 Provide branch circuit wiring and an outlet for each motorized damper, variable air volume box (VAV Box), infrared plumbing fixture control or heating control valve. Control wiring below 120Vac shall be performed under Division 15.

.6 In the case of exhaust fans, unit heaters, gas furnace, energy recovery ventilator, air conditioning and condensing units, terminate wiring on terminals provided. Control wiring, thermostats or other control device operating at voltages below 120Vac will be done under Mechanical Division 15.

.7 Ascertain exact locations of starters, motors, motorized dampers, VAV boxes, infra-red plumbing fixture controls and heating control valves from Mechanical Drawings and coordinate exact locations with Division 15.

.8 Unless specifically determined in Drawings or Specifications, motors up to and including 1/3 H.P., shall be 1 phase, 60 Hz, 120 volts.

.9 Unless specifically determined in Drawings or Specifications, motors 1/2 H.P. and above shall be 3 phase, 60 Hz, 208 volts.

14 WIRING METHODS

.1 Install wiring in conduit unless otherwise specified.

.2 Use thin wall conduit, for branch circuit and feeder wiring in ceilings, furred spaces, and in

hollow walls and partitions. Use rigid galvanized steel conduit for wiring in poured concrete, or where exposed. Use rigid PVC conduit for wiring in slabs on grade and wiring below grade.

.3 Aluminum conduit may be used, in lieu of rigid steel conduit, in clean and dry locations, but shall not be used in poured concrete, or for signal and intercommunication systems wiring.

.4 Flexible conduit and armored cable will be accepted for a maximum length of 3000 mm (10'-0") for final connection to lighting fixtures. Do not connect from fixture to fixture.

.5 Conduit manufacturer's touch-up enamel shall be used to repair all scratches and gouges on epoxy-coated conduit.

15 OUTLET BOXES

.1 Boxes shall conform to C.S.A. Standard C22.2 No. 18-1972.

.2 Where 103 mm square outlet boxes are installed in exposed concrete or cinder block finished areas, blocks will be cut under Masonry Division as instructed under this Section. Opening shall be cut to provide a close fit to boxes and covers so that edges of openings are not visible after installation of plates. Mortar shall not be used to patch up openings that are cut too large or to patch ragged edges.

.3 Ceiling boxes shall be 103 mm octagon or square, complete with fittings, where required to support fixtures.

.4 Switch and receptacle boxes shall be:

- 103 mm square with plaster ring, where flush mounted in plaster walls.
- No. 1104, where flush mounted in wood or drywall, with stud fasteners as required.
- Masonry boxes in masonry walls.

.5 Where boxes are surface mounted in unfinished areas they shall be FS conduits.

.6 Standard outlet boxes shall be manufactured from code gauge galvanized steel.

.7 Provide a suitable outlet box for each powered-door operator, light, switch, receptacle or other outlet, approved for the particular area it is to be installed.

.8 Support outlet boxes independently of conduit and cable.

.9 Locate outlet boxes, mounted in hung ceiling space, so they do not obstruct or interfere with the removal of lay-in ceiling tiles.

.10 Use gang boxes at locations where more than one device, of the same system only, is to be mounted. Each system shall utilize separate boxes.

.11 Use tile wall covers where 103 mm square outlet boxes are installed in exposed concrete or cinder block in finished areas.

.12 Flush mount boxes, panels, cabinets and electrical devices, which are installed in finished areas, shall be provided with suitable flush trims and doors or covers, unless specifically noted otherwise.

.13 Provide pre-formed polyethylene vapor barriers for all boxes located in walls with internal vapor barriers.

16 CONDUIT ACCESSORIES, CONDULETS AND FITTINGS

.1 Conduit accessories, conduits and fittings shall conform to C.S.A. Standard C22.2 No. 18-1972.

.2 Rigid conduit bushings shall be as manufactured by:

- Thomas & Betts Ltd - Series 5031
- Efcor of Canada Ltd - Series 720B
- Commander/Iberville.

.3 EMT Connectors shall be as manufactured by:

- Thomas & Betts Ltd - Steel City TC 121E Series
- Efcor of Canada Ltd - Series 720B
- Commander/Iberville

.4 Ground bushing shall be as manufactured by:

- Thomas & Betts – Blackjack or 1220 Series
- Efcor of Canada Ltd.
- Commander / Iberville

.5 Flexible conduit connectors shall be as manufactured by:

- Thomas & Betts Ltd - Series 3110
- Efcor of Canada Ltd - Series 1001B
- Commander/Iberville
- EMT couplings shall be steel concrete tight to match connectors.

.6 Conduit fittings shall be as manufactured by:

- Crouse-Hinds of Canada Ltd.
- Kondu Mfg. Co. Limited
- Thomas & Betts Ltd.
- Killark of Canada
- Efcor of Canada Ltd.
- Commander/Iberville

.7 Steel conduit shall be as manufactured by:

- Conduits National Co. Ltd.
- MBF Industries

.8 Aluminum conduits shall be as manufactured by Alcan Canada Products Ltd.

.9 Terminate rigid conduit entering boxes or enclosures with nylon insulated steel threaded bushings such as Thomas & Betts – 8125 Series

.10 Terminate flexible conduit entering boxes or enclosures with nylon insulated steel connectors such as Thomas & Betts 5332 Series or equivalent.

.11 Install wall entrance seals where conduits pass through exterior walls below grade.

.12 Provide expansion coupling in conduit runs at building expansion joints and in long runs subject to thermal expansion, all in accordance with manufacturer recommendations.

17 CONDUCTORS, WIRES AND CABLES

.1 Wiring installed in conduit, unless otherwise noted, shall be 600volt "RW 90 X-Link".

However, wiring in channel back of fluorescent fixtures shall be 600volt type GTF or TEW.

.2 Feeder conductors shall be copper or aluminum and sized as indicated on the Drawings. Feeder conductors shall be sized for no more than 2% maximum voltage drop.

.3 Lighting and power branch circuit conductors shall be copper, minimum No. 12 gauge. Branch circuit conductors shall be sized for no more than 3% maximum voltage drop to farthest device on a maximum 80% loaded circuit.

.4 Home runs to lighting and receptacle panels which exceed 75 feet (22.6 m) in length shall be minimum No. 10 gauge.

.5 Conductors shall be color coded. Conductors #10 gauge and smaller shall have color impregnated into insulation at time of manufacture. Conductors size #8 gauge and larger may be color coded with adhesive color coding tape but only black insulated conductors shall be employed in this case, except for neutrals, which shall be white wherever possible.

.6 Color Coding shall be as follows:

- Phase "A" - Red
- Phase "B" - Black
- Phase "C" - Blue
- Control - Orange
- Ground - Green
- Neutral - White

.7 Wire shall be as manufactured by:

- Canada Wire and Cable Co. Ltd.
- Industrial Wire and Cable (1970) Ltd.
- Phillips Cables Ltd.
- Pirelli Cables Ltd.

.8 Neatly arrange circuit wiring in cabinets, panels, pull boxes and junction boxes and hold with nylon cable ties.

.9 Splice wire, up to and including No. 6 gauge, with nylon insulated expandable spring type connectors such as Thomas & Betts – Marr Max Series.

.10 Splice large conductors using compression type connections insulated with heat shrink sleeves.

.11 Where color coding tape is utilized, it shall be applied for a minimum of 2" at terminations, junction and pull boxes and conduit fittings. Do not paint conductors under any condition.

.12 Color coding shall also apply to bussing in panels and switchgear, disconnects, and metering cabinets.

18 LOCATION OF OUTLETS

.1 Location of lighting, convenience, telephone, power and communication outlets shall be subject to change, without extra cost to Owners, provided information is given prior to installation. No extra amount will be paid for extra labour and materials for relocating outlets up to 3000 mm from their original location nor will credits be anticipated where relocation up to 3000 mm reduces materials and labour. Other cases will be considered on their individual merits.

.2 Coordinate location of boxes with latest Architectural drawings and Instructions to suit door swings, millwork etc., prior to rough-in.

19 LOCAL SWITCHES

.1 Local switches shall be 20 ampere, silent, white colored, A.C. type and C.S.A. listed, specification grade. Provide switches rated to suit system voltage 120V.

.2 Local switches shall be as manufactured by:

- Leviton
- Pass & Seymour
- Hubbell of Canada Ltd.
- Cooper Wiring Industries

.3 Local switches and receptacles shall be of the same manufacturer throughout except where a specified item is not made by that manufacturer.

.4 Confirm color with Owner and Architect prior to ordering.

20 ELECTRIC PLATE FINISHES

.1 Switch, receptacle, telephone and other plates shall be white in finished areas and pressed steel in unfinished areas.

.2 Cover plates shall be as manufactured by:

- Leviton
- Hubbell
- Pass & Seymour Inc.

.3 Do not install plates until final painting of room or area is completed. Remove protective covering

21 RECEPTACLES

.1 Receptacles shall be as shown and as specified.

.2 Equal receptacles are acceptable as manufactured by:

- Hubbell of Canada Ltd.
- Pass & Seymour
- Leviton
- Cooper Wiring Industries

.3 Receptacles shall be white colored, specification grade.

.4 Receptacles shall be as listed below:

- 15 ampere, 120 volt, single phase grounded duplex receptacle shall be NEMA-U-ground type CSA Configuration 5-15R.
- ampere, 120 volt, single phase grounded duplex receptacle shall be NEMA-U-ground type CSA Configuration 5-20R.
- 15 ampere, 120 volt, weatherproof receptacles shall be equal to those above but complete with gasketted “while in use” cover.

.5 Other types of receptacles shall be provided as shown on Drawings.

.6 Exact position of service fittings shall be verified to suit furniture or equipment layout.

.7 Connect receptacle's grounding terminal to the outlet box with an insulated green ground strap.

.8 Verify color with Owner and Architect prior to ordering.

22 SAFETY SWITCHES

.1 Fused or un-fused disconnect or safety switches shall be Type "A", quick-make, quick-break construction with provision for padlocking switches in either "ON" or "OFF" position.

.2 Switches throughout job shall be of same manufacture.

.3 Fused switches shall have fuse clips designed for Class "J" fuses and designed to reject standard N.E.C. fuses.

.4 Switches shall be as manufactured by:

- Cutler Hammer
- Schneider
- Siemens

.5 Provide fused or un-fused safety or disconnect switches as shown and as required by Code.

23 FUSES

.1 Fuses shall be sized as shown, time delay type, and of the same type throughout.

.2 Fuses shall be CSA certified Class-J for 1-600 Amps or Class-L for 650 Amps and above.

24 CONTACTORS

.1 Contactors shall be electrically held 60Hz, 120V coil; EEMAC Type 1 general purpose enclosure, Allen Bradley "500L" Series, or equivalent by Cutler Hammer, Klockner Moeller, Schneider, Siemens.

25 TIMECLOCKS AND EXTERIOR PHOTOCELLS

.1 Timeswitch shall be 7-day electronic type capable of automatically controlling lighting loads with batteries for automatic carryover. Timeswitch shall be powered by 120 volt AC 60 Hz. Power supply, as shown on drawings. Timeswitch mechanism shall be installed in a EEMAC 1 enclosure where shown on drawings. Switch configuration shall be SPST with a ULC switch rating of 30 amp resistive.

.2 Photocell shall be thermal type for outdoor use to provide dusk to dawn control. (Required if photocell controls are not integral to light fixtures.)

.3 The thermal controls shall feature a cadmium sulfide photocell and sonic welded polycarbonate case and lens to seal out moisture. The design utilizes a dual temperature compensating bimetal and a metal film resistor for long life operation.

.4 Timeswitch shall be Intermatic ET1700 series or approved equal by Paragon or Tork.

.5 Photocell shall be Intermatic K1100 series or approved equal by Paragon or Tork.

26 LIGHTING OCCUPANCY SENSORS

.1 Ceiling mounted Occupancy Sensors shall be SensorSwitch Model CMR-PDT-10-2P Dual Technology 120 Volt combining Ultrasonic and Passive Infra-Red Technologies. Wire to local 120 volt room branch circuit. Adjust sensor as required on-site for a 360 degree sensitivity range.

.2 Approved equal combination technology sensor shall be Wattstopper or Leviton.

.3 Wall mounted Occupancy Sensors shall be SensorSwitch Model WSX-PDT-D Dual Technology 120 Volt combining Ultrasonic and Passive Infra-Red Technologies. Wire to local 120 volt room branch circuit.

END OF SECTION 16050

PART 1: GENERAL

1.1 WORK INCLUDED

A. This section provides minimum acceptance requirements for seismic restraints for all electrical equipment, conduit, and light fixtures.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete work is provided in Division 03.

B. Mechanical, HVAC, Ductwork, flexible connections are specified elsewhere in Division 15.

C. Sections 16010, 16050 and 16505 in Division 16.

1.3 QUALITY ASSURANCE

A. Unless otherwise directed by the local authority having jurisdiction, the latest edition of the following codes and standards will apply:

1. National Building Code

2. Ontario Building Code

3. Ontario Electrical Safety Code

1.4 SUBMITTALS

A. All vibration isolation and seismic/wind restraint systems shall be by one manufacturer. Preferred manufacturer is Vibro-Acoustics.

B. Submit shop drawings for all devices specified herein and as indicated and scheduled on the drawings. Submittals shall indicate full compliance with the device specification in Part 2. Any deviation shall be specifically noted and subject to engineer approval. Submittals shall include device dimensions, placement, attachment and anchorage requirements.

C. Provide calculations for selection of seismic/wind restraints, certified by a qualified professional engineer, licensed in the province of Ontario.

D. Provide Finite Element Analysis (FEA) of all customized restraints, snubbers, and support structures such as equipment bases and roof curbs. A summary report from the analyses shall be made available to the Engineer and shall indicate compliance with the design forces for the project – including all gravity, wind and seismic loads. The report shall show locations of maximum stress and explain any allowances given for localized yielding along with safety factors.

PART 2: PRODUCTS

2.1 SEISMIC AND WIND RESTRAINTS

A. General:

1. Provide positive seismic and wind restraints on those systems and components required by the applicable building code and by the local authority having jurisdiction.

2. Provide restraint devices as required, specified, and as scheduled for isolated and non-isolated systems and equipment. Provide calculations to determine restraint loadings for all restrained systems and equipment resulting from seismic forces.

3. See the vibration isolation and seismic restraint schedule on the drawings for equipment specific values to be used in calculating the seismic restraint forces.

B Definitions

1. Low: buildings that represent a low direct or indirect hazard to human life in the event of failure.

2. Normal: all buildings except those listed in the Importance Categories Low, High and Post-disaster.

3. High: buildings likely to be used as post-disaster shelters and manufacturing or storage facilities containing toxic, explosive or other hazardous substances in sufficient quantities to be dangerous to the public if released.

4. Post-disaster: buildings required to be operational after a disaster.

5. Provide positive seismic and wind restraints on those systems and components required by the Ontario Building Code and the local authority having jurisdiction.

   .1 Design Spectral response acceleration for short periods, Sa(0.2) shall be 0.34.

   .2 Site Classification shall be D (this is assumed and shall be confirmed by soils report).

   .3 Acceleration based site coefficient, Fa shall be 1.09.

   .4 Importance Factor for Earthquake Loads, I_E shall be 1.0 (Normal).

   .5 Wind reference velocity pressure, q shall be 0.42 kPa.

6. Seismic restraint devices: Devices shall be capable of withstanding the applicable design forces for the specific installation.

   1. Seismic Cable Restraints: Type SRK – Seismic cable sway bracing restraints shall consist of 7x19 galvanized steel aircraft cable sized to resist seismic loads with a safety factor of five (5). Cable end connections shall use heavy brackets, thimbles, and wire rope clips or compression sleeves.

   2. Hanger Rod Stiffener: Structural steel angle attached with a formed steel clamp (Type VAC) to threaded rod support. Steel angle to be provided by contractor; steel clamp to be provided by seismic restraint manufacturer.

3. Seismic Restraint Brackets: Type SRB – Formed steel brackets for securing floor-mounted equipment complete with pre-drilled holes. Brackets shall be galvanized or powder coated enamel for corrosion protection.

4. Concrete Anchor Bolts: Post-installed anchors in concrete shall be qualified for seismic restraint application in accordance with ACI 355.2.

   a. Mechanical anchor bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications.

   b. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications.

5. Grommet Washers: Type GW neoprene grommet washers, 70 durometer, of sufficient size to accommodate USS standard washers, long enough to sleeve through 6 mm (¼") plate material, and with at least 3 mm (1/8") thick material around the bolt hole.

PART 3: EXECUTION

3.1 GENERAL:

A. Coordinate size, doweling, and reinforcing of concrete equipment housekeeping pads and piers with vibration isolation and seismic restraint device manufacturer to ensure adequate space and prevent edge breakout failures. Pads and piers must be adequately doweled in to structural slab.

3.2 SEISMIC RESTRAINTS:

A. General:

1. All equipment, conduit and cable trays shall be restrained to resist seismic forces per the applicable building code(s) as a minimum. Additional requirements specified herein are included specifically for this project.

2. Install seismic restraint devices per the manufacturer's submittals. Any deviation from the manufacturer's instructions shall be reviewed and approved by the manufacturer.

3. Attachment to structure for suspended equipment and conduit: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

4. Wall penetrations may be used as bracing locations provided the wall can provide adequate resistance without significant damage.

5. Coordinate sizes and locations of cast-in-place inserts for post-tensioned slabs with seismic restraint manufacturer.

6. Provide hanger rod stiffeners where indicated or as required to prevent buckling of rods due to seismic forces.

7. Where rigid restraints are used on equipment, ductwork or piping, support rods for the equipment, conduit or cable trays, at restraint locations must be supported by anchors rated for seismic use. Post-installed concrete anchors must be in accordance with ACI 355.2.

8. Ensure housekeeping pads have adequate space to mount equipment and seismic restraint devices and shall also be large enough to ensure adequate edge distance for restraint anchor bolts to avoid housekeeping pad breakout failure.

B. Concrete Anchor Bolts:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre- or post-tensioned tendons, electrical and telecommunications conduit, and gas lines.

2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

3. Mechanical Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.

4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

5. Set anchors to manufacturer's recommended torque, using a torque wrench.

3.3 LATERAL RESTRAINT

.1 Conduits, cable trays and buss ducts: the following sizes, and larger, must be restrained:
- .1 2.5" diameter (62 mm) conduit in general areas
- .2 1.25" diameter (32 mm) conduit in mechanical/electrical rooms
- .3 Cable trays in general and mechanical/electrical rooms
- .4 Bus ducts in general and mechanical/electrical rooms
- .5 Any trapeze with a component combined weight that exceeds the above items

.2 Conduit hung where less than 12" (300 mm) from slab to top of conduit do not require restraint provided the following conditions are all satisfied:
- .1 All conduit supports in the "run" are attached to the structure with non-moment generating connections; and
- .2 At least 12" (300 mm) clearance on each side of the conduit is provided for the entire "run" so that the conduit can swing freely (non-moment connections) and will not contact anything; and
- .3 All conduit supports in a "run" of conduit must be less than 12" (300 mm) from slab to top of the conduit over the whole length. If one conduit support exceeds 12" (300 mm) in a "run", this exception cannot be applied.

.4 The 12" (300 mm) rule does not apply to suspended equipment.

.3 Base Mounted Equipment: all base mounted equipment requires attachments and restraint as specified by the Restraint Engineer.
.4 Suspended Equipment: all suspended equipment requires restraint.
.5 Roof mounted equipment needs to be installed on a structural frame, Lateral force rated roof curb, or structural curb or frame mechanically connected to the structure. Items shall not be mounted onto sleepers or pads that are not mechanically attached to the structure.

3.4 INSTALLATION

1. Provide restraint control measures with spacing and anchorage engineered for the specific project. Provide rod stiffeners where required.
2. Maximum Restraint Spacing
   .1 Conduit - ductile: transverse spacing 40' (12m), longitudinal spacing 80' (24m).
   .2 Cable tray and Bus Duct: transverse spacing 30' (9m), longitudinal spacing 60' (18m).

3.4 INSPECTION AND CERTIFICATION:

1. After installation, arrange and pay for the vibration isolation product manufacturer to visit the site to verify that the vibration isolation systems are installed and operating properly, and shall submit a certificate so stating. Verify that isolators are adjusted, with springs perpendicular to bases or housing, adjustment bolts are tightened up on equipment mountings, and hangers are not cocked.

2. After installation, arrange and pay for the seismic restraint product manufacturer to visit the site to verify that the seismic restraint systems are installed properly, and shall submit a certificate so stating.

End of Section 16171

PART 1 – PANELBOARDS

1 GENERAL

.1 This section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Division 1 - General Requirements - and all documents referred to therein.

.3 Comply with the requirements of Sections 16010 and 16050.

2 WORK INCLUDED

.1 The Contractor shall furnish and install the panelboards as specified and as shown on the contract drawings.

3 REFERENCES

.1 The panelboards and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of EEMAC and CSA.

4 SUBMITTALS FOR REVIEW AND APPROVAL

.1 The following information shall be submitted to the Engineer.

- Breaker layout drawing with dimensions indicated and nameplate designation.
- Component list.
- Conduit entry/exit locations.
- Assembly ratings including:
  a. Short circuit rating
  b. Voltage class
  c. Continuous current rating
- Cable terminal sizes

.2 Where applicable, the following information shall be submitted to the Engineer:

- Busway connections
- Key interlock scheme drawing and sequence of operations

5 SUBMITTALS FOR INFORMATION

.1 When requested by the Engineer the following product information shall be submitted:

- Descriptive bulletins
- Product sheets

6 SUBMITTALS FOR CLOSEOUT

.1 The following information shall be submitted for record purposes prior to final payment:

- Final as-built drawings for items listed in this section
- Installation information
- Seismic certification and equipment anchorage details (where required).

7 QUALIFICATIONS

.1 The manufacturer of the assembly shall be the manufacturer of the major components within

the assembly including circuit breakers and fusible switches.

.2 The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this request.

8 REGULATORY REQUIREMENTS

.1 All panelboards shall comply with the latest standard CSA C22.2 #31.

9 OPERATION AND MAINTENANCE

.1 Five (5) copies of the equipment operation and maintenance manuals shall be provided prior to final payment:

.2 Operation and maintenance manuals shall include the following information:

- Instruction books and /or leaflets
- Recommended renewal parts list
- Drawings and information

10 RATINGS

.1 Panelboards rated 240 Vac or less shall have short circuit ratings as shown on the drawings or as herein scheduled, but not less than 18,000 amperes RMS symmetrical.

11 CONSTRUCTION

.1 Interiors shall be completely factory assembled devices. They shall be designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.

.2 Trims for branch circuit panelboards shall be supplied with a hinged door over all circuit breaker handles. Doors in panelboard trims shall not uncover any live parts. Furnish semi flush cylinder lock and catch assembly to secure hinged door over circuit breaker handles. Provide door-in-door type construction so that the trim may be opened to access wire-ways without removing the trim from the panel. All trims shall have concealed mounting hardware when the door is closed.

.3 Distribution panelboard trims shall cover all live parts. Switching device handles shall be accessible.

.4 Surface trims shall be same height and width as box. Flush trims shall overlap the box by 3/4 of an inch on all sides and shall be constructed to allow trim contact on all sides with box when mounted in flush wall.

.5 A directory card with a clear plastic cover shall be supplied and mounted on the inside of each door.

.6 All locks shall be keyed alike.

12 BUS

.1 Main bus bars shall be plated aluminum or copper sized in accordance with CSA standards to limit temperature rise on any current carrying part to a maximum of 65 degrees C above

an ambient of 40 degrees C maximum.

.2 A bolted ground bus shall be included in all panels.

.3 Full-size insulated neutral bars shall be included for panelboards shown with neutral. Bus bar taps for panels with single-pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection.

.4 Where panels exceed 42 circuits, use multi-section panel with main crossover solid bus bars. Main bus capacity of each section shall be full size to match crossover bus.

13 BRANCH CIRCUIT PANELBOARDS

.1 The Minimum Integrated Short Circuit Rating for branch circuit panelboards shall be indicated on the drawings or as herein scheduled, but not less than 18,000 amperes RMS symmetrical. Panelboards shall be Cutler-Hammer type Pow-R-Line C, PRL-1 or PRL-2. Acceptable alternates are Schneider and Siemens. Panelboards shall have circuit breakers as indicated below.

.2 Bolt-in type, heavy-duty, quick-make, quick-break, single- and multi-pole circuit breakers of the types specified herein, shall be provided for each circuit with toggle handles that indicate when unit has tripped.

.3 Circuit breakers shall be thermal magnetic type with common type handle for all multiple pole circuit breakers. Circuit breakers shall be minimum 100 ampere frame and through 100 ampere trip sizes shall take up the same pole spacing. Circuit breakers shall be CSA listed as type SWD for lighting circuits.

.4 Circuit breaker handle locks shall be provided for all circuits that supply exit signs, emergency lights, energy management and control system (EMCS) panels and fire alarm panels.

.5 Circuit breakers shall have a minimum interrupting rating of 18,000 amperes symmetrical at 240 volts. All breakers shall be approved for switching duty.

.6 Where shown on Drawings or required by Code, certain breakers shall include ground fault interrupter.

.7 Panels shall be surface or flush-mounting type, as shown.

.8 Panels shall be dead front type in code gauge steel enclosures.

.9 Panels for non-linear loads shall be complete with lugs for double neutrals.

.10 Panels shall be constructed and finished in accordance with details specified in Article "Panel Trim".

.11 Supply typed circuit index card with protective plastic cover.

14 PANEL TRIM

.1 Panels shall be given a rust-resistant treatment to both tub and trim.

.2 Flush panels shall have concealed hinges and flush type combination lock latch. Locks shall

be chrome plated. Doors shall open minimum 135 degrees. Trims shall have fasteners concealed and shall be prime coated to receive room finish paint.

.3 Surface mounted panels shall have manufacturer's standard surface door trim complete with lock and latch.

.4 Recessed panels shall have standard flush trims.

.5 Deliver five (5) duplicate keys for each panel lock to Owner.

.6 Mount electrical panels, where possible, with top of trim at uniform height of 2000 mm.

15 ENCLOSURE

.1 Enclosures shall be at least 20 inches wide made from galvanized steel. Provide minimum gutter space in accordance with the Ontario Electrical Safety Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.

16 NAMEPLATES

.1 Provide an engraved nameplate for each panel section.

17 FINISH

.1 Surfaces of the trim assembly shall be properly cleaned, primed, and a finish coat of gray ANSI 61 paint applied.

18 INSTALLATION

.1 The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

END OF SECTION 16471

PART 1 – LIGHTING EQUIPMENT

1 GENERAL

.1 This section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Division 1 - General Requirements - and all documents referred to therein.

.3 Comply with the requirements of Sections 16010 and 16050.

2 WORK INCLUDED

.1 The Contractor shall furnish and install the light fixtures having the electrical characteristics, ratings and modifications as specified herein and as shown on the contract drawings.

3 SUBMITTALS FOR REVIEW AND APPROVAL

.1 Submit one digital copy of shop drawings for the product specified.

.2 Shop drawings shall be clearly marked as to fixture type, operating voltage, ballast or transformer information, number, type and wattage of lamps required, special information regarding housings and ratings for insulated ceilings or any special mounting instructions.

.3 Luminaire shop drawings shall bear the electrical contractor's stamp indicating that the Contractor has reviewed the shop drawings and is satisfied that the product represented meets all the criteria of the specification and is of the type, size and fit that is suited for the system in which it is to be installed. Any discrepancies shall be noted on the shop drawings.

4 SUBMITTALS FOR CLOSEOUT

.1 Provide drawings produced by the Contractor recording as-built circuiting and any layout changes with red ink. These drawings shall consist of four (4) sets of clean drawings marked up as required. The as-built drawings shall be turned over to the Engineer at the completion of the project. The contract shall not be deemed complete until this requirement is fulfilled.

.2 Include a copy of all luminaire shop drawings, manufactures special installation instructions, lamp data and maintenance instructions in the maintenance manuals.

.3 Turn over to the Owner a minimum a spare quantity equal to 10% of the total of each lamp type supplied by this Contractor under this contract.

5 LAMPS

.1 All fixtures shall be supplied complete by this Contractor with the proper number, size and wattage of lamps installed unless noted otherwise.

6 LIGHTING CONTROLS

.1 Interior lighting fixtures shall be controlled as shown on the drawings or as specified elsewhere in this document using switches, dimmers, contactors, photo cell controls and occupancy sensors.

7 COORDINATION

.1 Check the area where fixtures are to be installed for any interference with piping duct work equipment or building structure. Coordinate and adjust layout with other trades to avoid conflicts. No additional costs due to the failure of the Contractor to coordinate his work will be allowed.

.2 Verify that the specified fixture is compatible with the ceiling type and insulation in the area where the fixture is to be installed. Report any discrepancies to the Engineer.

8 INSTALLATION

.1 All lighting fixtures shall be supplied complete with the proper lamp(s) and all required accessory items such as IC housings, yokes, plaster rings, bar hangers, chains and other mounting materials.

.2 Fixtures shall be provided with hangers to adequately support the complete weight of the luminaire. In no case shall luminaires be supported solely by the ceiling assembly. Where recessed fixtures are installed in a suspended ceiling assembly, the ceiling assembly shall be reinforced with extra ceiling supports (one in each corner) and be equipped with safety chains to support the fixture should the ceiling assembly collapse.

.3 Hangers and methods of fastening which differ from the manufacturer's standard mounting arrangement shall be submitted to the Engineer for review.

.4 Do not support luminaires from metal roof deck. Provide supplemental rigid structural members (Uni-strut or steel angles) sized to support fixtures from the buildings structure. Do not use wood to support fixtures.

.5 Fixtures mounted on outlet boxes shall be rigidly secured to a fixture stud in the box and the box shall be rigidly fastened to the building structure.

.6 Install fixtures inline and level and avoid light leaks. Remove and reinstall luminaires which are not installed to the satisfaction of the Owner, Architect or Engineer.

.7 Coordinate installation of all lighting fixtures with sprinkler/HVAC Contractors as required.

9 THIRD PARTY TESTING

.1 Third party functional testing to be performed to verify all control devices and systems are installed per the drawings and per manufacturer's installation instructions as follows:

a) Occupancy sensor placement, sensitivity and time-out adjustments yield acceptable performance. Lights to turn off only after space is vacated and do not turn on unless space is occupied.

b) Confirm time switches and programmable schedule controls are programmed to turn the lights off.

c) Confirm the photosensor controls reduce electric light levels based on the amount of usable daylight in the space as specified.

.2 Acceptable third party tester: control device and system manufacturer/supplier.

END OF SECTION 16505

PART 1 – EXIT AND EMERGENCY LIGHTING

1 GENERAL

.1 This section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Division 1 - General Requirements - and all documents referred to therein.

.3 Comply with the requirements of Sections 16010 and 16050.

2 WORK INCLUDED

.1 The Contractor shall furnish and install the light fixtures having the electrical characteristics, ratings and modifications as specified herein and as shown on the contract drawings.

3 SUBMITTALS FOR REVIEW AND APPROVAL

.1 Submit one digital copy of shop drawings for the product specified.

.2 Shop drawings shall be clearly marked as to fixture type, operating voltage, ballast or transformer information, number, type and wattage of lamps required, special information regarding housings and ratings for insulated ceilings or any special mounting instructions.

.3 Luminaire shop drawings shall bear the electrical contractor's stamp indicating that the Contractor has reviewed the shop drawings and is satisfied that the product represented meets all the criteria of the specification and is of the type, size and fit that is suited for the system in which it is to be installed. Any discrepancies shall be noted on the shop drawings.

4 SUBMITTALS FOR CLOSEOUT

.1 Provide drawings produced by the Contractor recording as-built circuiting and any layout changes with red ink. These drawings shall consist of four (4) sets of clean drawings marked up as required. The as-built drawings shall be turned over to the Engineer at the completion of the project. The contract shall not be deemed complete until this requirement is fulfilled.

.2 Include a copy of all luminaire shop drawings, manufactures special installation instructions, lamp data and maintenance instructions in the maintenance manuals.

.3 Turn over to the Owner a minimum a spare quantity equal to 10% of the total of each lamp type supplied by this Contractor under this contract.

.4 The Contractor must provide documentation that the installed lighting has been verified as fully operational.

5 EMERGENCY BATTERY PACKS

.1 Emergency battery packs shall be complete and self-contained and include the battery, charger and all control devices and be capable of supplying the rated load for a minimum of 30 minutes to 87.5% of the rated voltage.

.2 Units shall be designed to accept standard power at 120 Vac.

.3 The battery units shall have an output rating as listed below at 24Vdc.

.4 The charger shall be computer tested at the factory and set to maintain battery output voltage to within +/- 1%. Chargers with field adjusted potentiometers are not acceptable.

.5 The charger shall supply a continuous high charge to recharge the battery and then off.

.6 The charger shall be of the pulse type to promote longer battery life and reduce grid corrosion. The pulse charger will provide a periodic pulse of energy to keep the battery topped off. The pulse charger shall be current limiting and regulated by a micro-controller circuit to sample the battery temperature, state of charge and input voltage fluctuations. The charger shall be current limiting, temperature compensated, short circuit proof and reverse polarity protected.

.7 The battery unit shall be equipped with an electronic lockout circuit to connect the battery when the AC circuit is activated and a brownout circuit to activate the emergency lights when AC drops below 75% of nominal input voltage.

.8 A low voltage battery protection circuit will disconnect the load when the battery reaches the end of discharge.

.9 The unit shall be self-testing for 1 minute every 30 days, 10 minutes at 6 months and 30 minutes every 12 months.

.10 The unit shall be equipped with a lighted test switch, diagnostic LEDs to monitor and report: battery failure, battery disconnected, charger failure, lamp failure, service required, AC on, and charger high rate. Units shall also be supplied with ammeter and volt meter.

.11 Where required, provide and install wire guards manufactured by the emergency lighting manufacturer specifically for the units being supplied.

.12 Supply and install Exit and Emergency lighting as per the drawings and fixture schedule or as where required by any local Codes.

6 EMERGENCY HEADS

.1 Unit mounted and remote emergency lighting heads shall be 24Vdc to match the DC output of the battery units.

.2 Remote single and double surface mounted wall or ceiling mounted heads shall have 24Vdc, 18W lamps or as indicated by the drawings.

.3 Where required, provide and install wire guards manufactured by the emergency lighting manufacturer specifically for the head(s) supplied.

.4 Supply and install exit lights, emergency light heads and battery packs as per the drawings and fixture schedule.

7 EXIT LIGHTS

.1 Exit lights shall be of the running man style and be single or double face as shown on the drawings and shall be wired to accept 120Vac normal power.

.2 Exit lights shall be self-powered in the emergency mode. Units shall contain an integral battery and charger system.

.3 Exit lights shall utilize LED(s) as a light source, shall consume less than 4 watts of power and comply with CSA standard C860.

.4 Fixture body shall be manufactured from extruded aluminum, be gasketed to eliminate light leaks, have field selectable direction chevrons and universal mounting capabilities.

.5 Where required, provide and install wire guards manufactured by the emergency lighting manufacturer specifically for the head(s) being supplied.

.6 Supply and Install exit lights, emergency light heads and battery packs as per the drawings and fixture schedule.

8 ACCEPTABLE MANUFACTURERS

.1 Acceptable manufacturers indude StanPro, Lumacell, Luxnet, Beghelli and Lithonia.

9 WARRANTY

.1 Warranty in writing the Exit and Emergency Lighting equipment from defects in material and workmanship for a period of one year after acceptance.

END OF SECTION 16530

1. General

1.1 General

.1 This section provides for the supply/installation of the fire alarm system.

.2 The electrical contractor shall provide all other material and labour including inspection fees to complete the installation, commissioning and confirmation of this work.

1.2. Description

.1 The fire alarm system is to be a conventional, single stage, zoned, fully integrated fire alarm system.

.2 These specifications describe the minimum functional requirements for an electronically supervised, micro-processor based, fully integrated system.

.3 All work in conjunction with this installation shall meet the provisions of the Ontario Electrical Safety Code, U.L.C. Standard CAN/ULC-S524, the Ontario Building Code, FM Global and applicable municipal requirements for building permit approval.

1.3. Quality Assurance

.1 Each and all items of the fire alarm system shall be listed as the products of a single manufacturer under the appropriate category by the U.L.C. and shall bear the U.L.C. label.

.2 Each and all items of the fire alarm system shall be covered by a one year parts and labour warranty covering defects resulting from faulty workmanship and materials. The warranty shall be deemed to begin on the date the system is accepted by the Owner on issuance of the substantial performance certificate for the project.

.3 All control equipment must have Transient Protection Devices to comply with U.L.C. requirements.

1.4. Shop Drawings

.1 Submit a digital copy of shop drawings.

.2 Shop drawings shall include, without being limited to, the following drawings prepared specifically for this project:

a) Control Panel.
b) Information on Alarm Initiating and Signaling Devices complete with catalogue numbers and wiring information.
c) Active Graphic Annunciator and Control Panel zoning.
d) As-Built layouts marked on a set of building plans indicating panels, annunciators, detectors, pull stations, signals, conduit routes, wiring information, pull boxes, terminal cabinets and access panels.

.3 Upon completion of the installation and testing, submit to the Architect, copies of all shop drawings, diagrams, operating instructions and descriptive literature assembled in loose leaf binders identified by Project Name.

2. Fire Detection System

2.1 Operation

.1 Actuation of any fire alarm device shall:

a) Sound the fire alarm speakers/strobes throughout the building.
b) At the main control panel the alarm shall be displayed by the system alarm red LED on the control panel. The built-in annunciator shall be actuated accordingly.
c) Alert the Local Fire Department via monitoring company.
d) Send signal to release all door hold-open devices.
e) Shut down all the ventilation fans and HVAC equipment.
f) Fire alarm signals shall sound for a period of not less than one minute before they can be silenced manually.
g) The fire alarm signals shall sound NON-STOP at the temporal rate until silenced at the main control panel. Subsequent alarms shall cause the evacuation signals to activate again.
h) Wiring shall be done in Class B configuration.
i) Complete addition to the system is to be supervised against failure of operating power. All supervision is to be maintained on all circuits even in the event of a power failure, when the system is on battery standby. The above shall cause a trouble buzzer to sound at the main control along with a common trouble lamp. The control panels on alert is to produce a tone distinct from the tone of the alarm signals located throughout the building.

2.2. Fire Alarm Devices

.1 Pull stations, smoke detectors and heat detectors are to be provided as indicated on the drawings.

.2 If required, break-glass pull stations that are key locked, shall be reset using the same key which opens the main fire alarm control panel and are to be installed as indicated in locations shown on drawings.

.3 The locations of devices shown on drawings are diagrammatic and shall be confirmed where conflict arises during construction.

2.3 Zones

.1 Zones are to be provided as shown on drawings and OBC.

3. Execution

3.1 Installation

.1 All wiring methods and materials used in the installation of the fire alarm system shall conform to the requirements of branch circuit wiring as outlined in the other sections of this specification.

.2 Minimum wire size for signal circuits shall be #14 AWG, color coded red for positive and black for negative.

.3 In accordance with CAN/ULC-S524, “Installation of Fire Alarm Systems”.

3.2 Verification

.1 In accordance with CAN/ULC-S537, “Verification of Fire Alarm Systems”.

END OF SECTION

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION

20 PELHAM TOWN SQUARE , FONTHILL, ON. L0S 1E0

GRGURIC ARCHITECTS INCORPORATED

28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
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HALLEX ENGINEERING LTD.

Niagara Falls Office
4999 Victoria Avenue,
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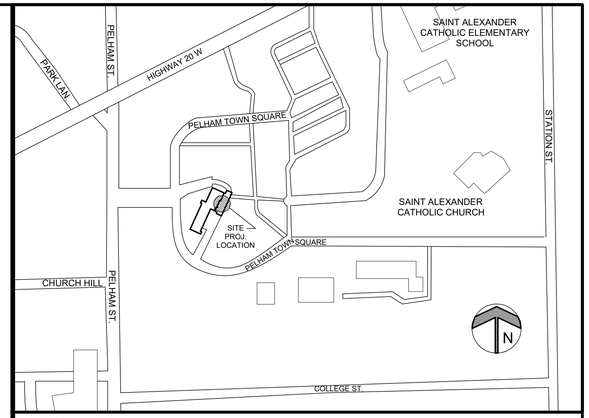
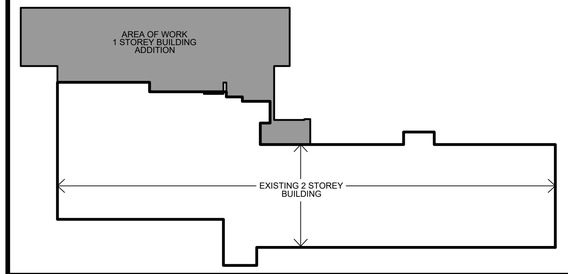
Hamilton Office
745 South Service Road, Unit 301A
Stoney Creek, ON L8E 5Z2
Tel: 905-561-4016



LOCATION PLAN
N.T.S.



KEY PLAN
N.T.S.

DRAWING LIST:

ARCHITECTURAL

A 0.00	COVER SHEET
A 0.10	OBC MATRIX, FIRE & LIFE SAFETY PLAN
A 1.00	SITE PLAN
A 1.10	GRADING PLAN & SITE DETAILS
A 2.00	PARTIAL GROUND FLOOR PLAN
A 2.10	REFLECTED CEILING PLAN & SCHEDULES
A 2.20	ROOF PLAN & DETAILS
A 3.00	BUILDING ELEVATIONS
A 4.00	BUILDING SECTIONS
A 4.10	WALL SECTIONS & DETAILS
A 4.20	WALL SECTIONS
A 4.30	WALL SECTIONS
A 4.40	WALL SECTIONS & PLAN DETAILS
A 4.50	CLOCK TOWER DETAILS
A 4.60	WALL SECTION DETAILS
A 5.00	WASHROOM INTERIOR ELEVATIONS
A 5.10	MILLWORK DETAILS

STRUCTURAL

S0.1	GENERAL NOTES & DRAWING LISTS
S0.2	STEEL STUD NOTES & TYPICAL DETAILS
S1	FOUNDATION PLAN
S2	GROUND FLOOR PLAN
S3	PARTIAL ROOF PLAN
S4	BUILDING SECTIONS
S5	DETAILS
S6	DETAILS
S7	DETAILS

MECHANICAL

M1.0	M&E COORDINATION TABLE, MECHANICAL SCHEDULES, LEGEND, DRAWING LIST & KEY PLAN
M1.1	MECHANICAL DETAILS
M2.1	PROPOSED DEMOLITION PLAN
M2.2	PROPOSED MECHANICAL PLAN
M2.3	PROPOSED ROOF PLAN
P1.1	PROPOSED STORM & SANITARY PLAN
P1.2	PROPOSED DOMESTIC WATER PLAN

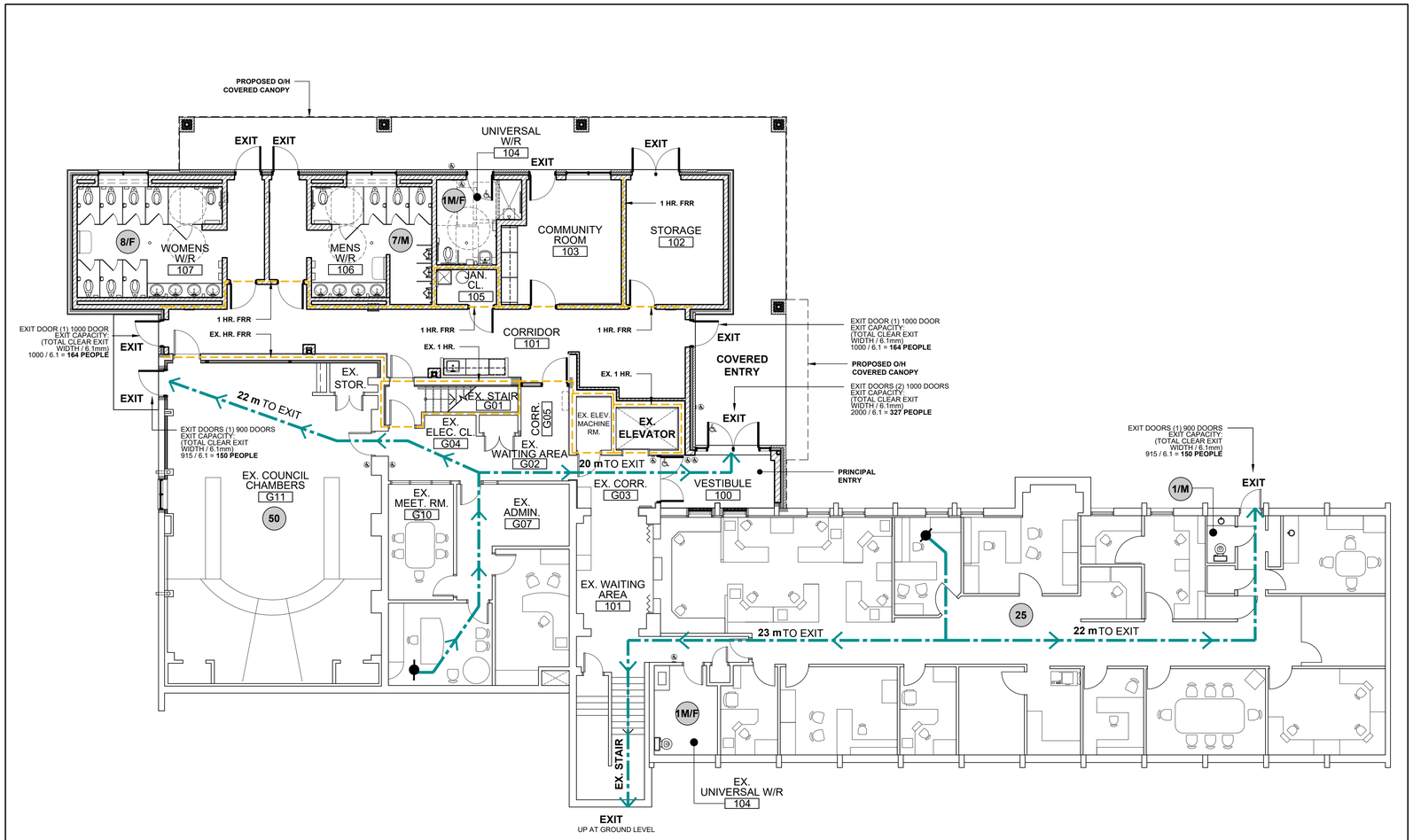
ELECTRICAL

E1	LEGENDS, LIGHT SCHEDULE & PARTIAL SINGLE LINE DIAGRAM
E2	ELECTRICAL SITE PLAN
E3	GROUND FLOOR ELECTRICAL PLAN
E4	GROUND FLOOR LIGHTING PLAN
E5	FIRE ALARM PLAN

ISSUED FOR TENDER
2022-06-07

PROJECT NUMBER
2022-10

SHEET NUMBER
A 0.00



GROUND FLOOR

SCALE: 1:200

FIRE RESISTANCE RATING SCHEDULE
DENOTES FIRE SEPARATION (TYPE DENOTED ON PLAN)
TRAVEL DISTANCE
LINE OF EGRESS ROUTE + TRAVEL DISTANCE
ARROWS DENOTE DIRECTION OF TRAVEL
START POINT AT DOOR
MAXIMUM 40m TRAVEL DISTANCE FROM EGRESS DOORWAY OF ROOM OR FLOOR AREA TO NEAREST EXIT
MAXIMUM 6m DEAD END FROM DEAD END POINT TO NEAREST POINT WHERE TWO EXIT ROUTES AVAILABLE

#M/F — DENOTES PLUMBING FIXTURE COUNT
M = MALE
F = FEMALE

— DENOTES OCCUPANCY COUNT

GENERAL LIFE SAFETY NOTES:

1. THE FOLLOWING GENERAL NOTES ON THIS DRAWING PROVIDE AN OVERVIEW AND SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL, STRUCTURAL MECHANICAL AND ELECTRICAL DRAWINGS, DETAILS AND SPECIFICATIONS.
2. REFER TO FIRE SEPARATION LOCATIONS INDICATED ON PLANS OF THIS DRAWING AND BUILDING SECTIONS.
3. GROUND FLOOR IS SLAB ON GRADE CONSTRUCTION UNLESS OTHERWISE NOTED
4. ENSURE CONTINUITY OF FIRE SEPARATION FRR BEHIND ALL BUILT-IN MECHANICAL AND ELECTRICAL WORK. INCREASE WALL THICKNESS LOCALLY FOR FULL HEIGHT OF WALL TO SUIT INSTALLATION OF MECHANICAL AND ELECTRICAL WORK
5. BARRIER FREE PATH OF TRAVEL SHALL HAVE AN UNOBSTRUCTED WIDTH OF 1.1m
6. PORTABLE FIRE EXTINGUISHERS SHALL BE PROVIDED IN ACCORDANCE WITH OBC 3.2.5.17. (1).
7. BARRIER FREE DOORS & HARDWARE TO COMPLY WITH THE REQUIREMENT OF THE 2012 OBC 3.8.3.3. & 3.8.2.1.
9. EVERY DOOR IN A FIRE SEPARATION SHALL BE EQUIPPED WITH A SELF CLOSING DEVICE & POSITIVE LATCHING MECHANISM AS PER OBC 3.1.8.11 & 3.1.8.13.
10. ALL DOOR LOCKING HARDWARE IN AN ACCESS TO EXITS ARE TO BE IN COMPLIANCE WITH OBC 3.3.1.12. DOORS SHALL BE READILY OPERABLE IN TRAVELLING TO AN EXIT WITHOUT REQUIRING KEYS, SPECIAL DEVICES, OR SPECIALIZED KNOWLEDGE OF THE DOOR OPENING MECHANISM.
11. CONNECTIONS OF ALL NON STRUCTURAL ELEMENTS AND EQUIPMENT TO SUPPORTING STRUCTURE TO BE DESIGNED TO COMPLY WITH ARTICLE 4.1.8.18 OF THE 2012 ONTARIO BUILDING CODE FOR SEISMIC LOADS. CONTRACTOR TO SUBMIT SHOP DRAWINGS SHOWING THESE CONNECTIONS STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER IF APPLICABLE.

GENERAL PROJECT NOTES

1. MECHANICAL AND ELECTRICAL ITEMS SHOWN, I.E. DUCTWORK, PIPING, LIGHT FIXTURES, ETC. ARE FOR REFERENCE ONLY AND ARE NOT INCLUSIVE. REFER TO MECHANICAL AND ELECTRICAL DRAWING FOR ALL RELATED NEW AND DEMOLITION WORK REQUIRED.
2. TRANSITIONS BETWEEN FLOOR FINISHES TO BE MADE SMOOTH, CONTINUOUS & FLUSH. GRIND DOWN EXISTING FLOOR SLAB ACROSS DOOR THRESHOLDS WHERE APPLICABLE TO SUIT THICKNESS OF NEW MATERIALS AND ENSURE NEW MATERIALS ARE INSTALLED FLUSH THROUGHOUT
4. CONTRACTOR TO ALLOW FOR PATCHING AND REPAIR OF ALL EXISTING ADJACENT MATERIALS, SURFACES & FINISHES AT SLAB CUTTING & TRENCHING OF ALL PLUMBING FIXTURES AS WELL AS MECHANICAL EQUIPMENT TO BE REMOVED OR RELOCATED. REFER TO MECHANICAL DRAWINGS. PREPARE ALL SURFACES FOR NEW FINISHES.
5. CONTRACTOR TO ALLOW FOR PATCHING AND REPAIR OF ADJACENT MATERIALS AT ALL ELECTRICAL LIGHTING, EQUIPMENT, CONDUIT, RACEWAYS, ETC. TO BE REMOVED OR RELOCATED. REFER TO ELECTRICAL DRAWINGS. PREPARE ALL SURFACES FOR NEW FINISHES.
6. CAUSE NO DAMAGE TO EXISTING CONSTRUCTION TO REMAIN. TAKE CARE NOT TO ENCROACH ON ADJACENT OCCUPIED AREAS OR AREAS NOT WITHIN THE SCOPE OF WORK. PROTECT ALL EXISTING FINISHES, DOORS, FRAMES, ETC. WHICH ARE TO REMAIN. PATCH AND MAKE GOOD ALL EXISTING ADJACENT SURFACES FINISHES & MATERIALS WHERE DISTURBED BY NEW CONSTRUCTION.

NAME OF PRACTICE: GRGURIC ARCHITECTS INCORPORATED
CERTIFICATE OF PRACTICE NUMBER: 4760
CONTACT: **JOHN GRGURIC**
28 KING STREET EAST, UNIT B, STONEY CREEK, ON L8G 1J8
TEL: 905-664-8737

NAME OF PROJECT:
TOWN OF PELHAM MUNICIPAL BUILDING ADDITION

LOCATION:
20 PELHAM TOWN SQUARE, FONTHILL, ON, L0S 1E0

Item	Ontario's 2012 Building Code Data Matrix Parts 3 or 9		OBC Reference (References are to Division B unless noted [A] for Division A or [C] for Division C)	
1	Project Description: **TOWN OF PELHAM MUNICIPAL BUILDING EVENTS FACILITY BUILDING ADDITION**	☐ New ■ Addition ☐ Addition & Renovation ☐ Alteration ☐ Change of Use — ■ Part 11 / 11.1 to 11.4 / ☐ Part 10 — ■ Part 3 / [A] 1.1.2. — ☐ Part 9 / 1.1.2 [A] & 9.10.1.3		
2	Major Occupancy(s)	**Group D (Business and Personal Services Occupancies)**	3.1.2.1.(1)	9.10.2
3	Building Area	Existing **580 m²** New **217 m²** Total **797 m²**	1.4.1.2.[A]	1.4.1.2.[A]
4	Gross Area	Existing **923 m²** New **217 m²** Total **1,140 m²**	1.4.1.2.[A]	1.4.1.2.[A]
5	Number of storeys	**1** Above grade **2** Below grade **0**	1.4.1.2.[A] & 3.2.1.1	1.4.1.2.[A] & 9.10.4
6	Number of Streets/ Fire Fighter Access	**2**	3.2.2.10 & 3.2.5	9.10.20.
7	Building Classification	**3.2.2.55 GROUP D, UP TO 2 STOREYS**	3.2.2.20.- 83	9.10.2.
8	Sprinkler System Proposed	☐ entire building ☐ selected compartments ☐ selected floor areas ☐ basement ☐ in lieu of roof rating ■ not required	3.2.2.20.- 83 / 3.2.1.5. / 3.2.2.17. / INDEX	9.10.8.2 / INDEX
9	Standpipe required	☐ Yes ■ No	3.2.9	N/A
10	Fire Alarm required	☐ Yes ■ No **(Fire Alarm Detector System Provided Even though not Required)**	3.2.4	9.10.18
11	Water Service/Supply is Adequate	■ Yes ☐ No	3.2.5.7.	N/A
12	High Building	☐ Yes ■ No	3.2.6	N/A
13	Permitted Construction / Actual Construction	☐ Combustible permitted / ☐ Combustible — ☐ Non-combustible required / ■ Non-combustible — ■ Both / ☐ Both	3.2.2.20.- 83 & 3.2.1.4.	9.10.6
14	Mezzanine(s) Area m²		3.2.1.1.(3)-(8)	9.10.4.1
15	Occupant load based on	☐ m² /person ■ design of building Ground Floor Occupancy **Offices** Load **25** persons Second Floor Occupancy **Offices** Load **25** persons Ground Floor Occupancy **Council Chambers** Load **50** persons **TOTAL OCCUPANT LOAD** Load **100** persons	3.1.17	9.9.1.3
16	Barrier-free Design	■ Yes ☐ No (Explain)	3.8	9.5.2
17	Hazardous Substances	☐ Yes ■ No	3.3.1.2. & 3.3.1.19	9.10.1.3(4)
18	Required Fire Resistance Rating (FRR)	Horizontal Assemblies FRR (Hours): Floors - Hours **Non-Combustible in lieu of rating**; Roof - Hours **Non-Combustible in lieu of rating**; Mezzanine **N/A** Hours **N/A** FRR of Supporting Members: Floors - Hours **Non-Combustible in lieu of rating**; Roof - Hours **Non-Combustible in lieu of rating**; Mezzanine **N/A** Hours **N/A**	3.2.2.20.- 83 & 3.2.1.4	9.10.8. / 9.10.9.

19 Spatial Separation - Construction of Exterior Walls — 3.2.3 — 9.10.14

Wall	Area of EBF (m²)	L.D. (m)	L/H or H/L	Permitted Max. % of Openings	Proposed % of Openings	FRR (Hours)	Listed Design or Description	Construction Type Required	Cladding Type Required
North	-	-	-	-	-	-	**Refer to Drawings**	**Combustible or Noncombustible**	**Noncombustible**
South	-	-	-	-	-	-	**Refer to Drawings**	**Combustible or Noncombustible**	**Combustible or Noncombustible**
East	-	-	-	-	-	-	**Refer to Drawings**	**Combustible or Noncombustible**	**Combustible or Noncombustible**
West	-	-	-	-	-	-	**Refer to Drawings**	**Combustible or Noncombustible**	**Combustible or Noncombustible**

20 Plumbing Fixture Requirements

Ratio: Male / Female Count at **50** % / **50** %, except as noted otherwise — Building Code Reference: ■ Part 3 ☐ Part 9

	Occupant Load	BC Table Number	Fixtures Required	Fixtures Provided	3.7.4.	9.31.
Group D (Existing Offices) **Male**	**50**	3.7.4.3.	**3**	**3**	3.7.4.2. - 3.7.4.3	
Group D (Existing Offices) **Female**	**50**	3.7.4.3.	**3**	**3**	3.7.4.2. - 3.7.4.3	

Note: Additional 8 female fixtures being provided at events facility building addition & Additional 7 male fixtures being provided at events facility building addition + 1 Additional Universal Washroom

21 Energy Efficiency — Compliance Path: **(A) Prescriptive** — Climatic Zone: **7**

22 Travel Distance to Exits (Refer to Drawings)

Pelham NIAGARA

TRUE NORTH / PROJ. NORTH

LEGEND

CONC	CONCRETE
CORR	CORRIDOR
CL	CLOSET
CUST	CUSTODIAN
DN	DOWN
ELEC	ELECTRICAL
ELEV.	ELEVATOR
EX	EXISTING
FFE	FINISHED FLOOR ELEVATION
FRR	FIRE RESISTANCE RATTING
JAN	JANITOR
HR	HOUR
MECH	MECHANICAL
N/A	NOT APPLICABLE
O/H	OVERHEAD
RM	ROOM
STOR	STORAGE
UNI	UNIVERSAL
W/R	WASHROOM

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

OBC MATRIX, FIRE & LIFE SAFETY PLAN

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A0.10
CHECKED J.G.	
PRINT DATE	06/07/22

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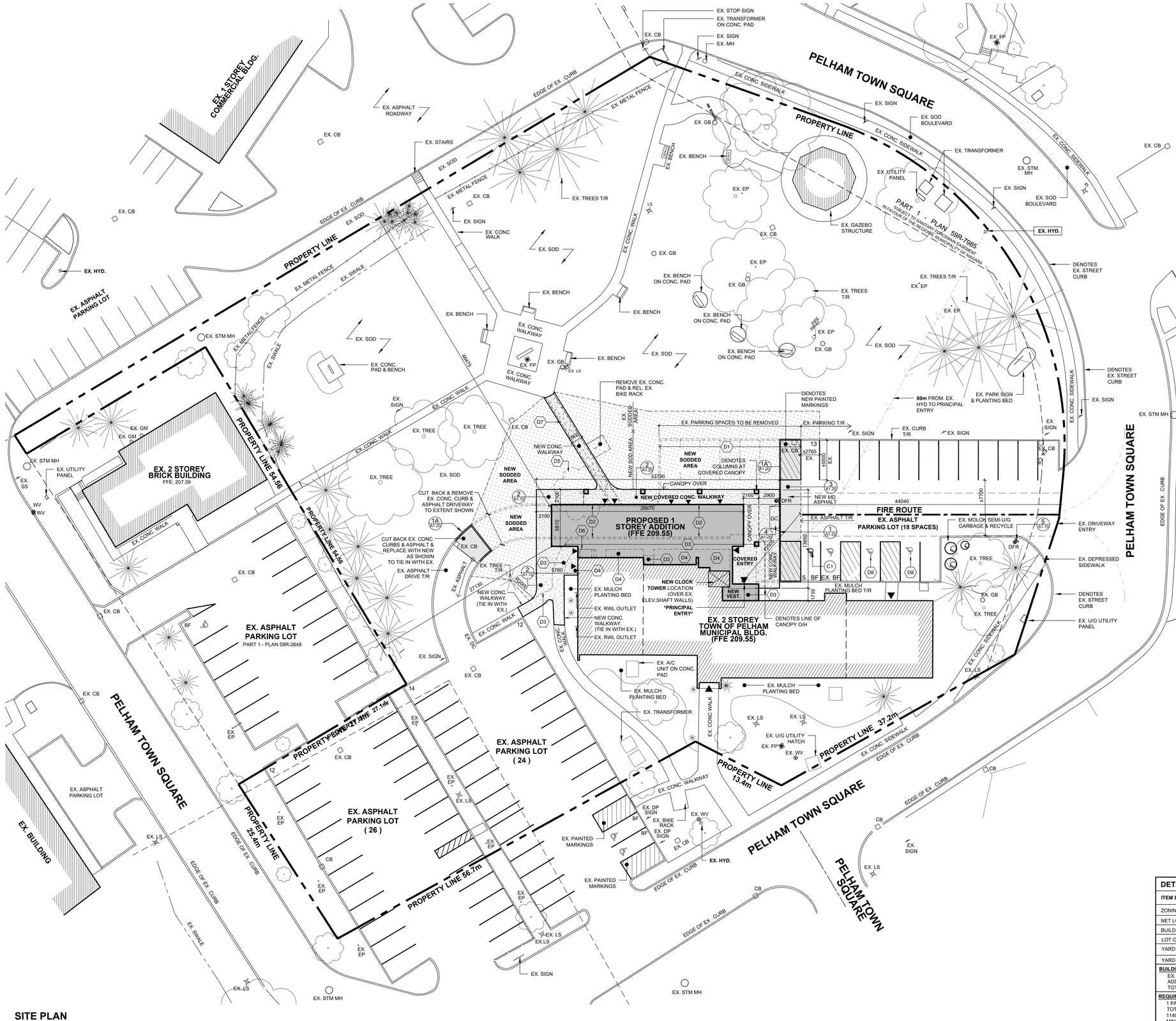
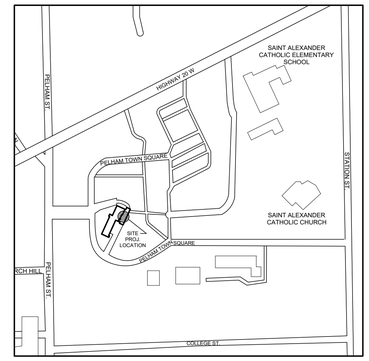


SITE PLAN
SCALE: 1:250



KEY PLAN
SCALE: NTS

NOTES:

DEMOLITION NOTES:

- D1 REMOVE PORTION OF EXISTING CONCRETE CURB AND ASPHALT PAVING OVER EXTENT DENOTED AND PREPARE AREA FOR NEW SOD.
- D2 REMOVE PORTION OF EXISTING CONCRETE CURB AND ASPHALT PAVING DRIVEWAY OVER EXTENT DENOTED TO PERMIT CONSTRUCTION OF NEW ADDITION.
- D3 REMOVE & DISCARD PORTION OF EXISTING EXT. CONCRETE WALKWAY ON GRADE TO PERMIT CONSTRUCTION NEW BUILDING ADDITION AND TO SUIT NEW WALKWAYS AND SITE LAYOUT SHOWN.
- D4 REMOVE AND DISCARD EXISTING SHRUBS / PLANTINGS TO PERMIT CONSTRUCTION OF NEW ADDITION.
- D5 REMOVE AND DISCARD EXISTING CONIFEROUS TREE
- D6 REMOVE EXISTING CONCRETE STAIR, LANDING AND STEEL RAILING TO & ASSOCIATED FOUNDATIONS TO PERMIT CONSTRUCTION OF NEW ADDITION.
- D7 REMOVE EXISTING CONCRETE WALKWAY AND REPLACE WITH NEW CONC. WALK IN PLACE AS PER LAYOUT SHOWN.
- D8 SCRUB OUT AND REMOVE (2) EXISTING BARRIER FREE PAINTED GRAPHICS AT EXISTING PARKING SPACES. (TO BE VISITOR PARKING)

CONSTRUCTION NOTES:

- C1 PAINT NEW MARKINGS AS SHOWN. PATCH AND MAKE GOOD ALL ADJACENT SURFACES AND MATERIALS.
- C2 PAINT NEW BARRIER FREE GRAPHIC AT EXISTING PARKING SPACE

GRAPHIC LEGEND

- NEW CONCRETE
- NEW MEDIUM DUTY ASPHALT
- NEW SOD
- DENOTES CONC. CURB
- ENTRANCE TO BLDG.
- PROPERTY LINE

LEGEND:

BF.	BARRIER FREE
CB.	CATCH BASIN
CONC.	CONCRETE
DC.	DEPRESSED CURB
DFR	DESIGNATE FIRE ROUTE SIGN
EP.	ELECTRICAL POST / POLE
EX.	EXISTING
FFE.	FINISHED FLOOR ELEVATION
FPOST.	FENCE POST
FP.	FLAG POLE
GB.	GARBAGE BIN
HYD	FIRE HYDRANT
IB.	IRON BAR
LS.	LIGHT STANDARD
MH.	MANHOLE
MD.	MEDIUM DUTY
MIN.	MINIMUM
REL	RELOCATE
RW.	RETAINING WALL
RWL.	RAIN WATER LEADER
SIB.	STANDARD IRON BAR
STM MH.	STORM MANHOLE
T/R	TO REMAIN
TYP.	TYPICAL
U/G	UNDER GROUND
VC.	VALVE CHAMBER
WP.	WALL PACK LIGHT FIXTURE
WV	WATER VALVE

NO.	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

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DETAILS OF DEVELOPMENT

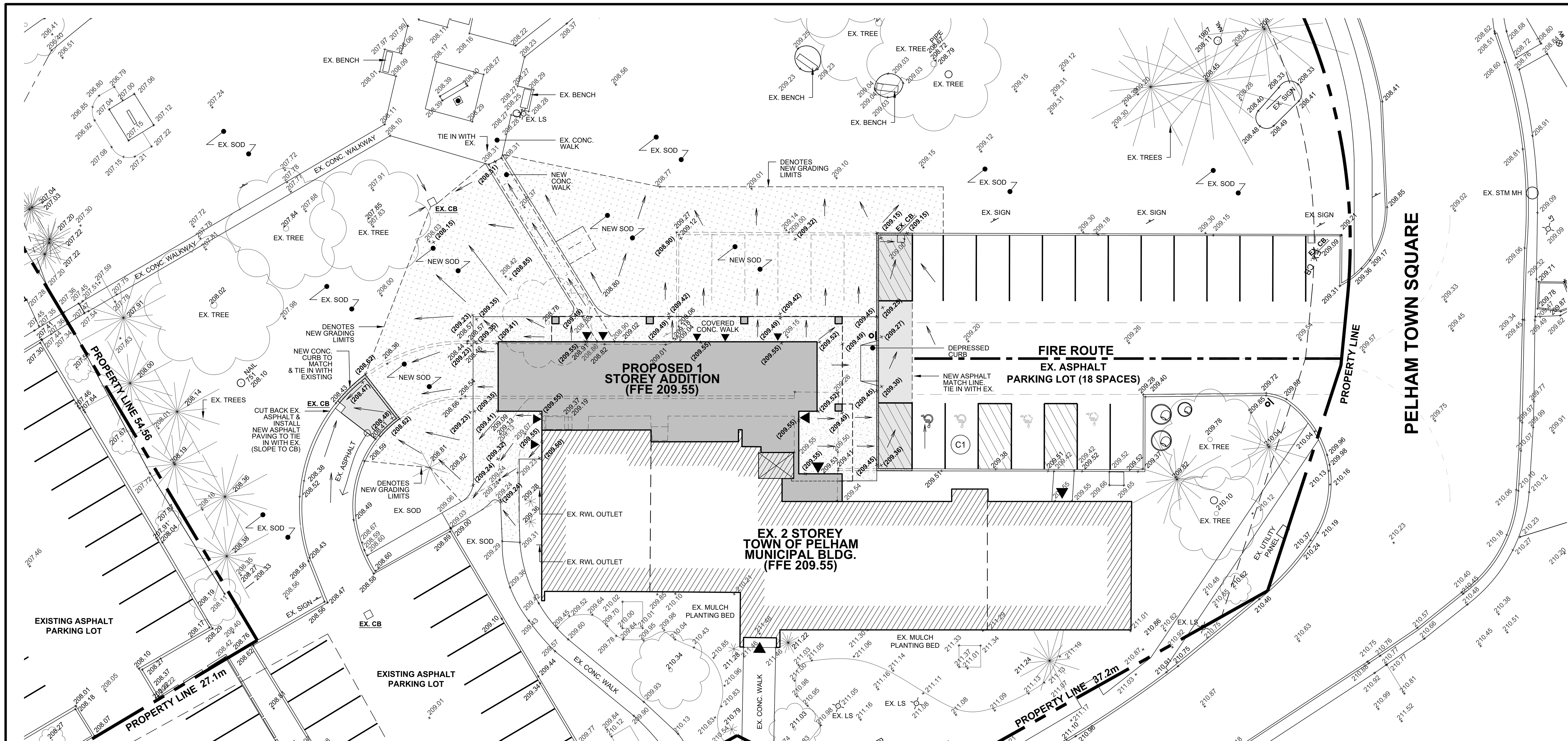
ITEM DESCRIPTION	REQUIRED	ACTUAL OR PROPOSED
ZONING DESIGNATION	PUBLIC BUILDING (P) ZONE	
NET LOT AREA (MINIMUM)	N/A	APPROX. **9,362** m^2
BUILDING HEIGHT (MAXIMUM)	N/A	N/A
LOT COVERAGE (MAXIMUM)	50%	797 m^2 = **10.45%**
YARD SETBACK (MINIMUM)	7.5m AT LOT LINE 15m AT STREET LINE	REFER TO SITE PLAN
YARD ABUTTING A RESIDENTIAL ZONE (MINIMUM)	15 M	N/A
BUILDING COVERAGE AREA (FOOTPRINT) EX. BUILDING AREA ADDITION BUILDING AREA TOTAL BUILDING COVERAGE AREA		 580 m^2 217 m^2 **797** m^2 = 10.45%
REQUIRED PARKING SPACES: 1 PARKING SPACE PER **30m²** OF GROSS FLOOR AREA TOTAL GROSS FLOOR AREA = **1,140 m²** 1140m^2 / 30 = **38 PARKING SPACES REQUIRED** MIN. 1 BARRIER FREE PARKING SPACES REQUIRED		**68** PARKING SPACES PROVIDED (INCLUDING 4 BARRIER FREE) NOTE: ONLY 1 BF REQUIRED

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

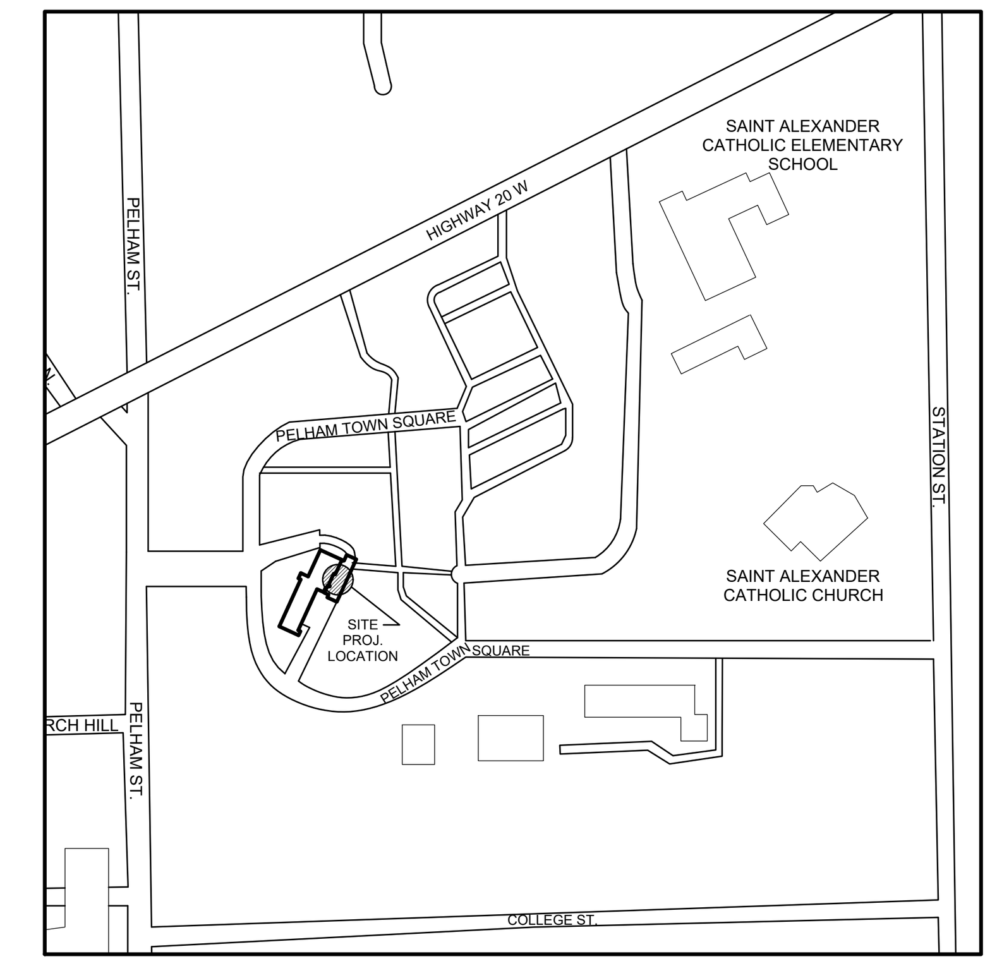
SITE PLAN

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A1.00
CHECKED J.G.	
PRINT DATE	06/07/22



PARTIAL GRADING PLAN
SCALE: 1:200



KEY PLAN
SCALE: NTS

EROSION AND SEDIMENTATION CONTROL NOTES:

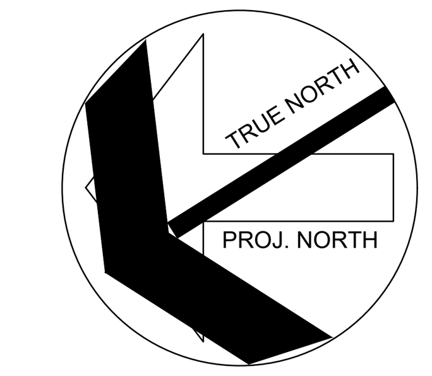
1. Silt traps in the form of single filter cloth barriers shall be installed along the site boundaries that are susceptible to siltation;
2. Temporary vehicle tracking controls to be constructed at all points of site access;
3. Sediment traps consisting of filter cloth barriers shall be installed at all rear yard catch basins. For roadway catch basins, the filter cloth shall be folded in half, hung across the outlet pipe and weighed down with rebar;
4. If building activity does not commence within 45 days after construction is completed, arrangements shall be made to seed any stripped areas and topsoil stockpiles that are not covered by vegetation and maintain them until ground cover is established;
5. Maintenance of all siltation control measures will be required to prevent them from being clogged including replacement of filter cloth as required.

Sedimentation control measures shall be kept in place until satisfactory ground cover has been established and all building activity has been completed.

GRAPHIC LEGEND

- NEW CONCRETE
- NEW MEDIUM DUTY ASPHALT
- NEW SOD
- DENOTES CONC. CURB
- ENTRANCE TO BLDG.
- PROPERTY LINE

Pelham NIAGARA



LEGEND:

EX.	EXISTING
FFE.	FINISHED FLOOR ELEVATION
CB.	CATCH BASIN
CONC.	CONCRETE
MH.	MANHOLE
DC.	DEPRESSED CURB
FPOST.	FENCE POST
FP.	FLAG POLE
EP.	ELECTRICAL POST
GB.	GARBAGE BIN
VC.	VALVE CHAMBER
RW.	RETAINING WALL
LS.	LIGHT STANDARD
TYP.	TYPICAL
MIN.	MINIMUM
MD.	MEDIUM DUTY
STM MH.	STORM MANHOLE
× 0.00	EXISTING GRADES
× (0.00)	PROPOSED GRADES

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
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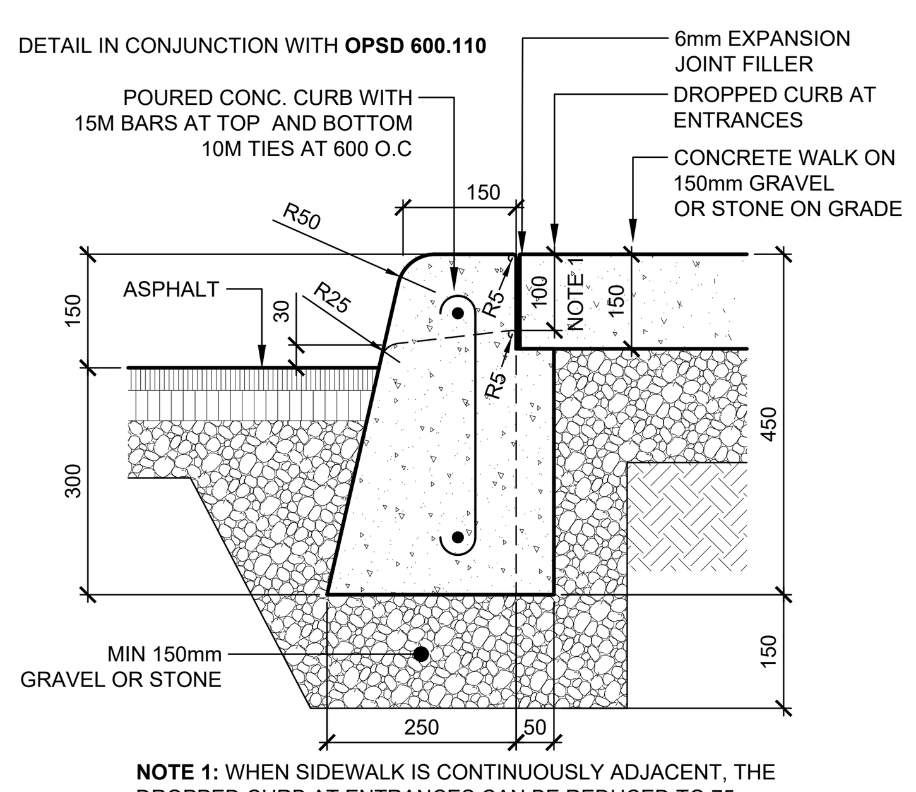
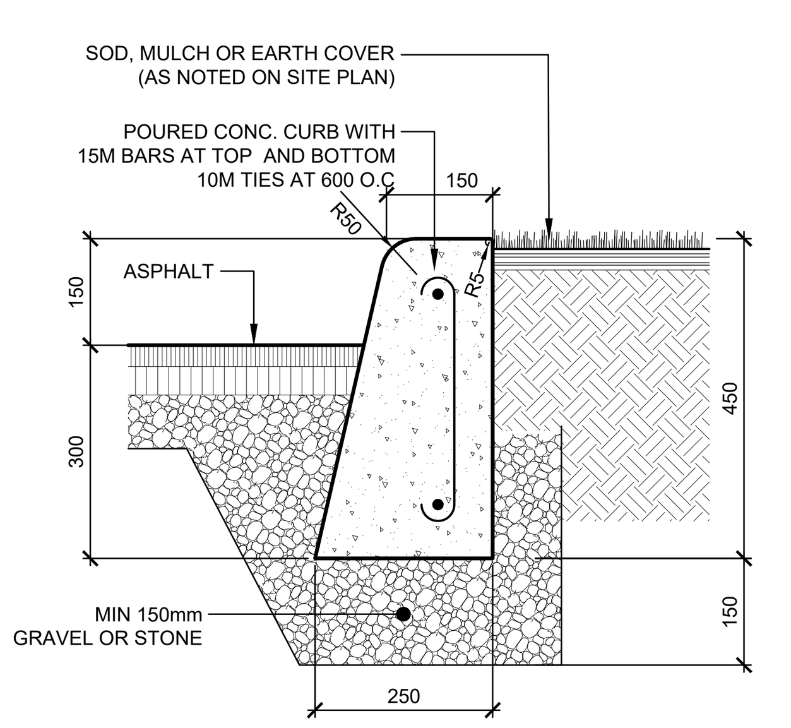
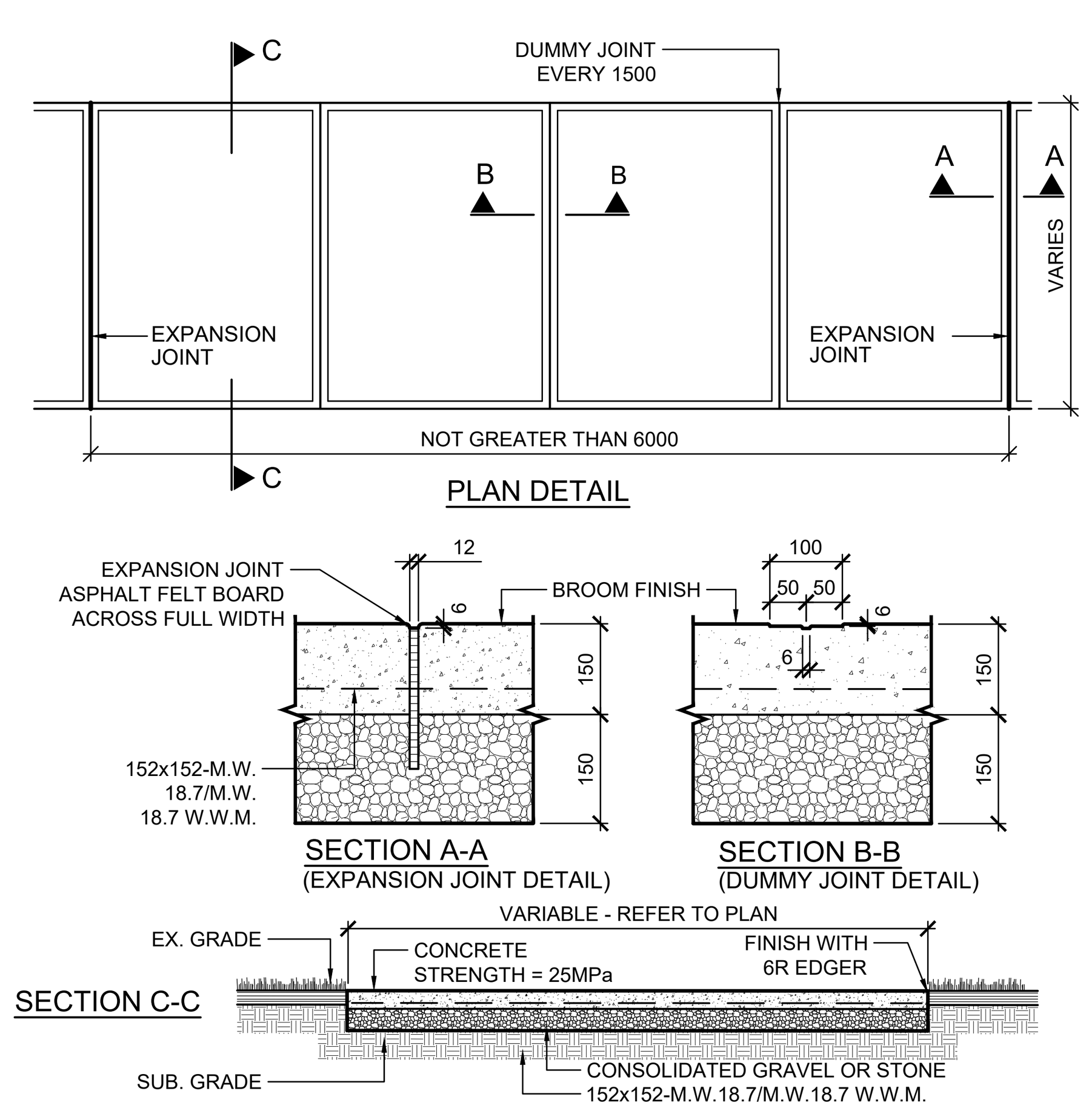


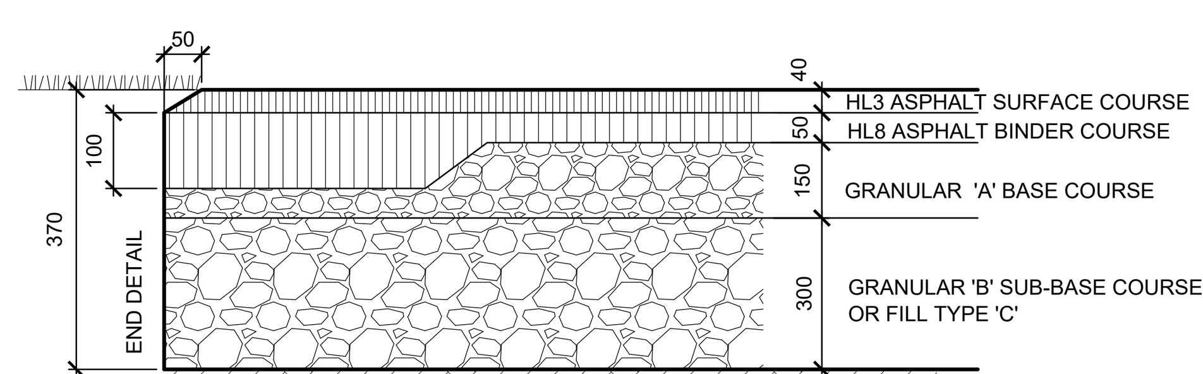
1 / A1.10 CONCRETE WALK & CURB
SCALE NTS



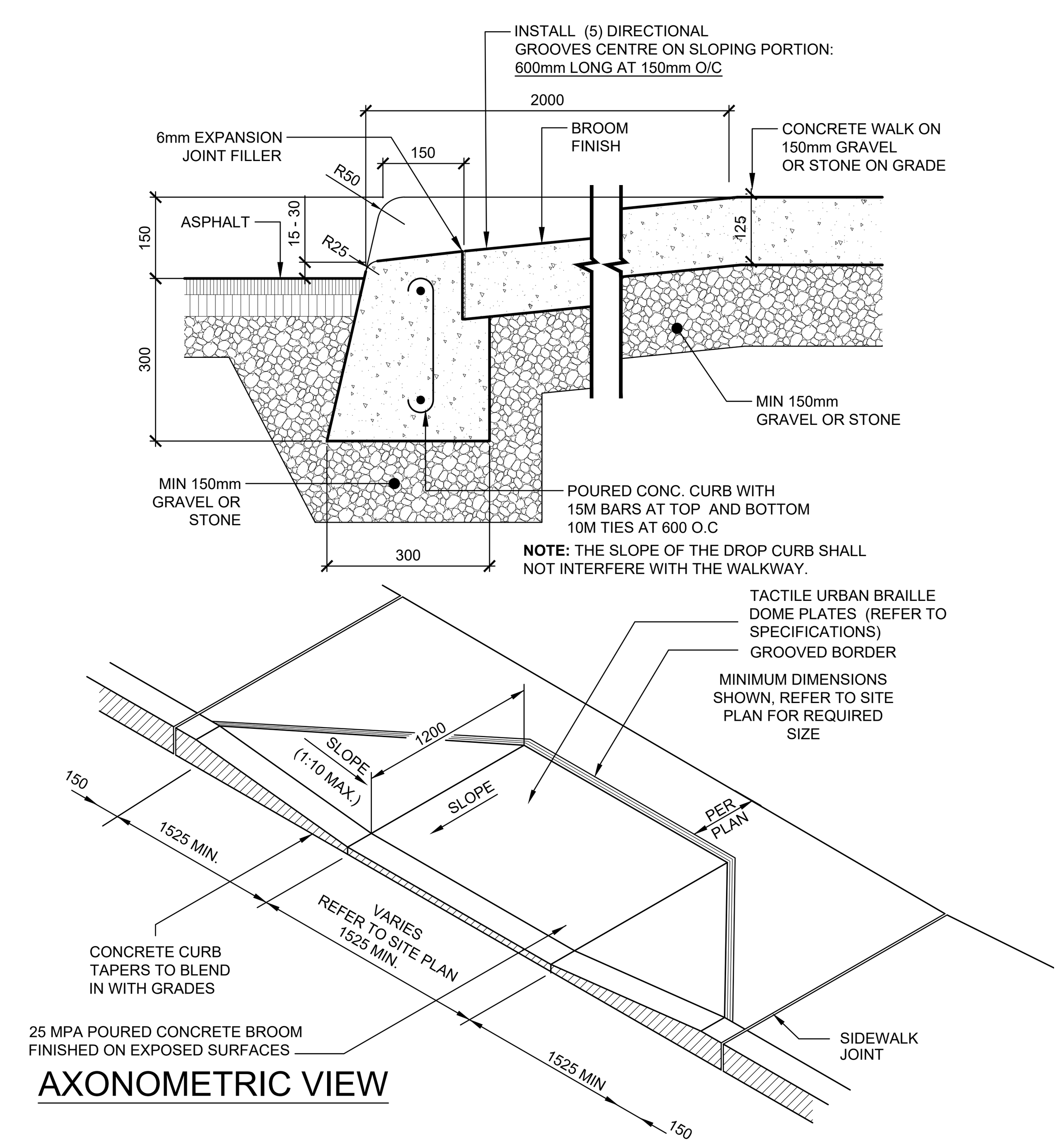
1A / A1.10 CONCRETE CURB AT GRADE (SOD / PLANTING)
SCALE NTS



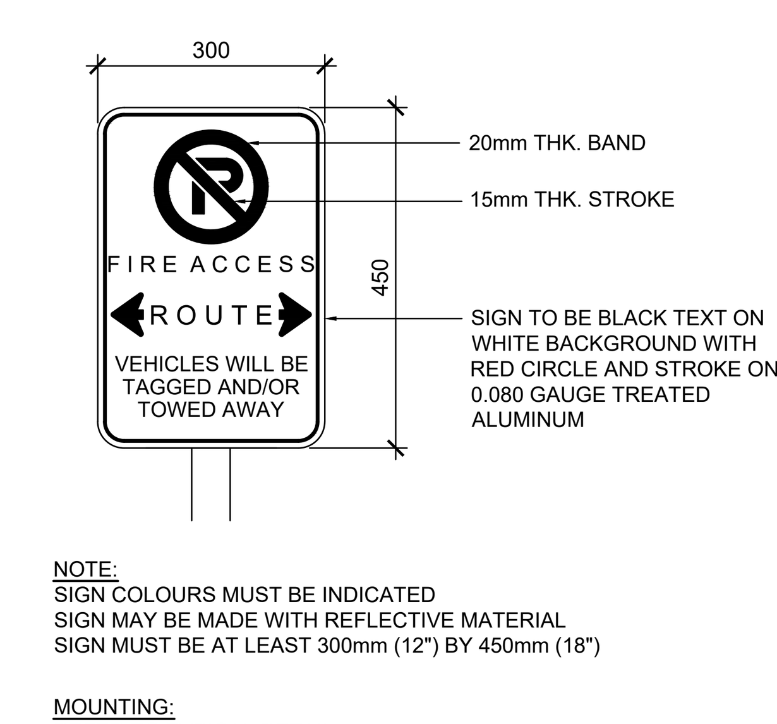
2 / A1.10 CONCRETE WALKWAY DETAIL (TYP.)
SCALE NTS



3 / A1.10 MEDIUM DUTY ASPHALT DETAIL
SCALE NTS



4 / A1.10 DEPRESSED CURB DETAIL (TYP.)
SCALE NTS



NOTE:
SIGN COLOURS MUST BE INDICATED
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL
SIGN MUST BE AT LEAST 300mm (12") BY 450mm (18")

MOUNTING:
REFER TO TYPICAL DETAIL

5 / A1.10 DESIGNATED FIRE ROUTE SIGN (DFS)
SCALE: NTS

TOWN OF PELHAM MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

GRADING PLAN & SITE DETAILS

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SCALE: AS NOTED	PROJECT: 2022-10
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S:\Data\2022\2022-10-Town-of-Pelham-Events-Building-Addition\65drawings\12-Working Dra A1.00-Site-Plan-[2022-10].dwg

DEMOLITION NOTES

- **D1** REMOVE & DISCARD EXISTING MILLWORK KITCHENETTE UNITS (BASE & UPPER CABINETS), COUNTERTOP & ALL ASSOCIATED HARDWARE & BLOCKING & BULKHEAD ABOVE. RELOCATE EXISTING APPLIANCES TO NEW MILLWORK LOCATION. PATCH AND MAKE GOOD ALL ADJACENT SURFACES, MATERIALS & FINISHES. PATCH AND MAKE GOOD ALL EXISTING GYP. BOARD AT MILLWORK REMOVAL TO MATCH AND TIE IN WITH EXISTING. PAINT TO FINISH.
- **D1A** REMOVE & DISCARD PORTION OF EX. INTERIOR DRYWALL PARTITION BACK TO WALL OF EX. ELEC. CLOSET OVER EXTENT SHOWN DOTTED. PATCH AND MAKE GOOD ALL ADJACENT / DAMAGED PARTITIONS. PAINT TO FINISH (MATCH EXISTING). REFER TO ELECT. FOR RELATED WORK.
- **D1B** REMOVE & DISCARD EXISTING INTERIOR DRYWALL PARTITION OVER EXTENT SHOWN DOTTED TO U/S OF EXISTING BULKHEAD. SALVAGE EX. WOOD BASE BOARD & RE-INSTALL AS REQUIRED BACK ON TO EX. ADJACENT PARTITION AT REMOVED END. PATCH AND MAKE GOOD ALL ADJACENT SURFACES, MATERIALS & FINISHES. PAINT TO FINISH (MATCH COLOUR WITHIN EX. ROOM)
- **D2** REMOVE AND DISCARD EXISTING ALUMINUM WINDOW FRAME, ALUMINUM SILL, GLAZING, BLOCKING, FLASHING & ALL ASSOCIATED COMPONENTS IN ITS ENTIRETY. PREPARE REMAINING OPENING TO RECEIVE NEW DOOR & FRAME AS PER SCHEDULE. PATCH AND MAKE GOOD ALL ADJACENT MATERIALS AND SURFACES AND PREPARE FOR NEW FINISHES.
- **D2A** CUT AND DISCARD PORTION OF EXISTING CONC. BLK. WALL ASSEMBLY OVER EXTENT DENOTED TO SUIT NEW WALL ACCESS OPENING FOR HM. DOOR & FRAME. SAW TOOTH EX. CMU BLOCKS AS REQUIRED. INSTALL NEW LINTELS ABOVE (REFER TO STRUCTURAL) (SHORE STRUCTURE AS REQUIRED). SALVAGE EX. INTERIOR TILE BASE TO BE RE-INSTALLED ALONG WALL AS PER NOTE C2 (SHOWN DOTTED) PATCH AND MAKE GOOD ALL ADJACENT MATERIALS AND SURFACES AND PREPARE FOR NEW FINISHES.
- **D2B** REMOVE AND DISCARD EXISTING ALUMINUM WINDOW FRAME, ALUMINUM SILL, GLAZING, BLOCKING, FLASHING & ALL ASSOCIATED COMPONENTS IN ITS ENTIRETY. PREPARE REMAINING OPENING TO RECEIVE NEW GLASS BLOCK INFILL. PATCH AND MAKE GOOD ALL ADJACENT MATERIALS AND SURFACES AND PREPARE FOR NEW FINISHES.
- **D3** REMOVE & DISCARD PORTION OF EXISTING WALL ASSEMBLY TO ALLOW INSTALLATION OF NEW HM DOOR AND FRAME AS PER SCHEDULE. SAW CUT EXISTING EXTERIOR WALL TO PROVIDE NEW 2150mm x 1100mm DOORWAY OPENING AS DIMENSIONED ON PLAN. TEMPORARILY SHORE STRUCTURE AS REQUIRED. INSTALL NEW LINTEL ABOVE (REFER TO STRUCTURAL). REFER TO WALL SECTION FOR COMPLETE DETAILS.
- **D4** REMOVE & DISCARD PORTION OF EXISTING BLOCK WALL TO ALLOW INSTALLATION OF NEW HM DOOR AND FRAME & NEW WALL ASSEMBLY. KEEP FLUSH WITH ADJACENT EXTERIOR BLOCK WALL. SAW TOOTH AS REQUIRED. REMOVE & CUT DOWN PORTION OF EX. FOUNDATION BELOW (REFER TO STRUCTURAL FOR RELATED WORK). PATCH AND MAKE GOOD EXISTING PARAPET AND FLASHING ABOVE.
- **D5** CUT BACK EXISTING WEEPING TILE (WT) AT NEW FOUNDATION WALL. RE-ROUTE & EXTEND AS REQUIRED AROUND NEW ADDITION TO NEAREST DRAINAGE SYSTEM (SHOWN DOTTED). WT DENOTES NEW WEEPING TILE EXTENTS. TIE IN WITH EXISTING.
- **D6** CUT OUT NEW OPENING IN EX. EXTERIOR CONC. BLOCK WALL ASSEMBLY TO SUIT NEW WINDOW SIZE. SAWTOOTH BLOCK AS REQUIRED. PATCH AND MAKE GOOD ALL ADJACENT SURFACES, MATERIALS AND FINISHES TO MATCH EX.
- **D7** REMOVE & DISCARD EX. PORCELAIN TILE FLOOR AND BASE OVER EXTENT SHOWN AND REPLACE WITH NEW PT & BASE TO REPLACE AND MATCH AND TIE IN WITH EXISTING.

CONSTRUCTION NOTES

- **C1** INSTALL NEW 13mm GYP. BD ON 22mm HAT CHANNELS (400mm O/C) OVER EX. CONCRETE BLOCK WALL. FULL HEIGHT TO U/S OF STRUCT.
- **C2** INSTALL SALVAGED TILE BASE ALONG WALL SHOWN DOTTED AT REMOVED MILLWORK AND PARTITION.
- **C3** INSTALL NEW CARPET TILE OVER EXTENT SHOWN (SHADED) TO MATCH AND TIE INTO EX. PATCH EX. CARPET BASE WHERE REQUIRED.
- **C4** EX. STAINLESS STEEL METAL MAIL BOX INSERT TO BE RELOCATED. INFILL REMAINING WALL OPENING TO MATCH EX. / NEW WALL ASSEMBLY.
- **C5** RELOCATE EX. RAIN GUAGE EQUIPMENT AND CABINET AS PER ELECTRICAL. PATCH AND MAKE GOOD EX. GYP. BD & ALL MATERIALS / FINISHES TO MATCH AND TIE IN WITH EX.
- **C6** PATCH, PRIME & PAINT WALL OVER EXTENT DENOTED BY DASHED LINE. FULL HEIGHT TO U/S OF CEILING.

EXTERIOR WALL TYPES

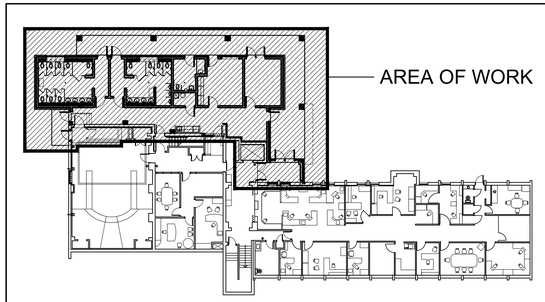
REFER TO STRUCTURAL FOR MASONRY REINFORCING.

NO.	ASSEMBLY	DESCRIPTION	REMARKS
W1	---	-90mm BRICK VENEER -25mm AIR SPACE -100mm RIGID INSULATION AIR/VAPOUR BARRIER 190mm CONC. BLOCK (REFER TO ELEVATIONS / SECTIONS FOR ARCH. MASONRY ACCENTS	REFER TO WALL SECTIONS FOR HEIGHTS
SIM. W1A			INCREASE AIR SPACE TO 30mm
W2	---	-PRE-FINISHED METAL SIDING (HORIZONTAL) -200mm GALV. Z-BAR SUB GIRT CHANNELS AT 400mm O/C -100mm RIGID INSULATION -AIR/VAPOUR BARRIER -190mm CONC. BLOCK	REFERENCE FOR TYPE OF METAL CLADDING: W1 - TYPE 1 W2 - TYPE 2

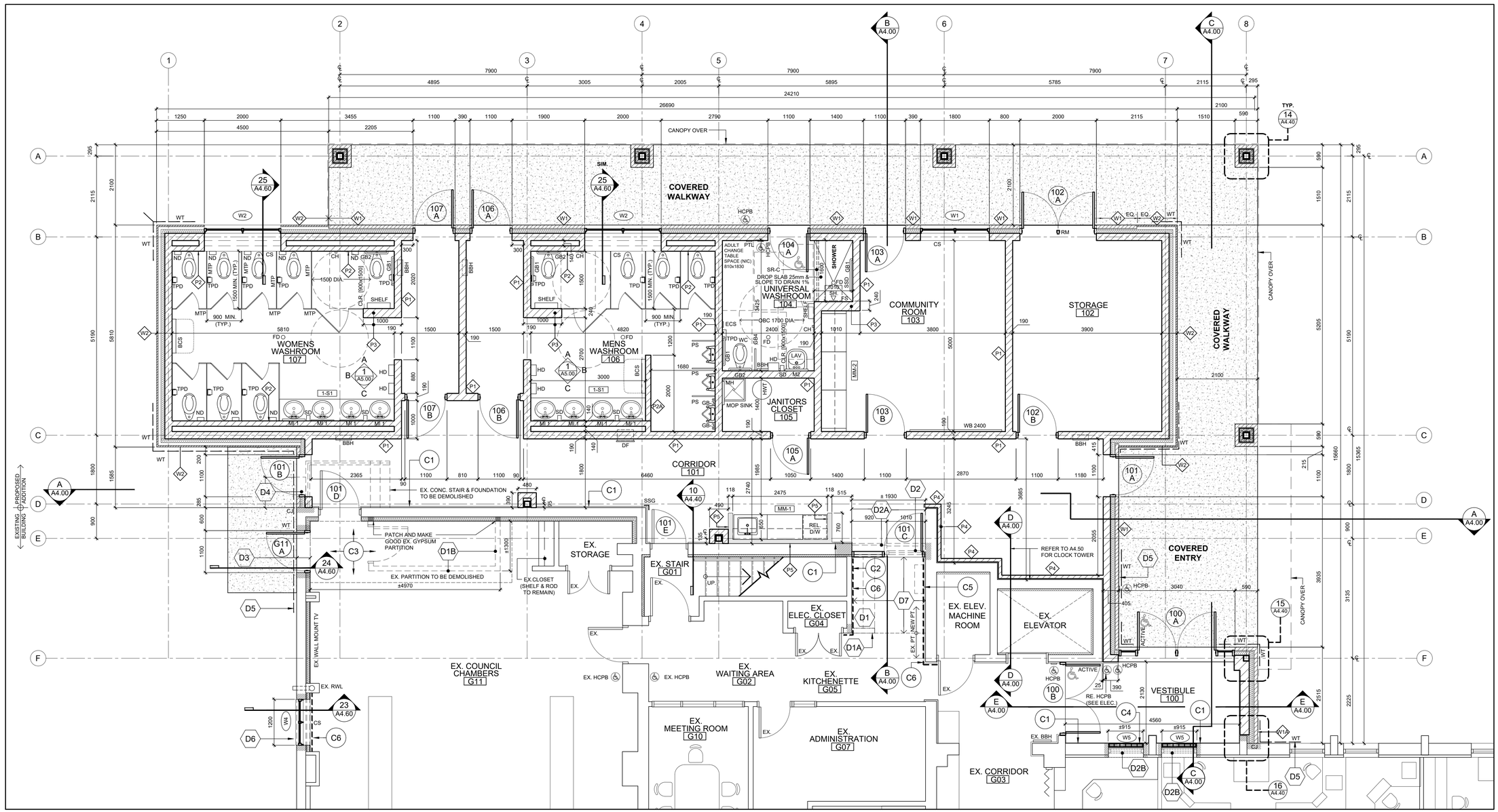
INTERIOR WALL PARTITION TYPES

REFER TO STRUCTURAL FOR MASONRY REINFORCING.
REFER TO LIFE SAFETY PLAN FOR PARTITIONS REQUIRED TO BE FIRE SEPARATIONS

NO.	DESCRIPTION	REMARKS
P1	- 190mm CONC. BLOCK	• EXTEND TO U/S OF STRUCTURE ABOVE • BULL-NOSE BLOCKS AT ALL EXPOSED CORNERS
P2	- 140mm CONC. BLOCK	P2 • EXTEND TO U/S OF STRUCTURE ABOVE • BULL-NOSE BLOCKS AT ALL EXPOSED CORNERS
P2A		P2A PARTIAL HEIGHT PARTITION: • EXTEND TO 2000mm FROM FFE • BULL-NOSE BLOCKS AT ALL EXPOSED CORNERS & TOP COURSE
P3	- 240mm CONC. BLOCK	• EXTEND TO U/S OF STRUCTURE ABOVE • BULL-NOSE BLOCKS AT ALL EXPOSED CORNERS • REFER TO CROSS SECTIONS FOR HEIGHTS
P4	- 90mm CONC. BLOCK	• BULL-NOSE BLOCKS AT ALL EXPOSED CORNERS • EXTEND TO U/S OF STRUCTURE ABOVE. • REFER TO CROSS SECTIONS FOR HEIGHTS
P5	**GYPSUM BOARD PARTITION** - 13mm GYPSUM BOARD - 92mm METAL STUDS AT 400mm O/C - 13mm GYPSUM BOARD	• EXTEND METAL STUDS TO U/S OF STRUCT. • EXTEND GYPSUM BOARD TO 100mm ABOVE ACT. • SOUND SEAL AT ALL JOINTS. • PAINT GYPSUM BOARD TO FINISH (TYP.)



KEY PLAN
SCALE: NTS



PARTIAL GROUND FLOOR PLAN
SCALE: 1:50

LEGEND

ACT	ACOUSTIC CEILING TILE
BBH	BASE BOARD HEATER
BD	BOARD
BCS	BABY CHANGE STATION
BFS	BOTTLE FILLING STATION
BLK	BLOCK
CH	COAT HOOK
CJ	CONTROL JOINT
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CONT	CONTINUOUS
CSK	COUNTERSINK
CS	CORIAN SILL
C/W	COMPLETE WITH
CWT	CERAMIC WALL TILE
DIA	DIAMETER
ECS	EMERGENCY CALL SWITCH
EQ	EQUAL
EX	EXISTING ITEM
FE	FIRE EXTINGUISHER
FFE	FINISHED FLOOR ELEVATION
FD	FLOOR DRAIN
FS	FOLD DOWN SHOWER SEAT
GB#	GRAB BAR TYPE
GYP	GYPSUM
HCPB	HANDICAP PUSH BUTTON
HD	HAND DRYER
MI	MIRROR TYPE
MAT'L	MATERIAL
MIN	MINIMUM
MH	MOP HOLDER
MS	MOP SINK
ND	NAPKIN DISPOSAL
NIC	NOT IN CONTRACT
NO.	NUMBER
NTS	NOT TO SCALE
O/C	ON CENTRE
PT	PORCELAIN TILE
PTL	PUSH TO LOCK BUTTON
RB	RUBBER BASE
REL.	RELOCATED ITEM
RM	REMOVABLE MULLION
RWL	RAIN WATER LEADER
SD	SOAP DISPENSER
SIM.	SIMILAR
SR-C	SHOWER ROAD + CURTAIN
SSD	SHOWER SOAP DISH
SSG	STAINLESS STEEL GUARD
TPD	TOILET PAPER DISPENSER
TYP.	TYPICAL
U/S	UNDERSIDE
VCT	VINYL COMPOSITE TILE
VEST	VESTIBULE
WC	WATER CLOSET
WR	WASHROOM
WSH	WALL SHELF
WT	WEEPING TILE
MM-#	DENOTES MILLWORK ITEMS

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TOWN OF PELHAM
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PARTIAL GROUND FLOOR PLAN

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DOOR SCHEDULE

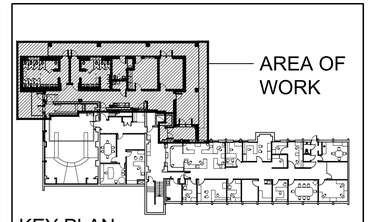
ROOM NAME	DOOR NO.	DOORS								FRAMES					REMARKS
		WIDTH	HEIGHT	THK.	FIRE	TYPE	MAT'L	FINISH	GLASS	TYPE	MAT'L	FINISH	PANIC BAR	DOOR CLOSER	
VESTIBULE	100 A (2)	1000	2100	45	-	B	ALUM.	ANOD.	DBL GL.	2	ALUM.	ANOD.	•	•	INS, WS, TH, CL, CH, PDO
VESTIBULE	100 B (2)	900	2050	45	-	B	ALUM.	ANOD.	TG	4	ALUM.	ANOD.	•	•	CL, PDO
CORRIDOR	101 A	1000	2150	45	-	C	HM	PAINT	-	1	HM	PAINT	•	•	CH, DC, WS, INSULATED DOOR/FRAME.
CORRIDOR	101 B	1000	2150	45	-	A	HM	PAINT	-	1	HM	PAINT	•	•	CH, DC, WS, INSULATED DOOR/FRAME.
CORRIDOR	101 C	1000	2200	45	45 MIN.	B	HM	PAINT	FG	3	HM	PAINT		•	
CORRIDOR	101 D	1000	2100	45	45 MIN.	C	HM	PAINT	FG	1	HM	PAINT		•	NEW HARDWARE TO BE INSTALLED ON EX. DOOR
CORRIDOR	101 E	900	2100	45	45 MIN.	C	HM	PAINT	FG	1	HM	PAINT	•	•	INS, WS, TH, CL, CH,
STORAGE	102 A (2)	1000 (2)	2150	45	-	A	HM	PAINT	-	1	HM	PAINT		•	
STORAGE	102 B	1000	2150	45	45 MIN.	A	HM	PAINT	FG	1	HM	PAINT			INS, WS, TH, CL, CH,
COMMUNITY ROOM	103 A	1000	2150	45	-	A	HM	PAINT	-	1	HM	PAINT		•	
COMMUNITY ROOM	103 B	1000	2150	45	45 MIN.	C	HM	PAINT	TG	1	HM	PAINT			INS, WS, TH, CL, CH, PDO
UNIVERSAL WASHROOM	104 A	1000	2150	45	-	A	HM	PAINT	-	1	HM	PAINT		•	
JANITORS CLOSET	105 A	950	2150	45	45 MIN.	A	HM	PAINT	-	1	HM	PAINT			INS, WS, TH, CL, CH,
MENS WASHROOM	106 A	1000	2150	45	-	A	HM	PAINT	-	1	HM	PAINT		•	
MENS WASHROOM	106 B	1000	2150	45	45 MIN.	A	HM	PAINT	-	1	HM	PAINT			INS, WS, TH, CL, CH,
WOMENS WASHROOM	107 A	1000	2150	45	-	A	HM	PAINT	-	1	HM	PAINT		•	
WOMENS WASHROOM	107 B	1000	2150	45	45 MIN.	A	HM	PAINT	-	1	HM	PAINT			
EX. COUNCIL CHAMBERS	G11 A	1000	2150	45	-	A	HM	PAINT	-	1	HM	PAINT	•	•	INS, WS, TH, CL, CH,

CONSTRUCTION NOTES

C1 PATCH, PRIME, PAINT & MAKE GOOD ANY DAMAGED GYPSUM BOARD CEILING AT REMOVED INTERIOR PARTITIONS / BULKHEADS BACK TO IT'S ORIGINAL INTEGRITY. PAINT TO FINISH TO MATCH EXISTING ADJACENT CEILING.

ROOM FINISH SCHEDULE

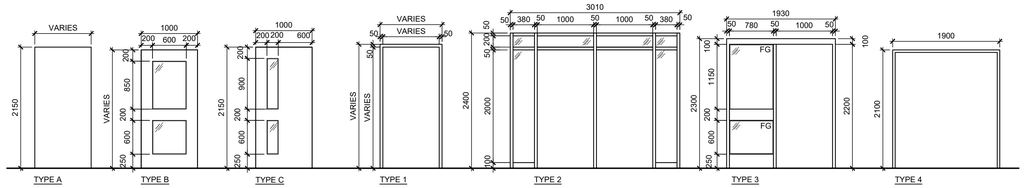
ROOM NO.	ROOM NAME	FLOOR FINISH	BASE	WALL		CEILING			REMARKS
				MAT'L	FINISH	MAT'L.	FINISH	HEIGHT	
100	VESTIBULE	PT	PT	CMU / GYP. BD	PAINT/ PAINT	GYP. BD	ACT-1	2400	
101	CORRIDOR	PT	PT	CMU / GYP. BD	PAINT/ PAINT	ACT	ACT-1	2300	
102	STORAGE	SEALED CONC.	-	CMU	PAINT	EXPOSED CONC. STRUCT.	PAINT	2800	
103	COMMUNITY ROOM	VCT	RB	CMU	PAINT	ACT	ACT-1	2400	
104	UNIVERSAL WASHROOM	SEALED CONC.	-	CMU	PAINT	GYPSUM	PAINT	2400	CWT AT SHOWER STALL WALLS CT AT SHOWER FLOOR (REFER TO SPECS)
105	JANITORS CLOSET	SEALED CONC.	-	CMU	PAINT	EXPOSED CONC. STRUCT.	PAINT	2800	
106	MENS WASHROOM	SEALED CONC.	-	CMU	PAINT	EXPOSED CONC. STRUCT.	PAINT	2800	
107	WOMENS WASHROOM	SEALED CONC.	-	CMU	PAINT	EXPOSED CONC. STRUCT.	PAINT	2800	



KEY PLAN
SCALE: NTS

DOOR SCHEDULE LEGEND

ALUM	ALUMINUM
ANOD (CL)	ANODIZED CLEAR
ANOD (CO)	ANODIZED COLOURED
CH.	CONTINUOUS HINGE
CL.	CLOSER
DC.	DOOR CONTACT
DGS	DOUBLE GLAZED SEALED INSULATING GLASS UNITS
EX.	EXISTING
HM.	HOLLOW METAL
INS.	THERMALLY INSULATED DOOR / FRAME
MAT'L	MATERIAL
MC	MINERAL CORE
MIN	MINUTE
OHS	OVER HEAD STOP
PDO	POWER DOOR OPERATOR
PH.	PANIC HARDWARE
PLAM	PLASTIC LAMINATE
REL	RELOCATED ITEM
TG	TEMPERED GLASS
THK	THICKNESS
TH.	THRESHOLD
SCWD	SOLID CORE WOOD DOOR
WD	WOOD
WS	WEATHER STRIPPING



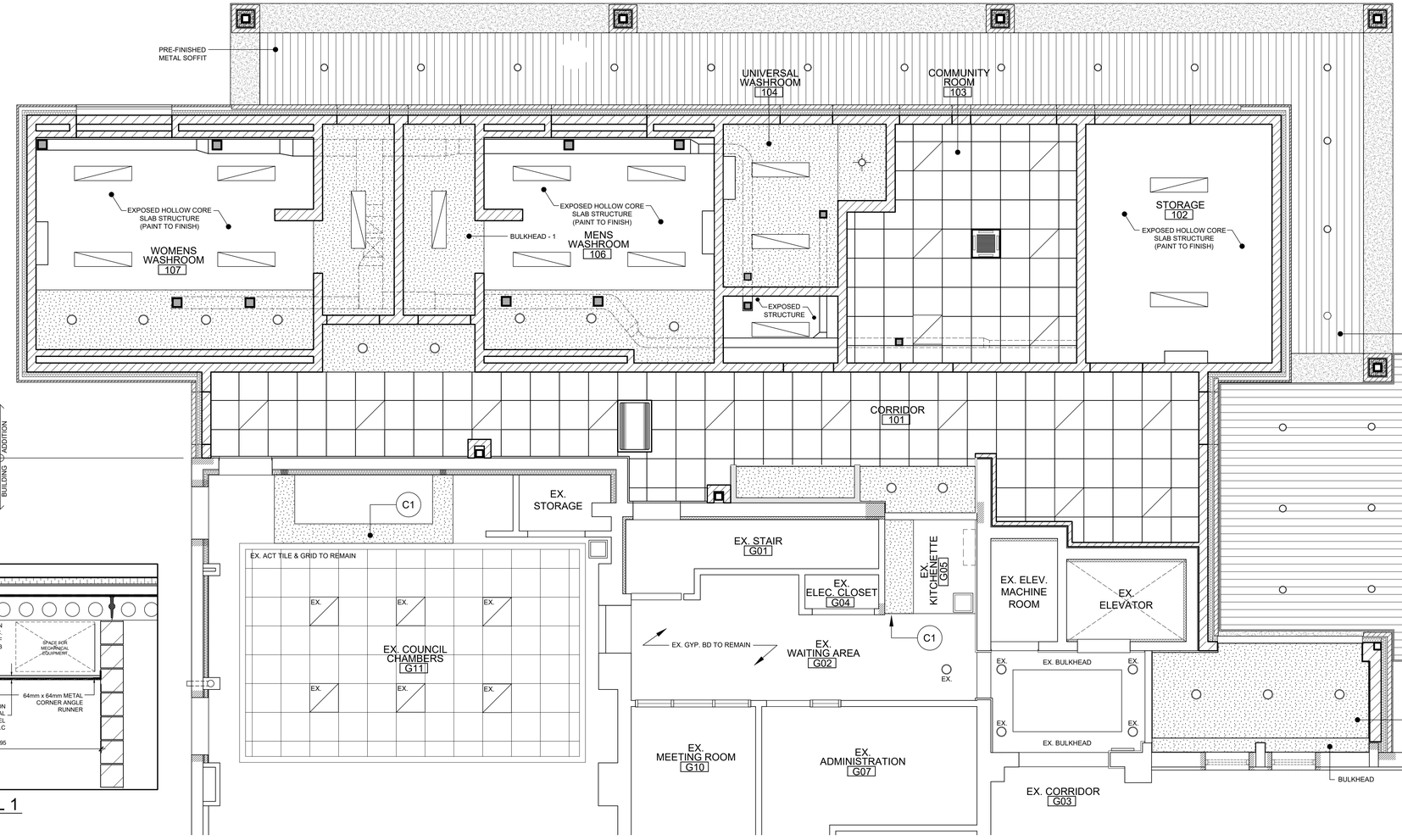
DOOR TYPES

FRAME TYPES

DOOR & FRAME ELEVATIONS

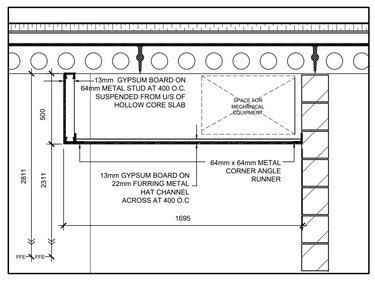
SCALE: 1:50

NOTE:
- GLAZINGTO BE DOUBLE GLAZED SEALED INSULATING UNITS WITH 6mm TEMPERED GLASS BOTH SIDES.
- FRAMES TO BE THERMALLY BROKEN ALUMINUM.



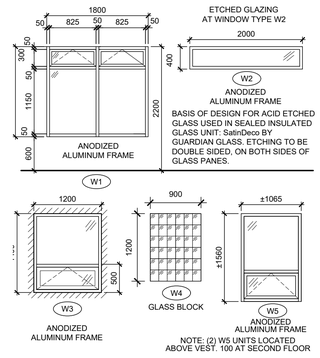
PARTIAL GROUND FLOOR REFLECTED CEILING PLAN

SCALE: 1:50



BULKHEAD DETAIL 1

SCALE: 1:20



NOTE: (2) W5 UNITS LOCATED ABOVE VEST. 100 AT SECOND FLOOR

WINDOW ELEVATIONS

SCALE: 1:50

GRAPHIC RCP LEGEND

NOTE: REFER TO ELECTRICAL DRAWINGS FOR FIXTURE TYPES

- RECESSED LIGHT FIXTURE
- 300×1200 LIGHT
- 600×1200 LIGHT FIXTURE
- 600×600 LIGHT FIXTURE
- GYPSUM BOARD BULKHEAD.
- 600×600 SUSPENDED ACOUSTIC CEILING TILE
- DIFFUSER
- RETURN AIR GRILLE
- EXHAUST FAN

Pelham NIAGARA

TRUE NORTH
PROJ. NORTH

LEGEND

ACT	ACOUSTIC CEILING TILE
BD	BOARD
BLK	BLOCK
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CONT	CONTINUOUS
CORR	CORRIDOR
C/W	COMPLETE WITH
CWT	CERAMIC WALL TILE
CT	CERAMIC FLOOR TILE
DIA	DIAMETER
EQ	EQUAL
EX	EXISTING ITEM
FFE	FINISHED FLOOR ELEVATION
GYP	GYPSUM
HCPB	HANDICAP PUSH BUTTON
MAT'L	MATERIAL
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
NTS	NOT TO SCALE
O/C	ON CENTRE
PT	PORCELAIN TILE
RB	RUBBER BASE
REL.	RELOCATED ITEM
RM	ROOM
RWL	RAIN WATER LEADER
SIM	SIMILAR
SSG	STAINLESS STEEL CORNER GUARD
TYP	TYPICAL
U/S	UNDERSIDE
VCT	VINYL COMPOSITE TILE
VEST	VESTIBULE
W/R	WASHROOM

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

PARTIAL GROUND FLOOR REFLECTED CEILING PLAN & SCHEDULES

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A2.10
CHECKED J.G.	
PRINT DATE	06/07/22

E:\Data\2022\2022-10-Town-of-Pelham-Events-Building-Addition\05drawings\09Working Dra
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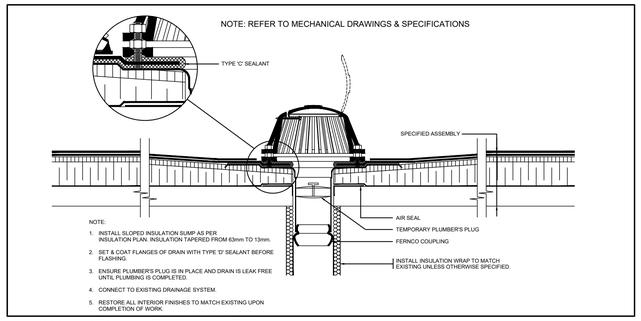
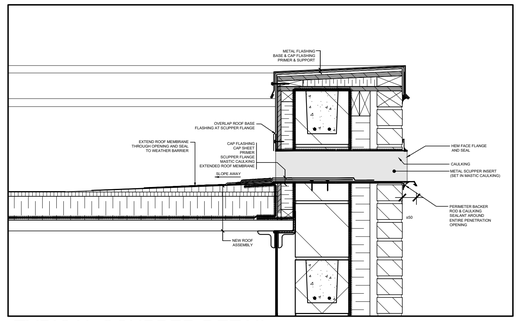


ROOF DRAIN DETAIL (RD)

SCALE: NTS



TYPICAL SCUPPER DETAIL

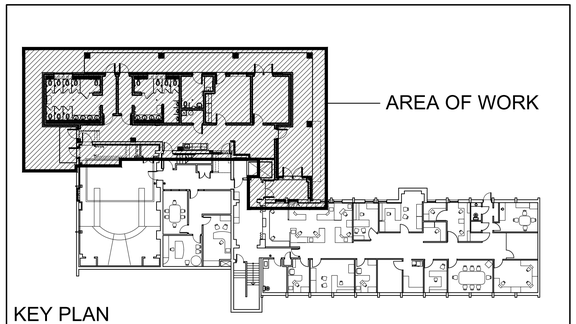
SCALE: NTS

GENERAL NOTES

1. ALL ROOF TOP UNIT LOCATIONS ARE APPROXIMATE & SHOWN FOR REFERENCE. REFER TO MECHANICAL DRAWINGS.
2. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS OF ALL ROOF PENETRATIONS FOR, VENTS, ROOF DRAINS, EXHAUST FANS, LOCATION OF ROOF TOP UNITS ETC. GENERAL CONTRACTOR TO COORDINATE THIS WORK WITH WORK OF ALL OTHER RELATED TRADES.EQUIPMENT SHOWN ON ARCHITECTURAL ROOF PLAN IS FOR GENERAL REFERENCE AND NOT INCLUSIVE.
3. REFER TO ROOFING SPECIFICATIONS FOR COMPLETE ROOFING DESCRIPTION & REQUIREMENTS NOT NOTED ON DRAWINGS.
4. REFER TO MECHANICAL & ELECTRICAL DRAWINGS FOR ROOF DRAIN, CURB & EQUIPMENT PENETRATION DETAILS.
5. GENERAL CONTRACTOR TO PROVIDE AND INSTALL ALL WOOD BLOCKING AT ROOF PARAPETS AND CANOPIES AS REQUIRED. WOOD BLOCKING TO BE PRESSURE TREATED WOOD.
6. TAPERED INSULATION IS SHOWN FOR REFERENCE ONLY. GENERAL CONTRACTOR AND ROOFING INSTALLER TO COORDINATE INSTALLATION, LOCATION AND VERIFY QUANTITIES OF MATERIAL REQUIRED. CONTRACTOR TO VERIFY THAT ALL ROOF AREAS HAVE A POSITIVE DRAINAGE (MIN. 1%) TO ALL ROOF DRAINS PRIOR TO INSTALLATION OF ROOF ASSEMBLY. CRICKETS TO BE PROVIDE AT ALL ROOF TOP EQUIPMENT WHERE REQUIRED.
7. THE ROOFING ASSEMBLY SHALL CONFORM TO THE REQUIREMENTS OF OBC DIV B. 3.1.15.

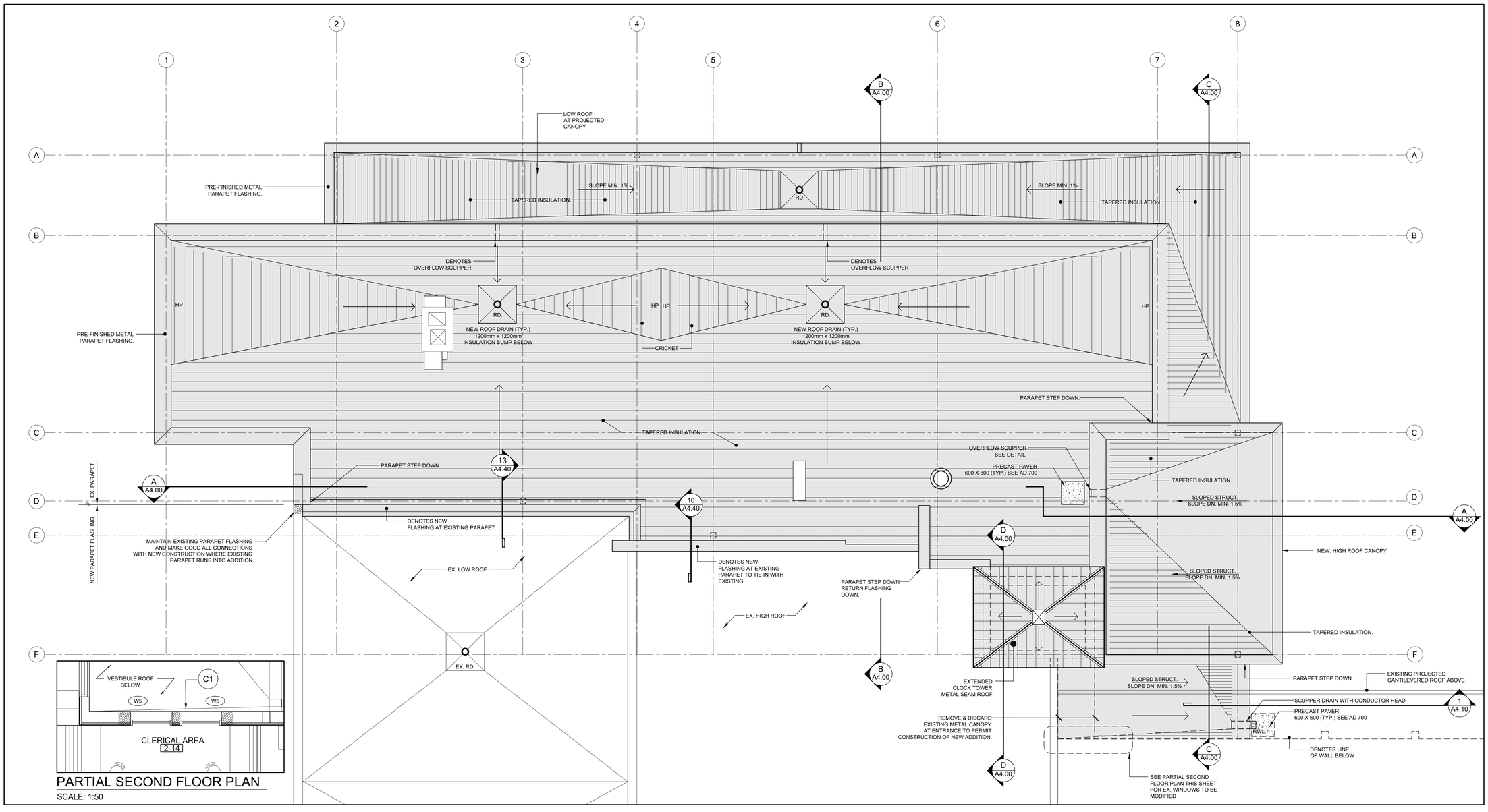
CONSTRUCTION NOTES

C1 **AT SECOND FLOOR LEVEL ABOVE NEW VESTIBULE 100 ROOF:**
-REMOVE & DISCARD (2) EXISTING LOWER HALF WINDOWS AND SPANDREL PANELS.
- INSTALL NEW PARTIAL HEIGHT BLOCK INFILL TO BE FLUSH AND MATCH WITH EXISTING 800mm FROM FINISHED FLOOR.
-INSTALL NEW WINDOWS TO SUIT OPENING. PATCH AND MAKE GOOD ALL ADJACENT SURFACES, FINISHES AND MATERIALS.



KEY PLAN

SCALE: NTS



PARTIAL SECOND FLOOR PLAN

SCALE: 1:50

PARTIAL ROOF PLAN

SCALE: 1:50

Pelham NIAGARA

TRUE NORTH

PROJ. NORTH

LEGEND

ACT	ACOUSTIC CEILING TILE
CB	CONCRETE BLOCK
EX	EXISTING ITEM
HM	HOLLOW METAL
PNT	PAINT
RB	RUBBER BASE
VCT	VINYL COMPOSITE TILE
SCW	SOLID CORE WOOD
SD	SOAP DISPENSER
PTD	PAPER TOWEL DISPENSER
MI	MIRROR
TPD	TOILET PAPER DISPENSER
SSCG	STAINLESS STEEL CORNER GUARD
FD	FLOOR DRAIN
RSF	RESILIENT SHEET FLOORING
PLS	PLASTER
TR	TO REMAIN

LEGEND:

TAPERED INSULATION

NO.	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

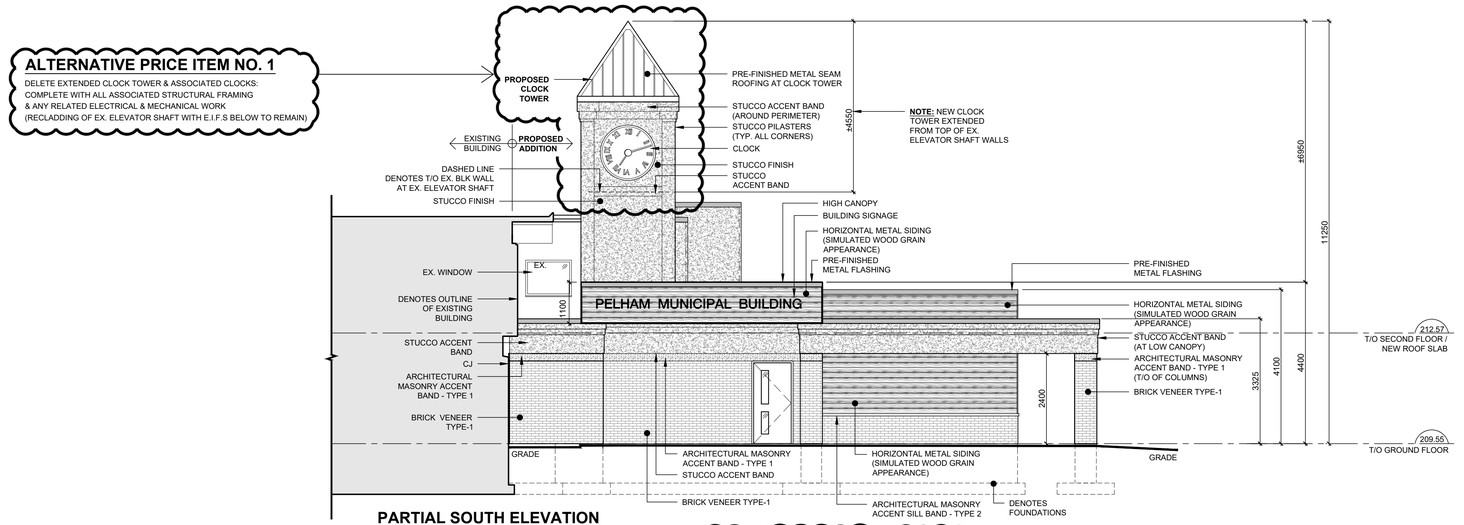
ROOF PLAN

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A2.20
CHECKED J.G.	
PRINT DATE	06/07/22

ALTERNATIVE PRICE ITEM NO. 1

DELETE EXTENDED CLOCK TOWER & ASSOCIATED CLOCKS:
COMPLETE WITH ALL ASSOCIATED STRUCTURAL FRAMING
& ANY RELATED ELECTRICAL & MECHANICAL WORK
(RECLADDING OF EX. ELEVATOR SHAFT WITH E.I.F.S BELOW TO REMAIN)

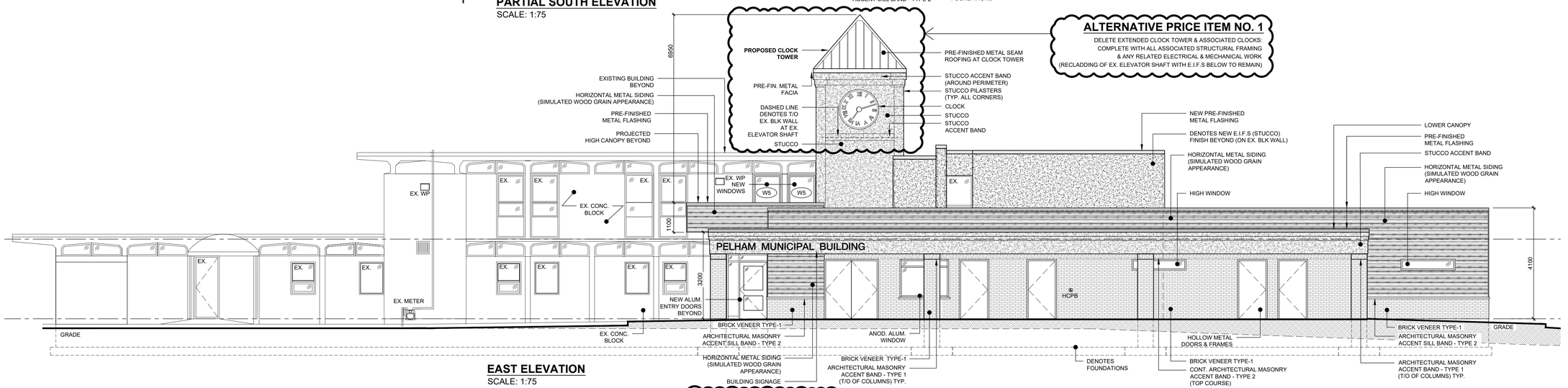


PARTIAL SOUTH ELEVATION

SCALE: 1:75

ALTERNATIVE PRICE ITEM NO. 1

DELETE EXTENDED CLOCK TOWER & ASSOCIATED CLOCKS:
COMPLETE WITH ALL ASSOCIATED STRUCTURAL FRAMING
& ANY RELATED ELECTRICAL & MECHANICAL WORK
(RECLADDING OF EX. ELEVATOR SHAFT WITH E.I.F.S BELOW TO REMAIN)



EAST ELEVATION

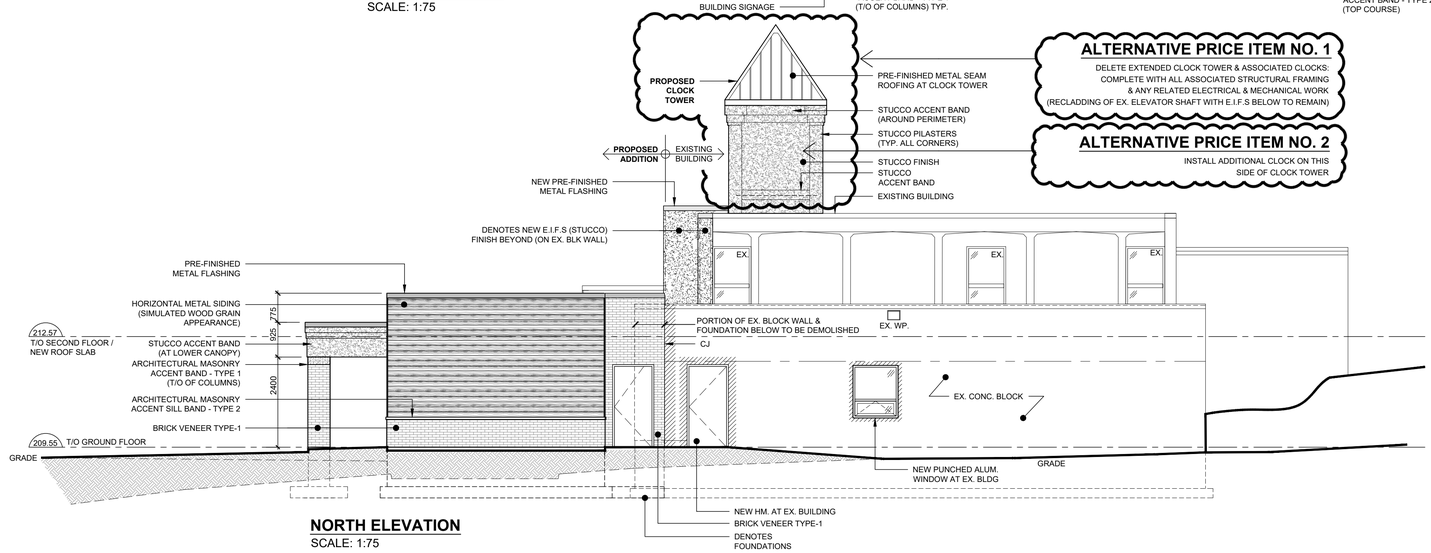
SCALE: 1:75

ALTERNATIVE PRICE ITEM NO. 1

DELETE EXTENDED CLOCK TOWER & ASSOCIATED CLOCKS:
COMPLETE WITH ALL ASSOCIATED STRUCTURAL FRAMING
& ANY RELATED ELECTRICAL & MECHANICAL WORK
(RECLADDING OF EX. ELEVATOR SHAFT WITH E.I.F.S BELOW TO REMAIN)

ALTERNATIVE PRICE ITEM NO. 2

INSTALL ADDITIONAL CLOCK ON THIS SIDE OF CLOCK TOWER



NORTH ELEVATION

SCALE: 1:75

LEGEND

ANOD.	ANODIZED
BLDG	BUILDING
BLK.	BLOCK
C.J.	CONTROL JOINT
CONC.	CONCRETE
CONT.	CONTINUOUS
EX.	EXISTING ITEM
FFE.	FINISHED FLOOR ELEVATION
HCPB	HANDICAP PUSH BUTTON
HM.	HOLLOW METAL
SP.	SPANDREL PANEL
T/O.	TOP OF
U/S.	UNDERSIDE
WP.	WALL PACK

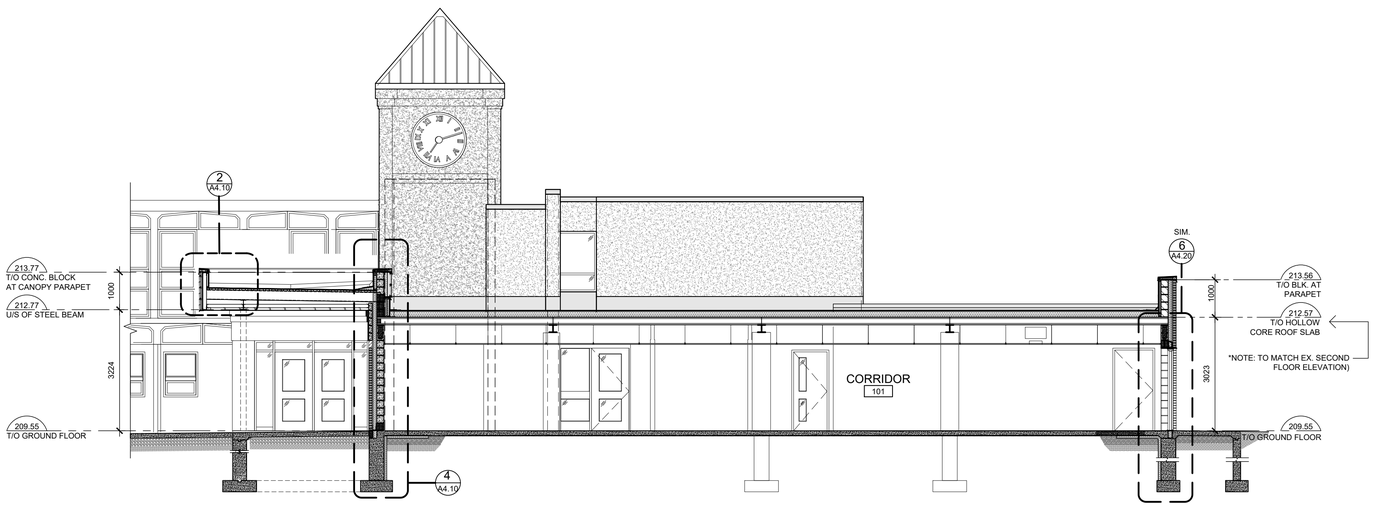
NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING
ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

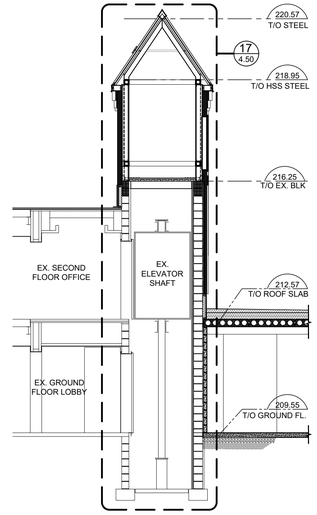
BUILDING
ELEVATIONS

GRGURIC
ARCHITECTS
INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

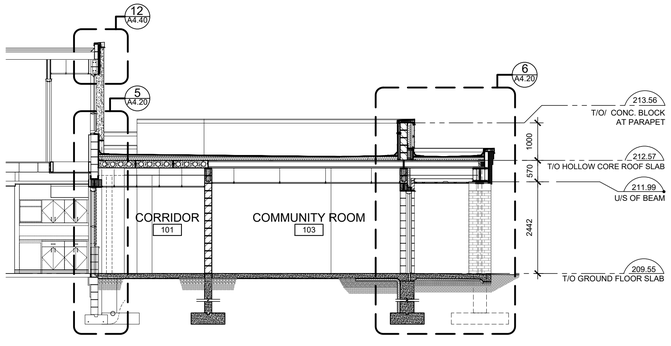
SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A3.00
CHECKED J.G.	
PRINT DATE	06/07/22



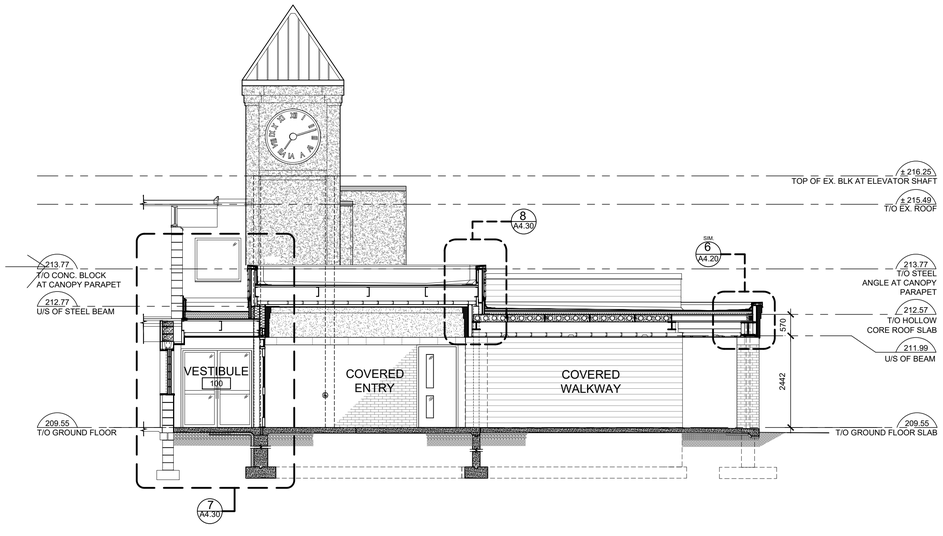
A-A A4.00 SECTION A-A
SCALE: 1:50



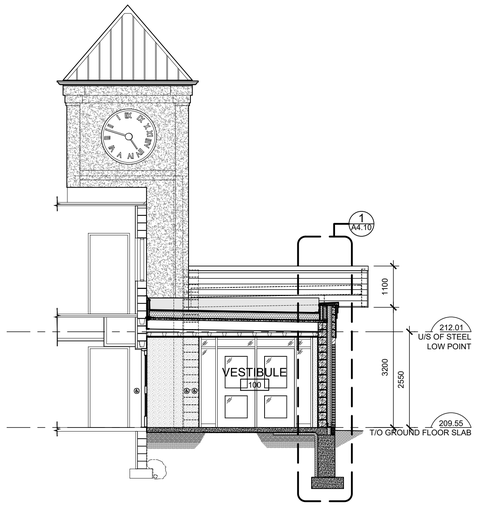
D-D A4.00 SECTION D-D
SCALE: 1:50



B-B A4.00 SECTION B-B
SCALE: 1:50



C-C A4.00 SECTION C-C
SCALE: 1:50



E-E A4.00 SECTION E-E
SCALE: 1:50

Pelham NIAGARA

LEGEND

BLK	BLOCK
BD	BOARD
CORR	CORRIDOR
CUST	CUSTODIAN
ELEV	ELEVATOR
FIN	FINISHED
GRND	GROUND
GYP	GYPSUM
HP	HIGH POINT
LP	LOW POINT
MECH	MECHANICAL
RM	ROOM
SIM	SIMILAR
T/O	TOP OF
TYP	TYPICAL
U/S	UNDERSIDE
VEST	VESTIBULE
W/R	WASHROOM

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING
ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

BUILDING
SECTIONS

GRGURIC
ARCHITECTS
INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
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SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A4.00
CHECKED J.G.	
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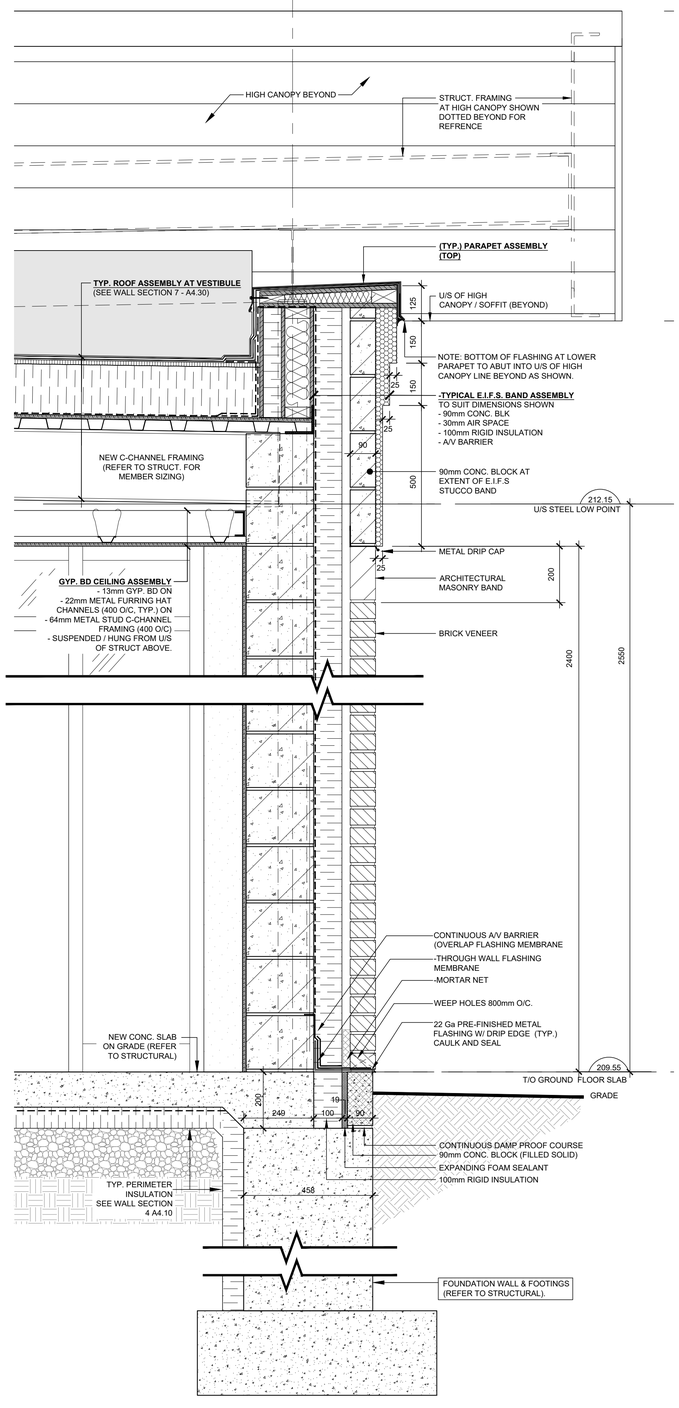
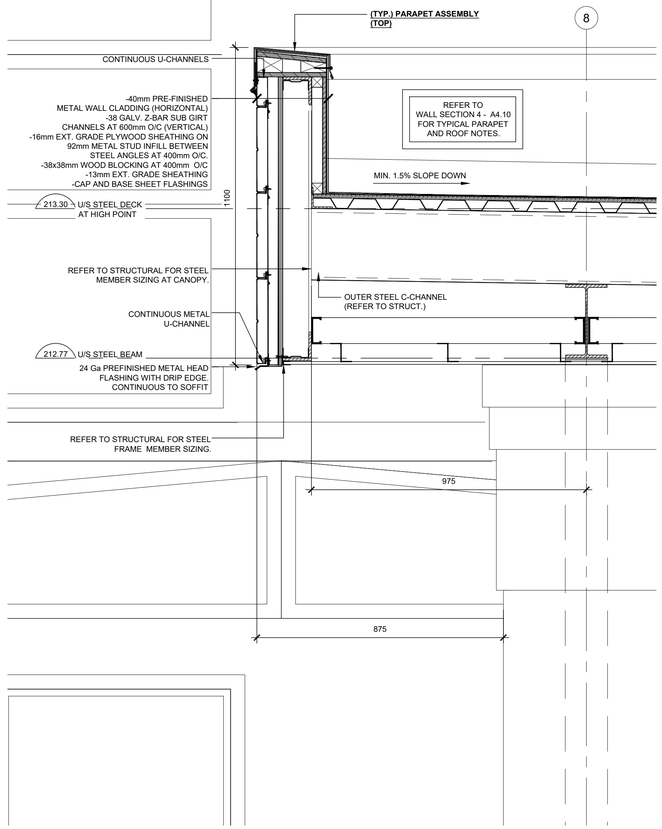
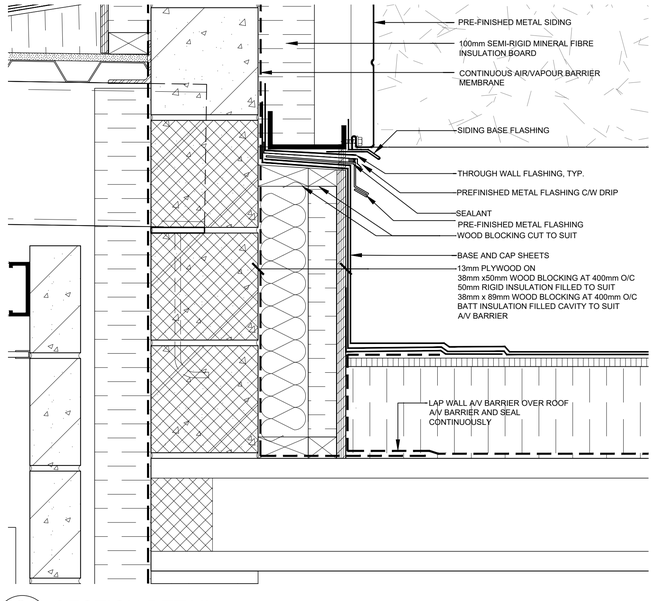


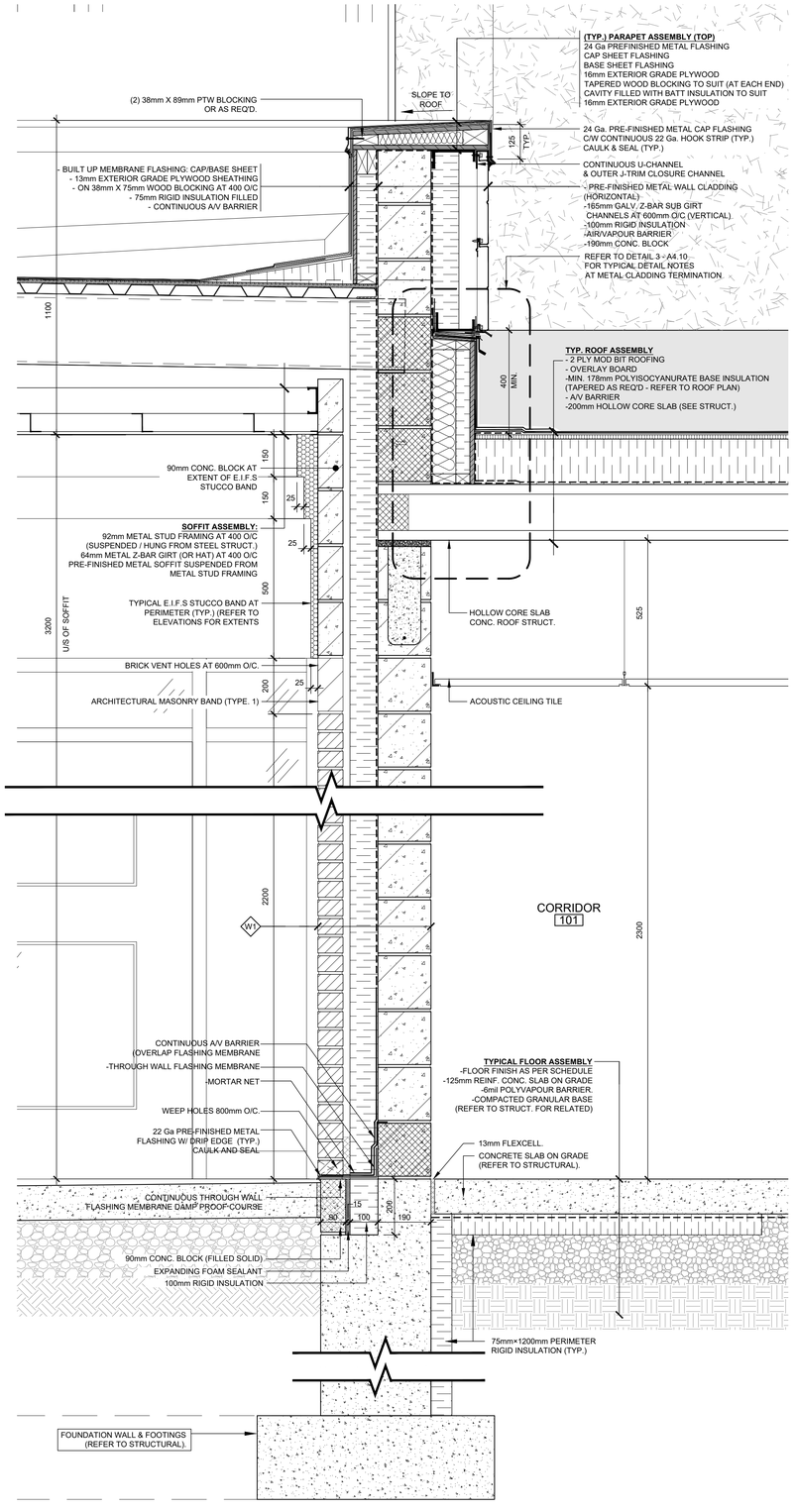
1 A4.10 WALL SECTION
SCALE: 1:10



2 A4.10 SECTION DETAIL AT CANOPY
SCALE: 1:10



3 A4.10 SECTION DETAIL
SCALE: 1:5



4 A4.10 WALL SECTION
SCALE: 1:10

Pelham NIAGARA

LEGEND

ALUM.	ALUMINUM
A/V	AIR / VAPOUR
BD.	BOARD
BLK.	BLOCK
BRG.	BEARING
CONC.	CONCRETE
CONT.	CONTINUOUS
C/W	COMPLETE WITH
℄	CENTRE LINE
DN.	DOWN
EIFS	EXTERIOR INSULATED FINISH SYSTEM
EXT.	EXTERIOR
FIN.	FINISHED
Ga.	GAUGE
GALV.	GALVANIZED
GYP.	GYPSUM
HM	HOLLOW METAL
HP	HIGH POINT
LP	LOW POINT
MIN.	MINIMUM
HSS.	HOLLOW STRUCTURAL STEEL
O/C	ON CENTRE
PTW	PRESSURE TREATED WOOD
REQ'D	REQUIRED
RD	ROOF DRAIN
RWL	RAIN WATER LEADER
SIM	SIMILAR
STRUCT.	STRUCTURAL
T/O	TOP OF
TYP.	TYPICAL
U/S	UNDERSIDE

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
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TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

WALL SECTION DETAILS

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
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SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A4.10
CHECKED J.G.	
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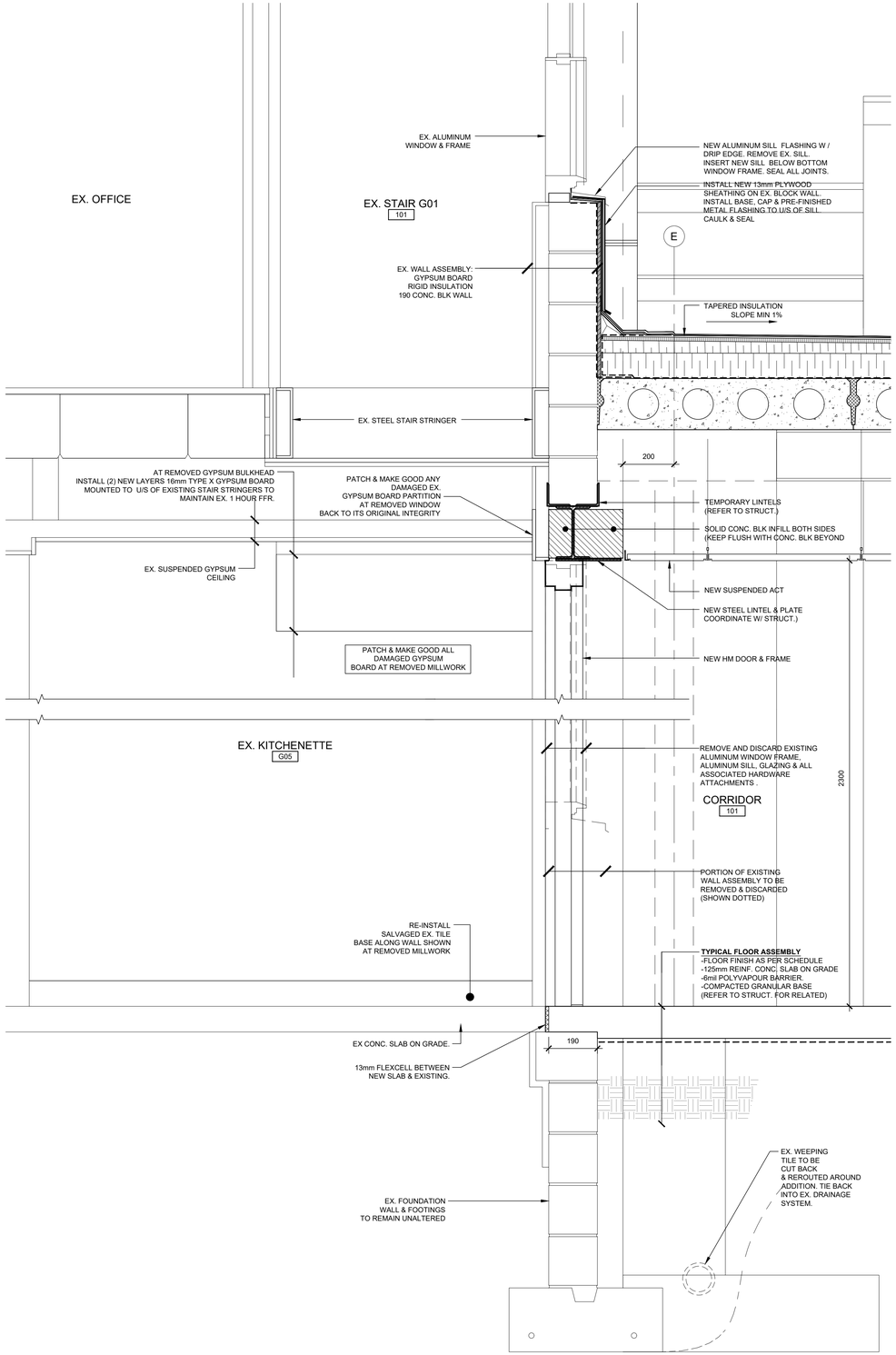
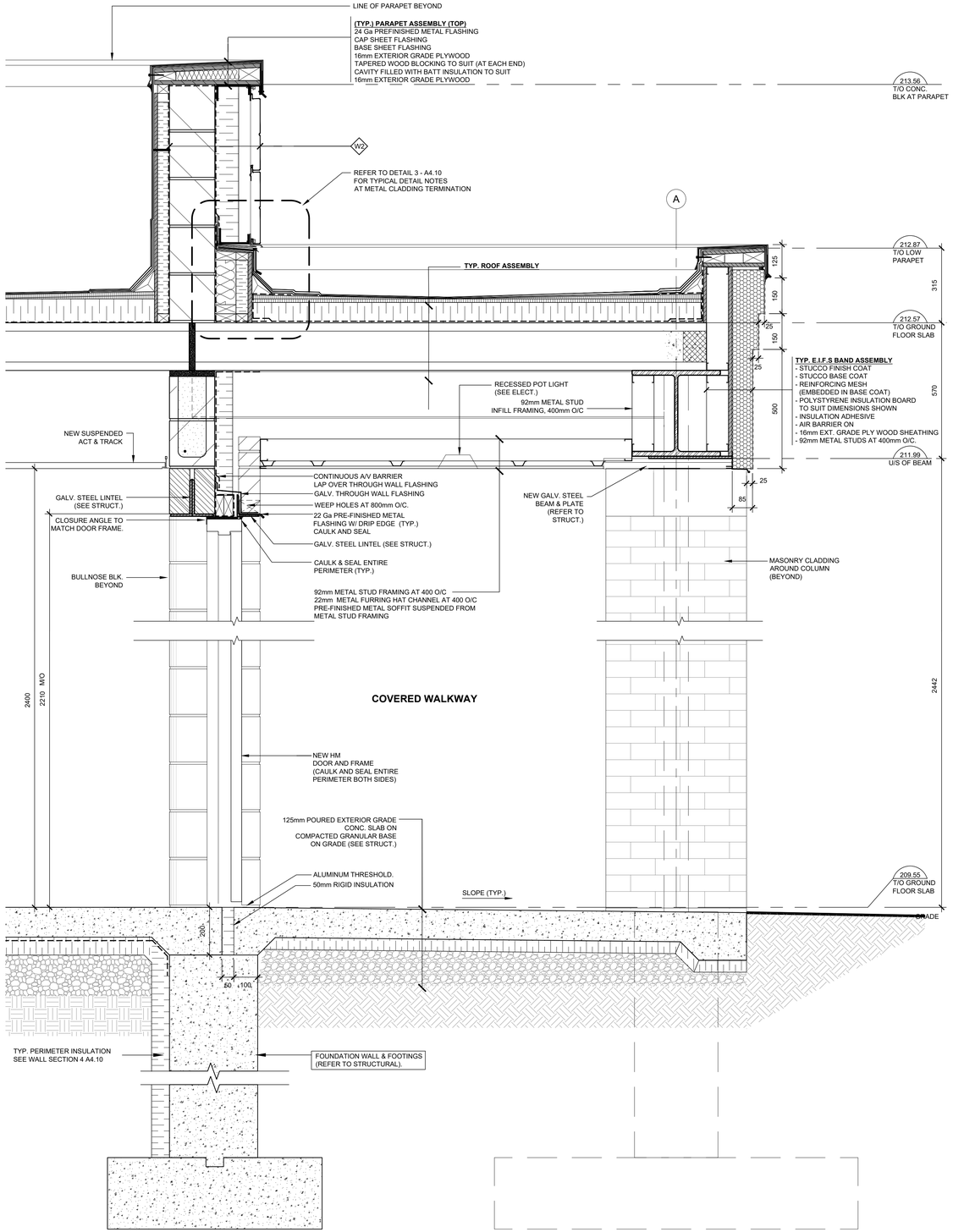


5 A4.20 WALL SECTION
SCALE: 1:10



6 A4.20 WALL SECTION
SCALE: 1:10

Pelham NIAGARA

LEGEND

ALUM.	ALUMINUM
A/V	AIR / VAPOUR
BD.	BOARD
BLK.	BLOCK
BRG.	BEARING
CONC.	CONCRETE
CONT.	CONTINUOUS
C/W	COMPLETE WITH
℄	CENTRE LINE
DN.	DOWN
EIFS	EXTERIOR INSULATED FINISH SYSTEM
EXT.	EXTERIOR
FIN.	FINISHED
Ga.	GAUGE
GALV.	GALVANIZED
GYP.	GYPSUM
HM	HOLLOW METAL
HP	HIGH POINT
LP	LOW POINT
MIN.	MINIMUM
HSS.	HOLLOW STRUCTURAL STEEL
O/C	ON CENTRE
PTW	PRESSURE TREATED WOOD
REQ'D	REQUIRED
RD	ROOF DRAIN
RWL	RAIN WATER LEADER
SIM	SIMILAR
STRUCT.	STRUCTURAL
T/O	TOP OF
TYP.	TYPICAL
U/S	UNDERSIDE

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

WALL SECTION DETAILS

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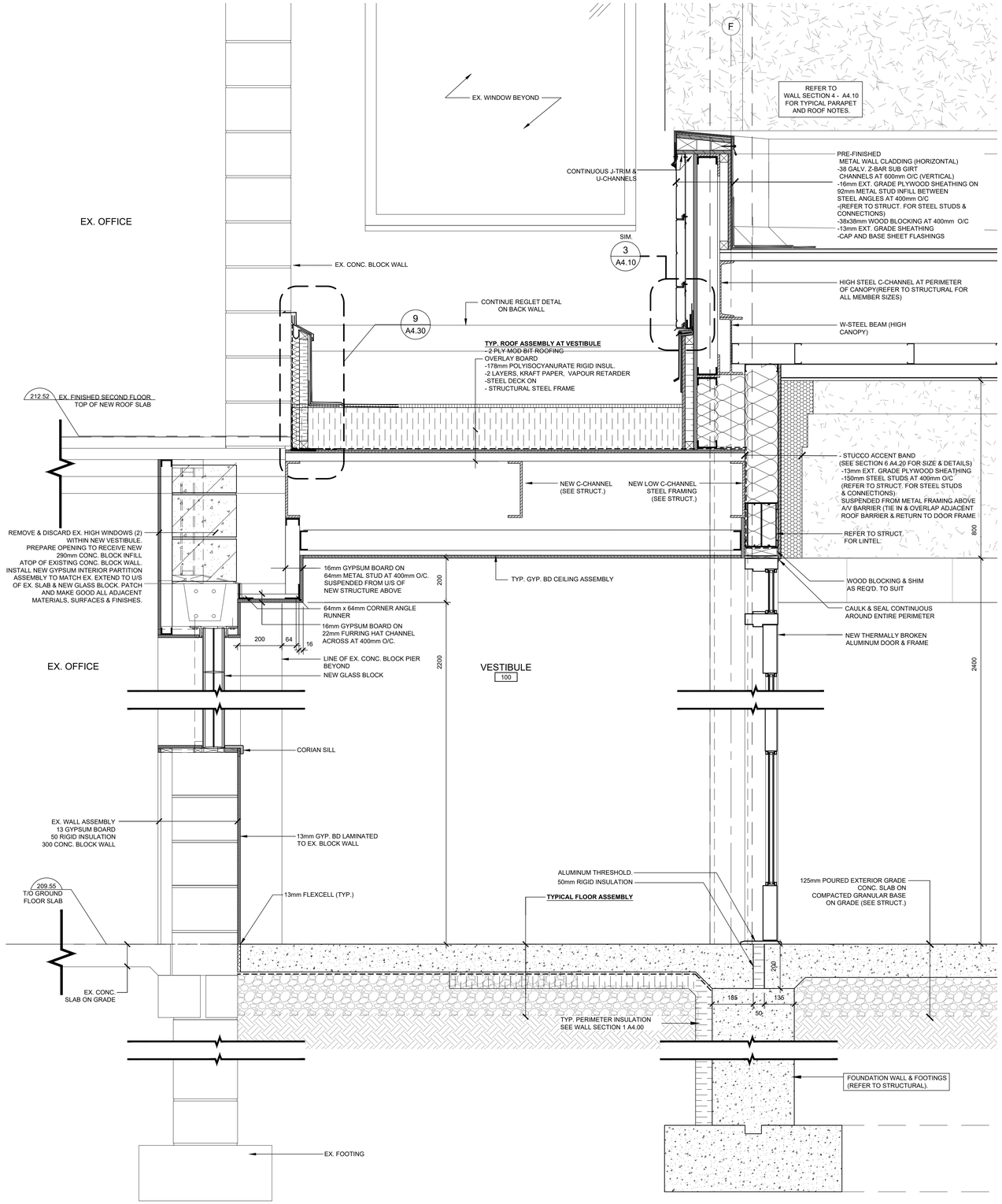
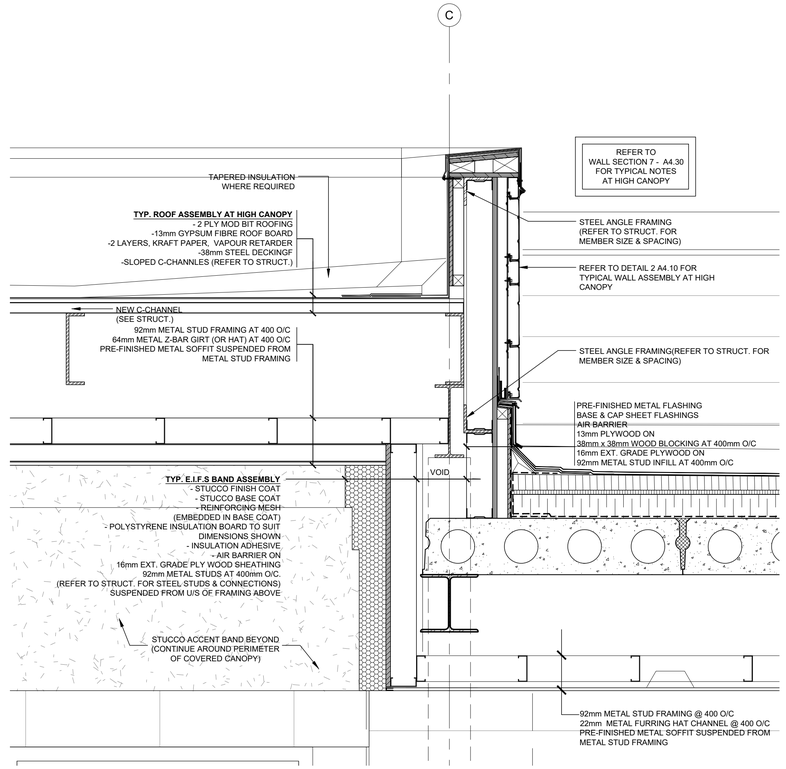
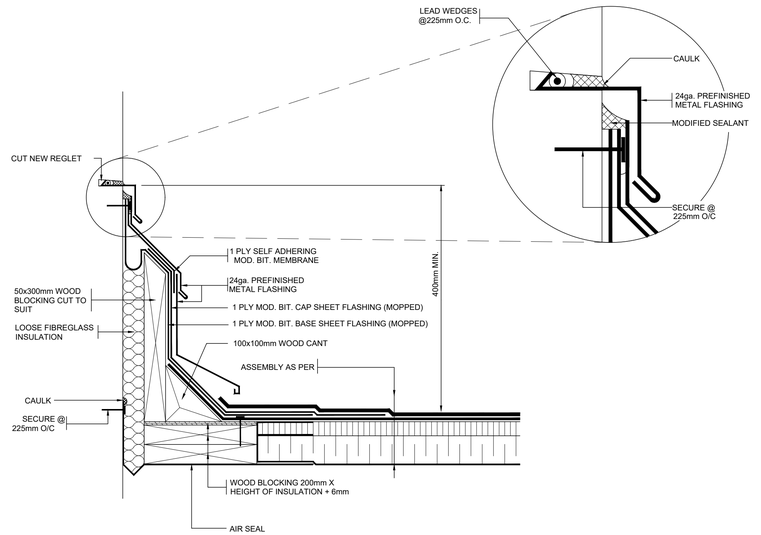
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A4.20
CHECKED J.G.	
PRINT DATE	06/07/22



7 A4.30 PARTIAL WALL SECTION
SCALE: 1:10



8 A4.30 DETAIL
SCALE: 1:10



9 A4.30 TYPICAL REGLET DETAIL
SCALE: 1:5

Pelham NIAGARA

LEGEND

ALUM.	ALUMINUM
A/V	AIR / VAPOUR
BD.	BOARD
BLK.	BLOCK
BRG.	BEARING
CONC.	CONCRETE
CONT.	CONTINUOUS
C/W	COMPLETE WITH
℄	CENTRE LINE
DN.	DOWN
EIFS	EXTERIOR INSULATED FINISH SYSTEM
EXT.	EXTERIOR
FIN.	FINISHED
Ga.	GAUGE
GALV.	GALVANIZED
GYP.	GYPSUM
HM	HOLLOW METAL
HP	HIGH POINT
LP	LOW POINT
MIN.	MINIMUM
HSS.	HOLLOW STRUCTURAL STEEL
O/C	ON CENTRE
PTW	PRESSURE TREATED WOOD
REQ'D	REQUIRED
RD	ROOF DRAIN
RWL	RAIN WATER LEADER
SIM	SIMILAR
STRUCT.	STRUCTURAL
T/O	TOP OF
TYP.	TYPICAL
U/S	UNDERSIDE

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

WALL SECTION DETAILS

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gal.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A4.30
CHECKED J.G.	
PRINT DATE	06/07/22

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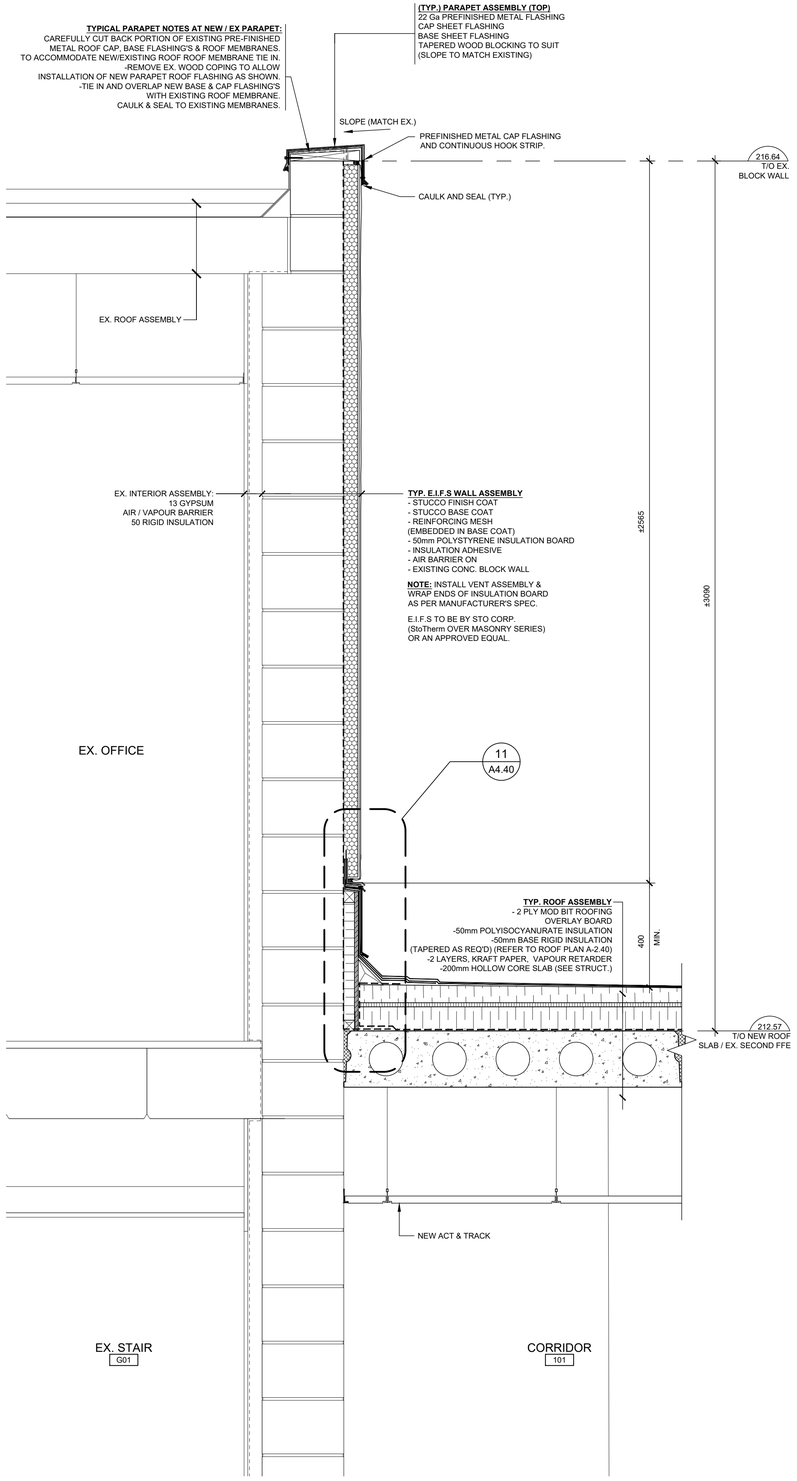
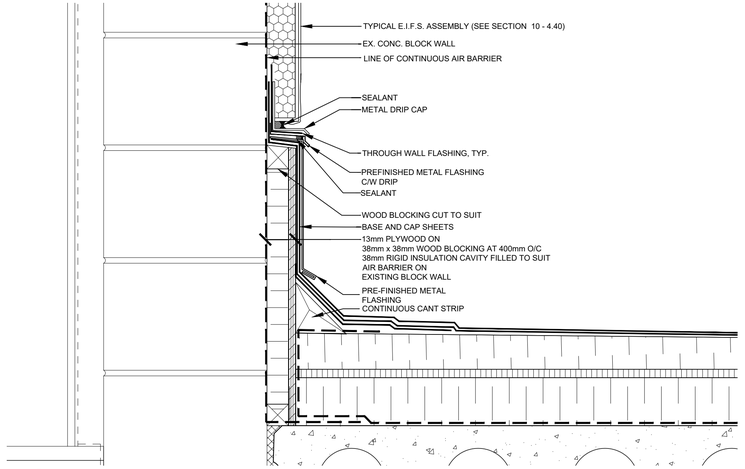
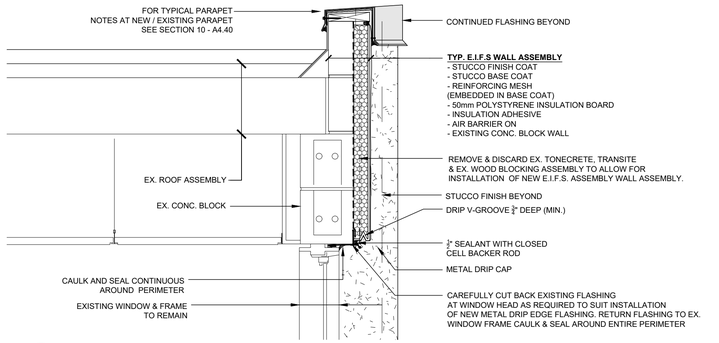


10 A4.40 PARTIAL WALL SECTION
SCALE: 1:10



11 A4.40 DETAIL
SCALE: 1:5



12 A4.40 DETAIL
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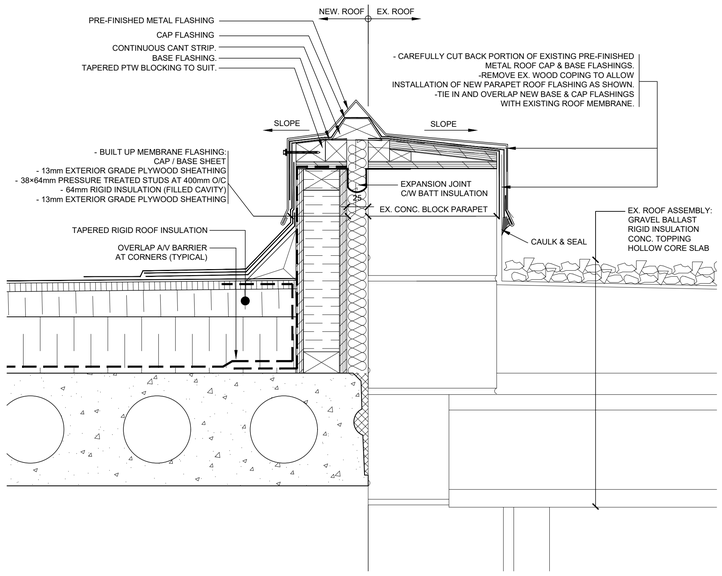

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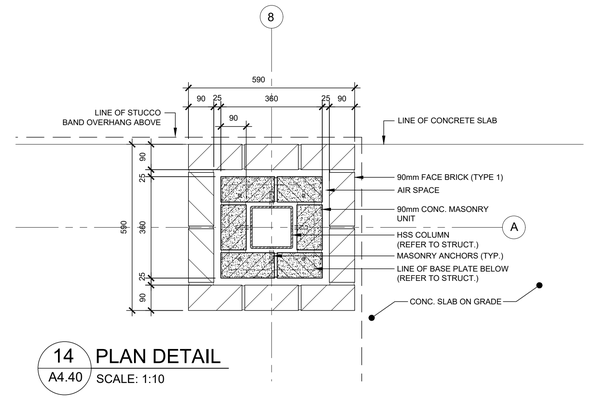
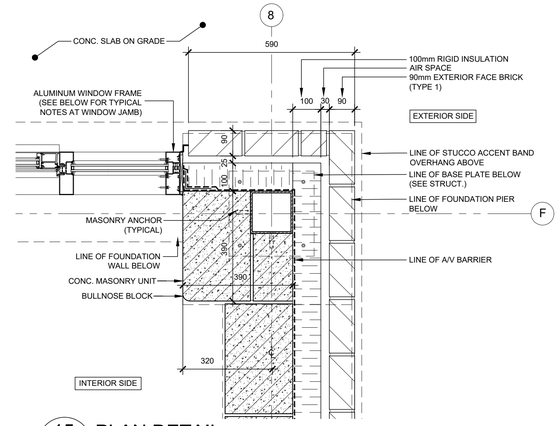


14 A4.40 PLAN DETAIL
SCALE: 1:10



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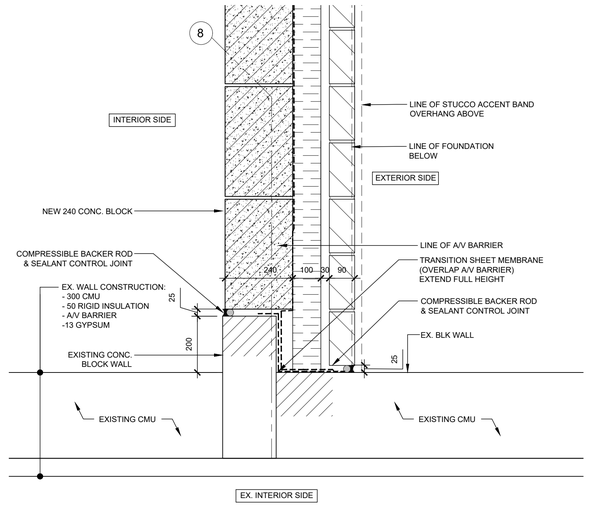
SCALE: 1:10



16 A4.40 PLAN DETAIL
SCALE: 1:10

Pelham NIAGARA

LEGEND

ALUM.	ALUMINUM
A/V	AIR / VAPOUR
BD.	BOARD
BLK.	BLOCK
BRG.	BEARING
CONC.	CONCRETE
CONT.	CONTINUOUS
C/W	COMPLETE WITH
℄	CENTRE LINE
DN.	DOWN
EIFS	EXTERIOR INSULATED FINISH SYSTEM
EXT.	EXTERIOR
FIN.	FINISHED
Ga.	GAUGE
GALV.	GALVANIZED
GYP.	GYPSUM
HM	HOLLOW METAL
HP	HIGH POINT
LP	LOW POINT
MIN.	MINIMUM
HSS.	HOLLOW STRUCTURAL STEEL
O/C	ON CENTRE
PTW	PRESSURE TREATED WOOD
REQ'D	REQUIRED
RD	ROOF DRAIN
RWL	RAIN WATER LEADER
SIM	SIMILAR
STRUCT.	STRUCTURAL
T/O	TOP OF
TYP.	TYPICAL
U/S	UNDERSIDE

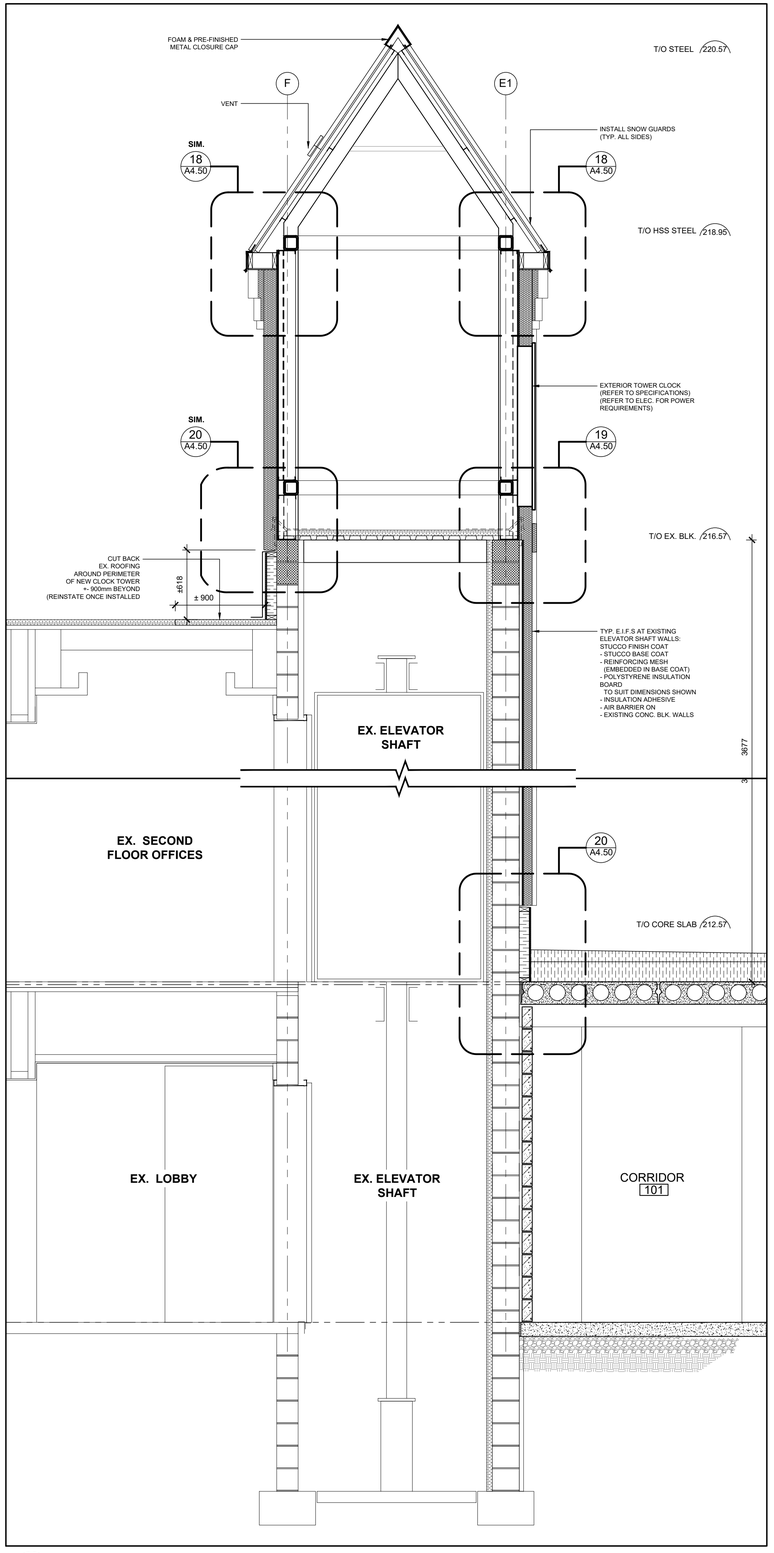
NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

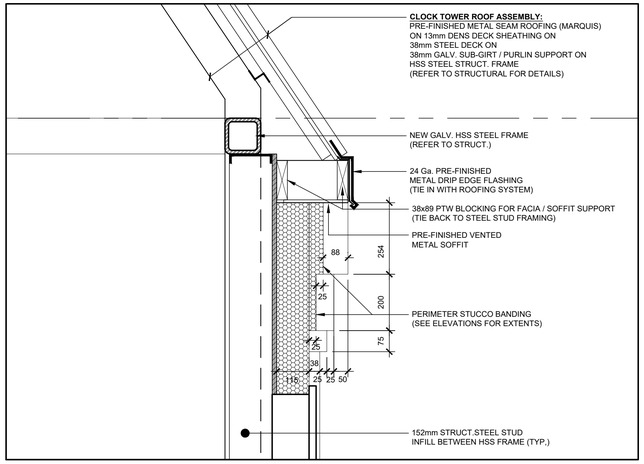
WALL SECTION & PLAN DETAILS

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

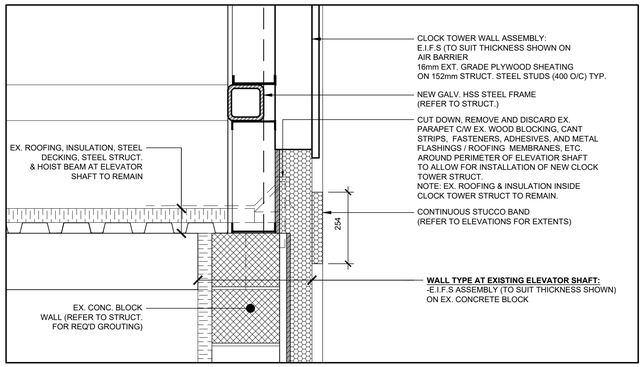
SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A4.40
CHECKED J.G.	
PRINT DATE	06/07/22



17 A4.50 WALL SECTION DETAIL AT CLOCK TOWER
SCALE: 1:25



18 A4.50 SECTION DETAIL
SCALE: 1:10



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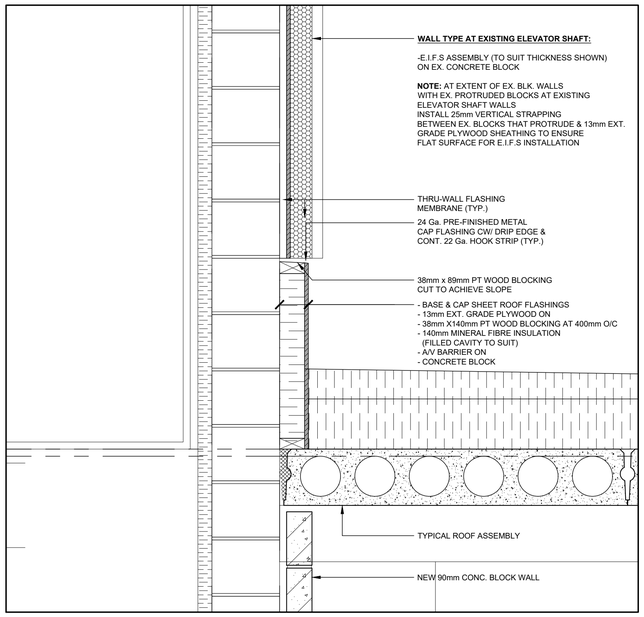
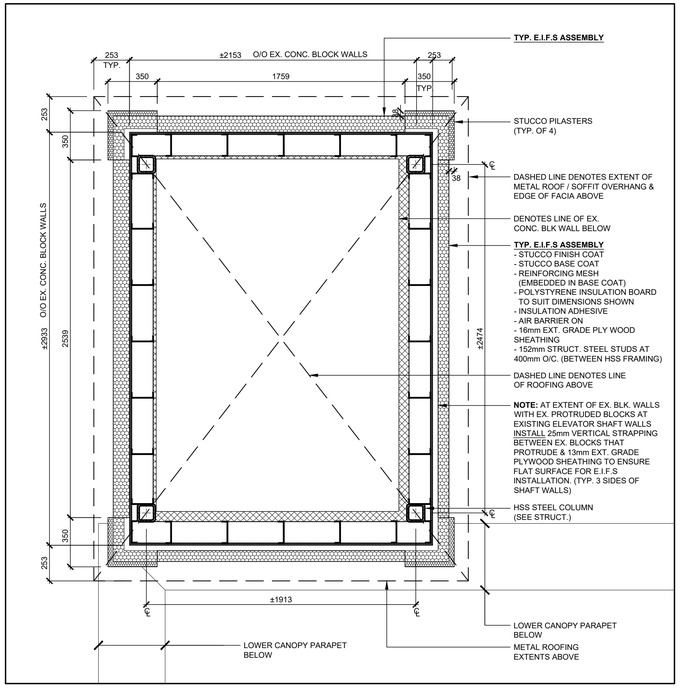
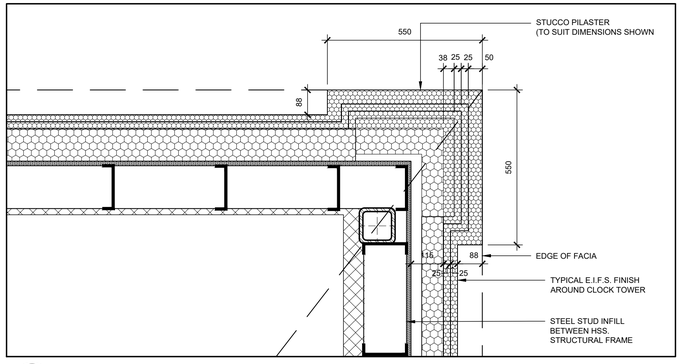


20 A4.50 SECTION DETAIL
SCALE: 1:10



21 A4.50 ENLARGED PLAN THROUGH TOP OF CLOCK TOWER
SCALE: 1:20



22 A4.50 PLAN DETAIL AT STUCCO PILASTER (UPWARDS)
SCALE: 1:10

Pelham NIAGARA

LEGEND

ALUM.	ALUMINUM
A/V	AIR / VAPOUR
BD.	BOARD
BLK.	BLOCK
BRG.	BEARING
CONC.	CONCRETE
CONT.	CONTINUOUS
C/W	COMPLETE WITH
℄	CENTRE LINE
DN.	DOWN
EIFS	EXTERIOR INSULATED FINISH SYSTEM
EXT.	EXTERIOR
FIN.	FINISHED
Ga.	GAUGE
GALV.	GALVANIZED
GYP.	GYPSUM
HM	HOLLOW METAL
HP	HIGH POINT
LP	LOW POINT
MIN.	MINIMUM
HSS.	HOLLOW STRUCTURAL STEEL
O/C.	ON CENTRE
PTW	PRESSURE TREATED WOOD
REQ'D	REQUIRED
RD	ROOF DRAIN
RWL	RAIN WATER LEADER
SIM	SIMILAR
STRUCT.	STRUCTURAL
T/O	TOP OF
TYP.	TYPICAL
U/S	UNDERSIDE

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

CLOCK TOWER DETAILS

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A4.50
CHECKED J.G.	
PRINT DATE	06/07/22

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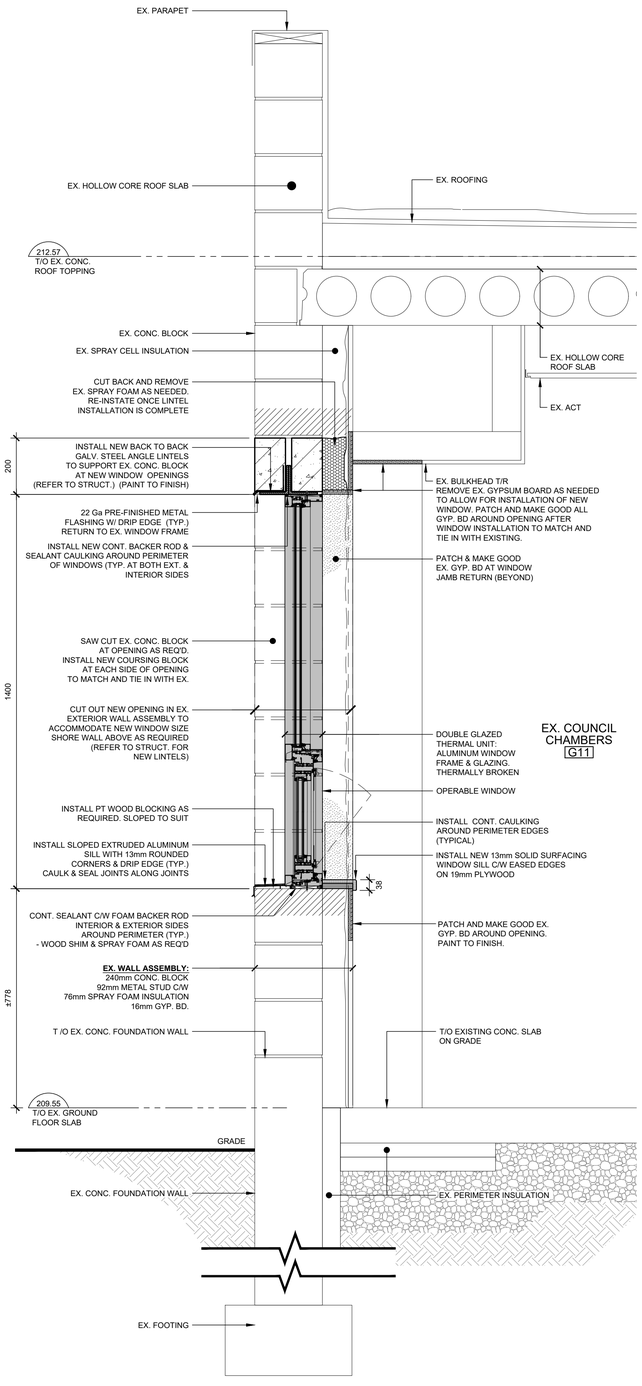
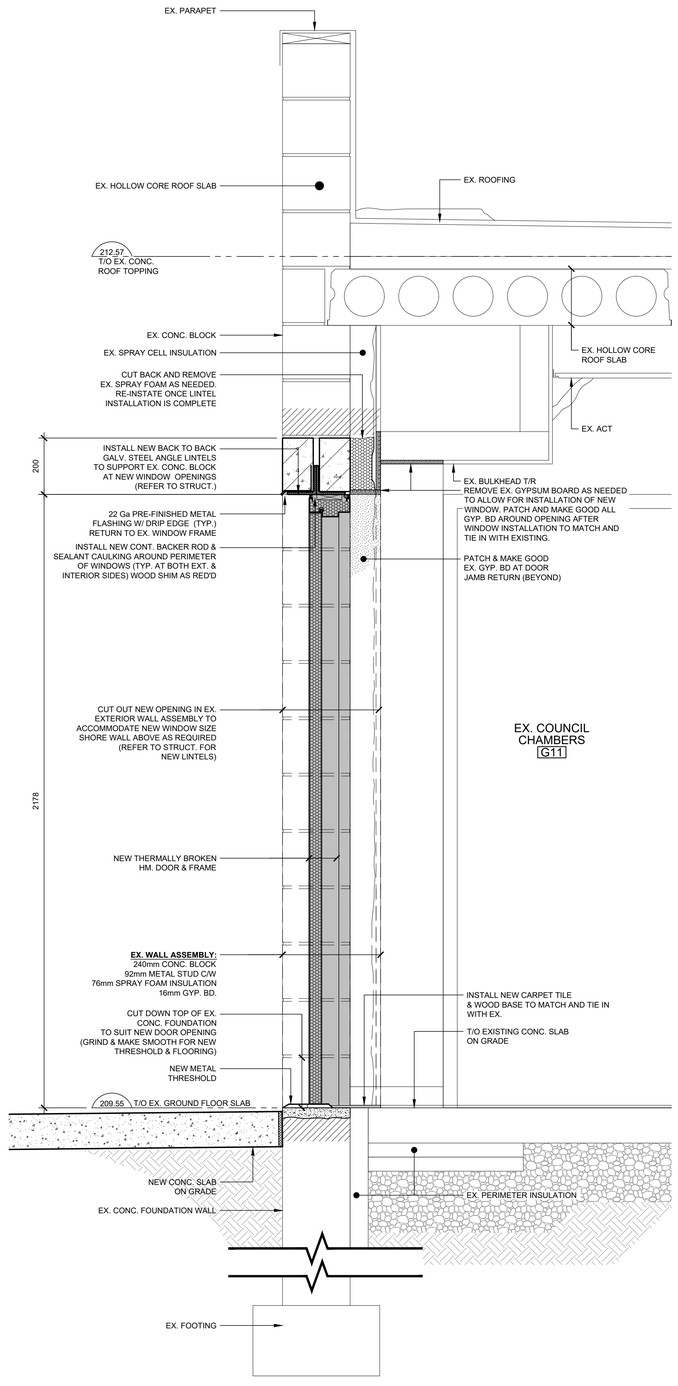
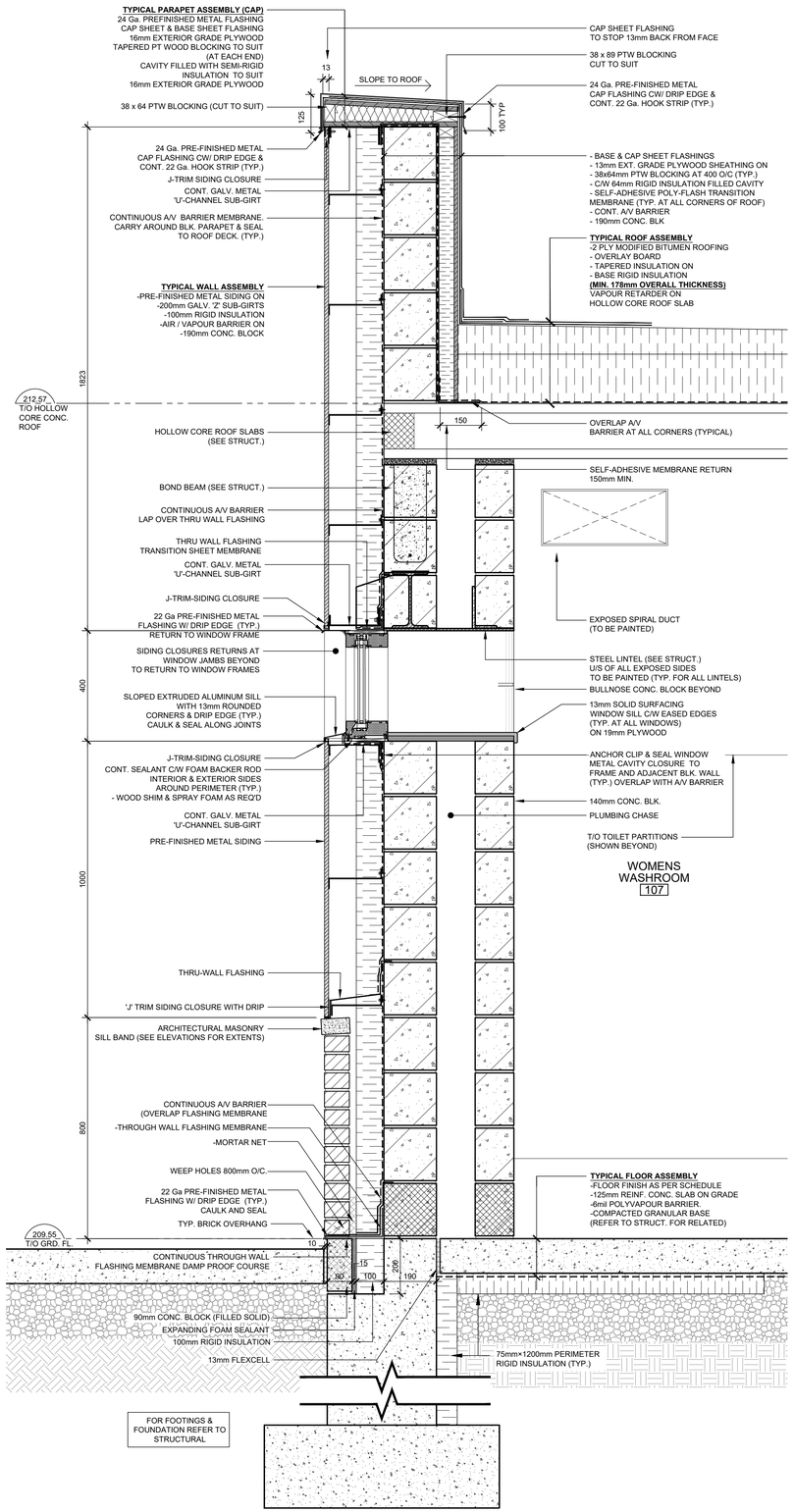


23 A4.60 WALL SECTION DETAIL
SCALE: 1:10



24 A4.60 WALL SECTION DETAIL
SCALE: 1:10



25 A4.60 WALL SECTION DETAIL
SCALE: 1:10

Pelham NIAGARA

LEGEND

ACT	ACOUSTIC CEILING TILE
ALUM.	ALUMINUM
A/V	AIR / VAPOUR
BD.	BOARD
BLK.	BLOCK
BRG.	BEARING
CONC.	CONCRETE
CONT.	CONTINUOUS
C/W	COMPLETE WITH
℄	CENTRE LINE
DN.	DOWN
EXT.	EXTERIOR
FIN.	FINISHED
FL.	FLOOR
Ga	GAUGE
GALV.	GALVANIZED
GRD	GROUND
GYP	GYPSUM
HM	HOLLOW METAL
HP	HIGH POINT
HSS.	HOLLOW STRUCTURAL STEEL
LP.	LOW POINT
MIN	MINIMUM
O/C	ON CENTRE
PTW	PRESSURE TREATED WOOD
RD	ROOF DRAIN
RWL	RAIN WATER LEADER
SIM	SIMILAR
STRUCT.	STRUCTURAL
T/O	TOP OF
T/R	TO REMAIN
TYP.	TYPICAL
U/S	UNDERSIDE

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING
ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

WALL SECTION
DETAILS

GRGURIC
ARCHITECTS
INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A4.60
CHECKED J.G.	
PRINT DATE	06/07/22

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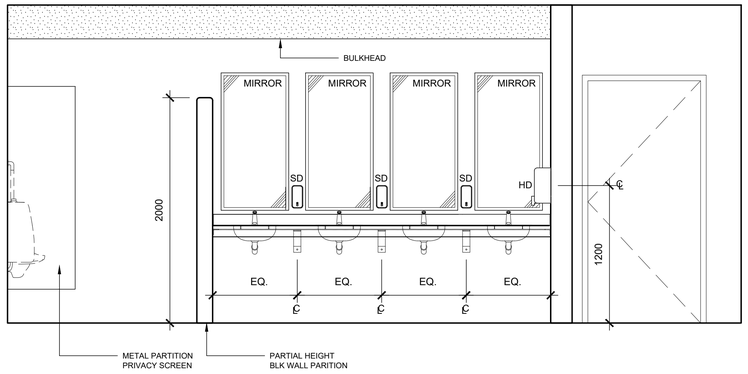
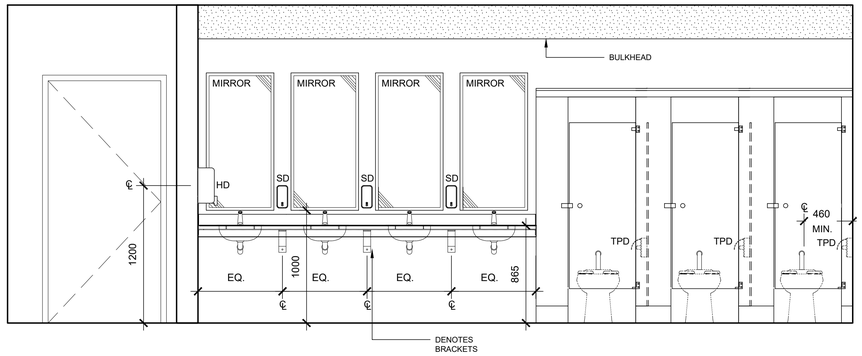
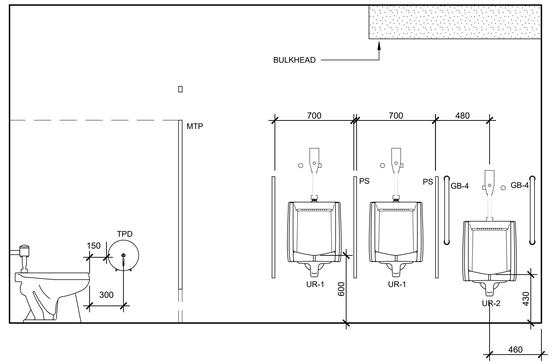


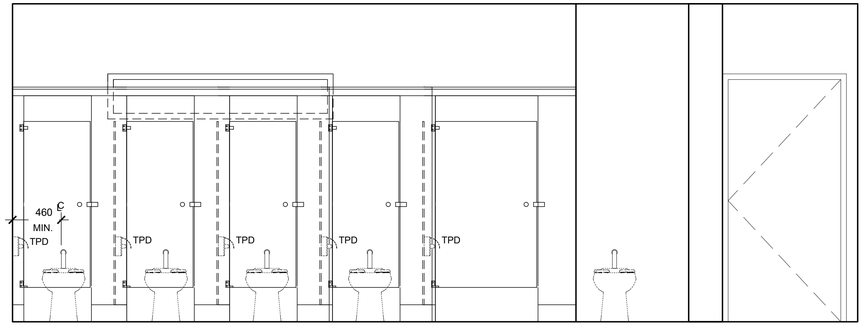
INTERIOR ELEVATION **A**
MENS WASHROOM



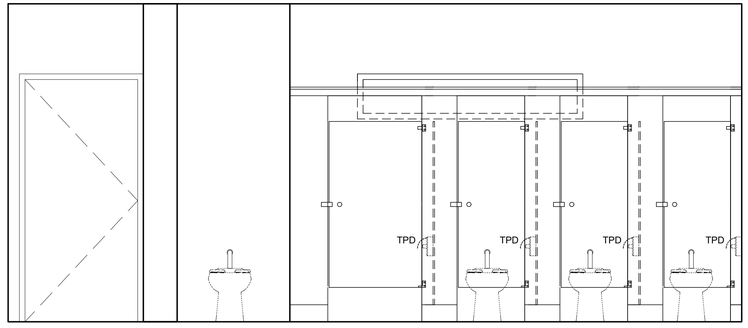
INTERIOR ELEVATION **A**
WOMENS WASHROOM



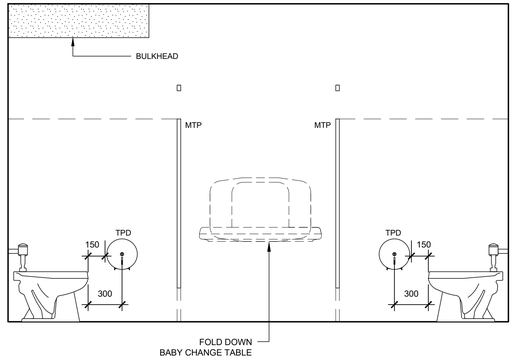
INTERIOR ELEVATION **B**
MENS WASHROOM



INTERIOR ELEVATION **C**
WOMENS WASHROOM

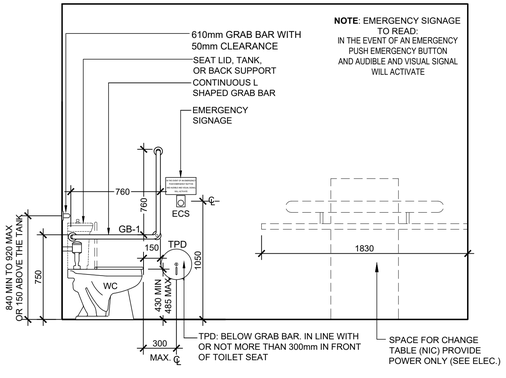


INTERIOR ELEVATION **C**
WOMENS WASHROOM

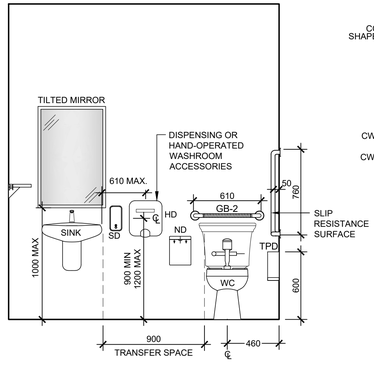


INTERIOR ELEVATION **B**
WOMENS WASHROOM

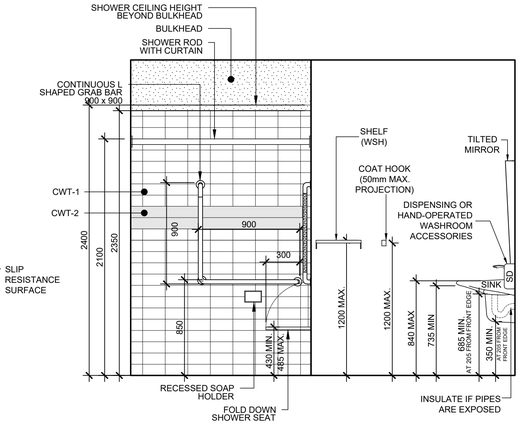
1 / A5.00 INTERIOR WASHROOM ELEVATIONS
SCALE: 1:25



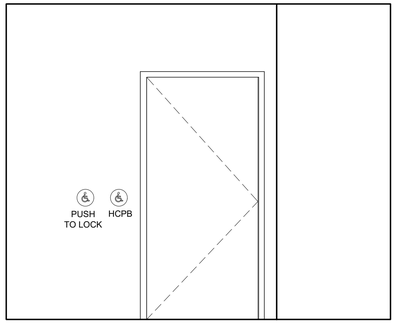
ELEVATION **A**



ELEVATION **B**



ELEVATION **C**



ELEVATION **C**

2 / A5.00 UNIVERSAL WASHROOM INTERIOR ELEVATIONS & TYP. MOUNTING FIXTURE HEIGHTS
SCALE: 1:25

Pelham NIAGARA

LEGEND

BD	BOARD
CH	COAT HOOK
CHG	CHANGE
CLR	CLEAR
CLR T	CLEAR TRANSFER
C/W	COMPLETE WITH
CWT	CERAMIC WALL TILE
DIA	DIAMETER
ECS	EMERGENCY CALL SWITCH
EQ	EQUAL
EX.	EXISTING
FD	FLOOR DRAIN
FP	FILLER PANEL
GB-#	GRAB BAR
GYP	GYPSUM
HD	HAND DRYER
HM	HOLLOW METAL
MAX	MAXIMUM
MECH	MECHANICAL
MH	MOP HOLDER
MIN	MINIMUM
MR	MIRROR
ND	NAPKIN DISPENSER
NIC	NOT IN CONTRACT
OBC	ONTARIO BUILDING CODE
PDO	POWER DOOR OPERATOR
PROJ	PROJECTOR
RB	RUBBER BASE
SD	SOAP DISPENSER
TPD	TOILET PAPER DISPENSER
TYP	TYPICAL
WC	WATER CLOSET
WR	WASHROOM
WSH	STEEL WALL SHELF

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

WASHROOM INTERIOR ELEVATIONS

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
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SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A5.00
CHECKED J.G.	
PRINT DATE	06/07/22

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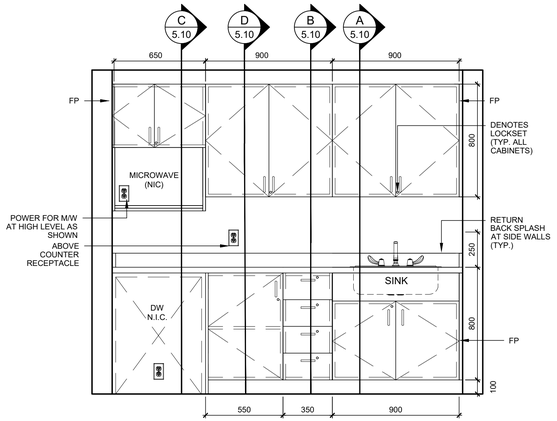
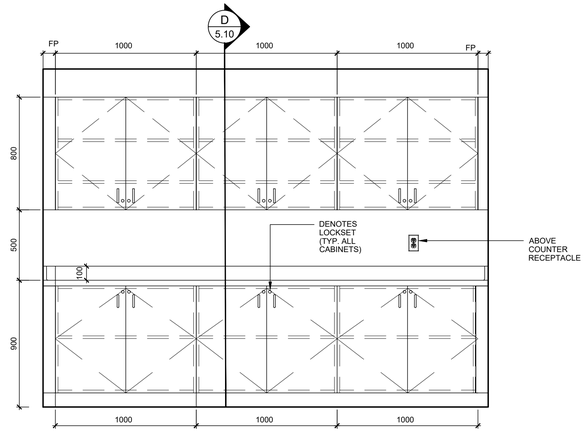
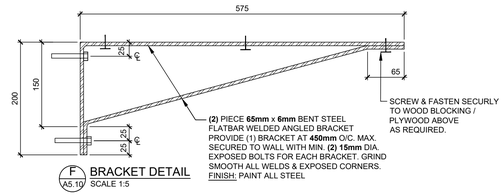


1 / A5.10 ELEVATION - MILLWORK TYPE MM-1 (KITCHENETTE)
SCALE: 1:20

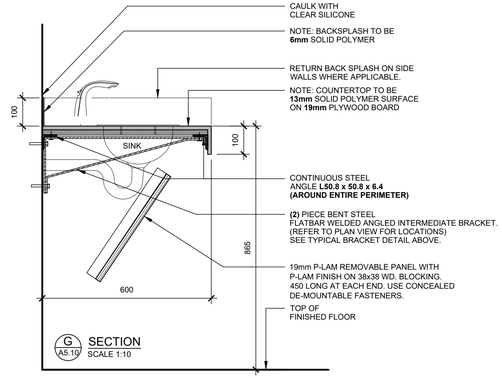


2 / A5.10 ELEVATION - MILLWORK TYPE MM-2
SCALE: 1:20



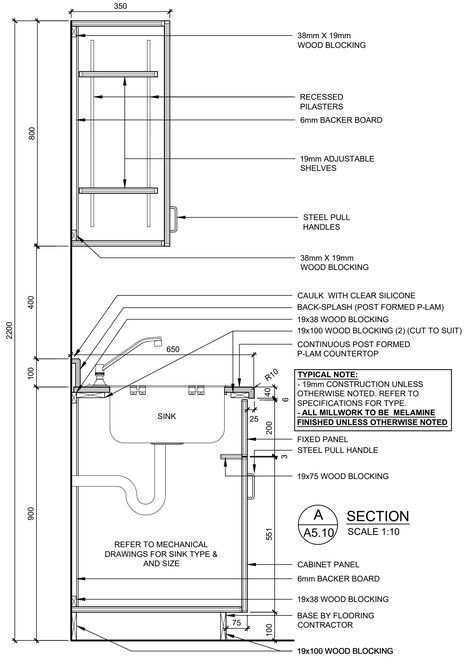
F / A5.10 BRACKET DETAIL
SCALE 1:5

MILLWORK TYPE 1-S1
SCALE: 1:5

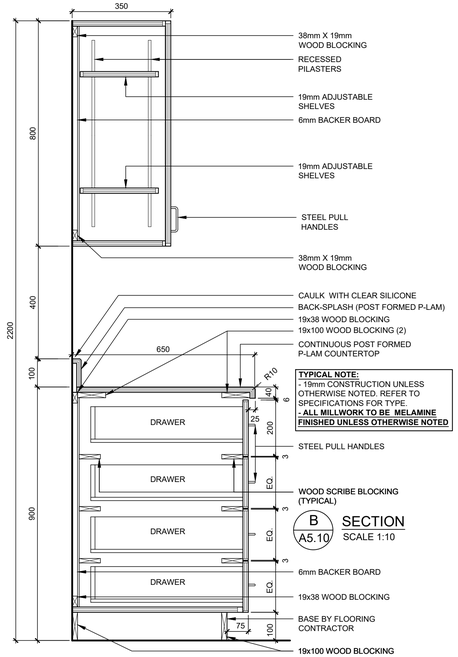


G / A5.10 SECTION
SCALE 1:10

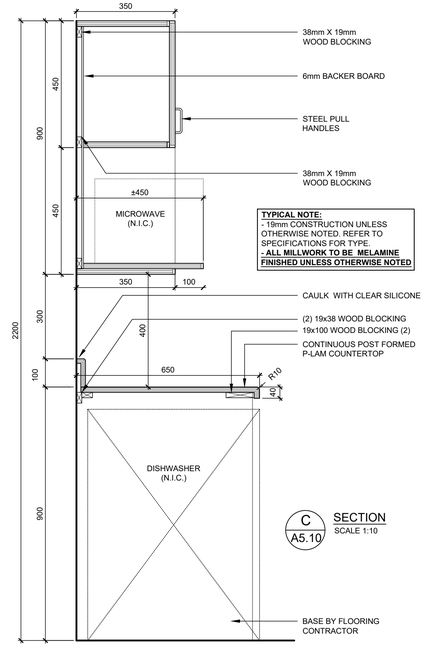
MILLWORK TYPE 1-S1
SCALE: 1:10



A / A5.10 SECTION
SCALE 1:10

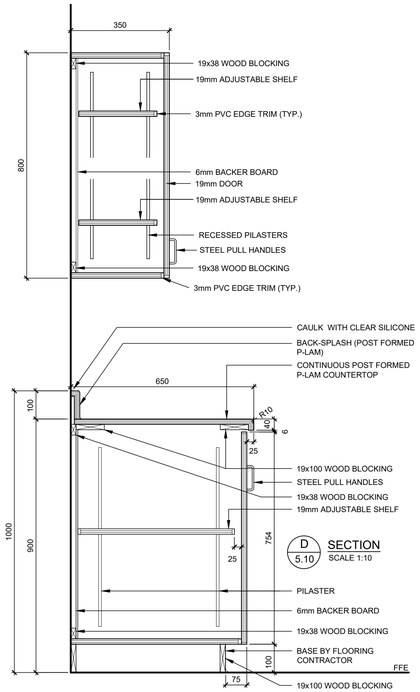


B / A5.10 SECTION
SCALE 1:10



C / A5.10 SECTION
SCALE 1:10

TYPICAL NOTE:
- 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR TYPE.
- **ALL MILLWORK TO BE MELAMINE FINISHED UNLESS OTHERWISE NOTED**



D / 5.10 SECTION
SCALE 1:10

LEGEND

CONT	CONTINUOUS
C/W	COMPLETE WITH
DIA	DIAMETER
EQ.	EQUAL
FFE	FINISHED FLOOR ELEVATION
INT	INTERIOR
PAC	PERSONAL ASSISTANCE COMPUTER
P-LAM	PLASTIC LAMINATE
RCP	REFLECTED CEILING PLAN
SIM.	SIMILAR.
NIC	NOT IN CONTRACT
TYP	TYPICAL
WD	WOOD

NO	REVISIONS	DATE
3.	ISSUED FOR TENDER	2022-06-07
2.	ISSUED FOR CLIENT REVIEW	2022-05-25
1.	ISSUED FOR SPA	2022-04-20

TOWN OF PELHAM
MUNICIPAL BUILDING ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON L0S 1E0

MILLWORK DETAILS

GRGURIC ARCHITECTS INCORPORATED
28 KING STREET EAST, UNIT B
STONEY CREEK, ONTARIO, L8G 1J8
Tel. 905-664-8735 Fax. 905-664-8737
Web: www.2gai.com

SCALE: AS NOTED	PROJECT: 2022-10
START DATE: MARCH 2022	
DRAWN R.P.	DRAWING A5.10
CHECKED J.G.	
PRINT DATE	06/07/22

S:\Data\2022\2022-10-Town-of-Pelham-Events-Building-Addition\65drawings\5-Working Dra
A5.00-Interior-Elevations-Millwork-(2022-10).dwg

GENERAL NOTES:

1. READ ALL STRUCTURAL/CIVIL DRAWINGS IN CONJUNCTION WITH ALL CONTRACT DOCUMENTS, INCLUDING REFERENCED ELECTRICAL, MECHANICAL, VENDOR DRAWINGS, AND SPECIFICATIONS
2. THE CONTRACTOR FOR ANY PORTION OF WORK SHALL VISIT THE SITE AND SHALL BE THOROUGHLY FAMILIAR WITH ALL THE PHYSICAL FEATURES THAT MAY AFFECT THE WORK IN ANY WAY.
3. FIELD MEASURE AND MAKE ADJUSTMENTS TO SUIT EXISTING CONDITIONS.
4. THE CONTRACTOR SHALL KEEP WORK SITES CLEAN AND FREE OF ALL CONSTRUCTION DEBRIS DURING THE PROCESS OF CONSTRUCTION AND LEAVE THE SITE CLEAN UPON COMPLETION OF WORK OR PORTIONS OF THE WORK.
5. CONSULTANT MUST APPROVE ALL DEVIATIONS FROM THE WORKING DRAWINGS. THE CONTRACTOR MUST KEEP AN ACCURATE RECORD OF ALL CHANGES FROM THE ORIGINAL INFORMATION SHOWN ON THE CONSTRUCTION DRAWINGS.
6. FEATURES OF CONSTRUCTION NOT FULLY SHOWN ARE OF THE SAME CHARACTER AS THOSE NOTED FOR SIMILAR CONDITIONS.
7. ALL CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING:
   OCCUPATIONAL HEALTH AND SAFETY ACT
   ONTARIO REGULATION 213/91 - CONSTRUCTION PROJECTS
   THE ONTARIO BUILDING CODE AND THE NATIONAL BUILDING CODE
8. IF DISCREPANCIES EXIST BETWEEN THESE DWGS. AND THE SPECIFICATIONS, CONTACT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PROCEEDING.
9. DO NOT SCALE THESE DRAWINGS.

GENERAL MATERIALS:

1. DELIVER MATERIALS TO JOB SITE IN DRY CONDITION. KEEP MATERIALS DRY AND CLEAN UNTIL USE.
2. BACKFILL WITH GRANULAR A UNLESS OTHERWISE NOTED ON THE DRAWINGS, COMPACT IN ONE FOOT LIFTS TO A MINIMUM 95% S.P.D.D. TO SIX INCHES BELOW TOP OF CONCRETE.
3. ALL CEMENT TO BE PORTLAND BLAST FURNACE SLAG CEMENT TO CAN-A326 BLENDED HYDRAULIC CEMENTS CONSISTING OF 75% NORMAL TYPE 10 PORTLAND CEMENT AND 25% CEMENTITIOUS HYDRAULIC SLAG.
4. ALL REINFORCING STEEL TO BE GRADE 400 DEFORMED BARS TO CAN/CSA G30.18.
5. ALL BASE GROUT TO BE "MEADOWS V1" BY W.R. MEADOWS OR APPROVED EQUAL.
6. EPOXY GROUT FOR DOWELS TO BE ANCHORFIX 2CA BY SIKA CANADA OR APPROVED EQUAL.
7. DISPOSAL OF ALL EXCAVATED MATERIAL SHALL BE OFF-SITE OTHER THAN APPROVED BACKFILL

ABBREVIATIONS:

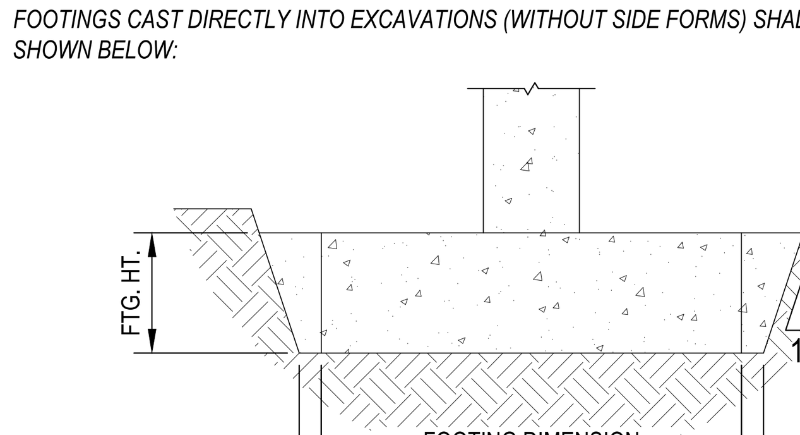
A.B.	---	ANCHOR BOLT
A.F.F.	---	ABOVE FINISHED FLOOR
ALT.	---	ALTERNATE
ARCH.	---	ARCHITECTURAL
B.C.E.	---	BOTTOM CHORD EXTENSION
B.F.F.	---	BELOW FINISHED FLOOR
B.L.L.	---	BOTTOM LOWER LAYER
BOT.	---	BOTTOM
B.U.L.	---	BOTTOM UPPER LAYER
C.A.	---	COLUMN ABOVE
C.B.	---	COLUMN BELOW
CANT.	---	CANTILEVER
C.I.P.	---	CAST IN PLACE
CONC.	---	CONCRETE
CONT.	---	CONTINUOUS
C.P.	---	COMPLETE PENETRATION
c/c	---	CENTER TO CENTER
C.L.	---	CENTER LINE
CRS.	---	COURSE
c/w	---	COMPLETE WITH
DET.	---	DETAIL
D.L.	---	DEAD LOAD
do	---	DO OVER (DITTO)
DP.	---	DEEP (DEPTH OF MEMBER)
DWG.	---	DRAWING
DWLS.	---	DOWELS
EA.	---	EACH
E.E.	---	EACH END
E.F.	---	EACH FACE
EL.	---	ELEVATION
ELEV.	---	ELEVATION
ELEC.	---	ELECTRICAL
EMBED.	--	EMBEDMENT
E.S.	---	EACH SIDE
E.W.	---	EACH WAY
EXIST.	---	EXISTING
EXT.	---	EXTERIOR
EXP. JT.	--	EXPANSION JOINT
F.D.	---	FLOOR DRAIN
F.S.	---	FAR SIDE
FTG.	---	FOOTING
GALV.	---	GALVANIZED
G.L.	---	GRID LINE
GRAN.	---	GRANULAR
HK.	---	HOOK
H&V	---	HORIZONTAL & VERTICAL
HORZ.	---	HORIZONTAL
I.J.	---	ISOLATION JOINT
INT.	---	INTERIOR
JT.	---	JOINT
LG.	---	LONG
L.B.	---	LOAD BEARING
L.L.	---	LIVE LOAD
L.L.H.	---	LONG LEG HORIZONTAL
L.L.V.	---	LONG LEG VERTICAL
L.S.H.	---	LONG SIDE HORIZONTAL
L.S.V.	---	LONG SIDE VERTICAL
MANUF.	-	MANUFACTURER
MAX.	---	MAXIMUM
MECH.	---	MECHANICAL
MIN.	---	MINIMUM
MIR.	---	MIRROR
N.I.C.	---	NOT IN CONTRACT
N.L.B.	---	NON-LOAD BEARING
N.S.	---	NEAR SIDE
N.T.S.	---	NOT TO SCALE
O/C	---	ON CENTER
OPP.	---	OPPOSITE
O.W.S.J.	-	OPEN WEB STEEL JOIST
PL.	---	PLATE
P.L.	---	POINT LOAD
P.L.A.	---	POINT LOAD ABOVE
P.T.	---	PRESSURE TREATED
R.D.	---	ROOF DRAIN
R/W	---	REINFORCED WITH
S.C.	---	SAW CUT CONTROL JOINT
S.D.L.	---	SUPERIMPOSED DEAD LOAD
S.D.F.	---	STEP DOWN FOOTING
SECT.	---	SECTION
SIM.	---	SIMILAR
S.J.	---	SNOW LOAD
S.O.G.	---	SLAB ON GRADE
SPEC.	---	SPECIFICATIONS
STAG.	---	STAGGERED
STIR.	---	STIRRUPS
SYM.	---	SYMMETRICAL
THK.	---	THICK
THRU	---	THROUGH
T.L.L.	---	TOP LOWER LAYER
TYP.	---	TYPICAL
T&B	---	TOP & BOTTOM
T&G	---	TONGUE & GROOVE
T.J.	---	TIE JOISTS
T/O	---	TOP OF
T.O.S.	---	TOP OF STEEL
T.U.L.	---	TOP UPPER LAYER
U.N.O.	---	UNLESS NOTED OTHERWISE
ULS	---	ULTIMATE LIMIT STATE
SLS	---	SERVICEABILITY LIMIT STATE
U/S	---	UNDERSIDE
VERT.	----	VERTICAL
W.P.	----	WORK POINT

CONCRETE FORMWORK:

1. THE DESIGN AND FIELD REVIEW OF FORMWORK, SHORING AND RE-SHORING IS THE RESPONSIBILITY OF THE CONTRACTOR. RE-SHORING DRAWINGS SHALL BE SUBMITTED TO HALLEX ENGINEERING LTD. FOR THE EFFECT ON THE BASE BUILDING STRUCTURE ONLY.
2. NO COLUMN OR WALL FORMS SHALL BE REMOVED BEFORE CONCRETE HAS REACHED 10 MPa FOR ARCHITECTURAL CONCRETE OR 8 MPa FOR OTHER COLUMNS OR WALLS.
3. NO SLAB FORMS OR BEAM FORMS SHALL BE REMOVED BEFORE CONCRETE HAS REACHED 75% OF THE 28 DAY STRENGTH BEFORE STRIPPING/RE-SHORING.
4. ALL SLABS, BEAMS, GIRDERS ETC. TO BE SHORED UNTIL CONCRETE REACHED DESIGN STRENGTH.
5. NO CONCRETE MAY BE REMOVED WITH PERCUSSIVE METHODS SUCH AS CHIPPING JACK-HAMMERING WITHOUT PRIOR APPROVAL OF HALLEX ENGINEERING LTD.

FOUNDATIONS:

1. BEARING SURFACES MUST BE APPROVED BY THE SOILS ENGINEER IMMEDIATELY PRIOR TO CONSTRUCTION.
2. REFER TO SOILS REPORT FOR OTHER SPECIFIC DESIGN REQUIREMENTS FOR FOOTING, SOIL SLOPES, FROST PROTECTION, MINIMUM COVER, ETC.
3. UNLESS OTHERWISE SHOWN, CENTER FOOTINGS BELOW COLUMNS AND WALLS.
4. DOWELS SHALL BE PLACED BEFORE CONCRETE IS PLACED. TEMPLATES SHALL BE USED TO ENSURE CORRECT PLACEMENT OF DOWELS.
5. FOOTINGS MAY HAVE TO BE LOWERED TO ACCOMMODATE MECHANICAL OR ELECTRICAL SERVICES. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR ELEVATIONS. FOOTINGS ARE NOT TO BE UNDERMINED BY EXCAVATIONS FOR SERVICES, PITS, ETC.
6. FOOTINGS ELEVATIONS, IF SHOWN, ARE FOR BIDDING PURPOSES ONLY, ARE NOT FINAL, AND MAY VARY ACCORDING TO SITE CONDITIONS OR AS REQUIRED BY SERVICES. ALL FOOTINGS MUST BE TAKEN TO A BEARING LAYER APPROVED BY THE SOILS ENGINEER.
7. BEARING SURFACES MUST BE PROTECTED FROM FREEZING BEFORE AND AFTER FOOTINGS ARE POURED.
8. SUB-BASE DESIGN OF THE SOIL UNDER THE SLAB ON GRADE SHALL BE IN ACCORDANCE WITH THE SOIL REPORT.
9. CONCRETE PLACED UNDER WATER SHALL CONFORM TO CAN/CSA-A23.1.
10. FOOTINGS CAST DIRECTLY INTO EXCAVATIONS (WITHOUT SIDE FORMS) SHALL NOT BE LARGER THAN SHOWN BELOW:



CONCRETE:

1. ALL CONCRETE SHALL CONFORM TO CSA STANDARD A23.1 (LATEST EDITION) HAVING A MINIMUM COMPRESSIVE STRENGTH OF 25 MPa (UNLESS NOTED OTHERWISE) EXCEPT FOR CONCRETE SLAB ON GRADE TO HAVE A MINIMUM STRENGTH OF 32 MPa (UNLESS NOTED OTHERWISE).
2. ALL CAST-IN-PLACE CONCRETE SHALL CONFORM TO THE LATEST EDITION OF CSA STANDARD A23.1, "CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION".
3. SUBMIT CONCRETE MIX DESIGN TO ENGINEER PRIOR TO PRODUCTION. NO WATER SHALL BE ADDED TO THE CONCRETE AT THE SITE.
4. SUBMIT PLACING DRAWINGS AND BAR LISTS FOR ALL REINFORCING STEEL TO RSIO MANUAL SUFFICIENTLY DETAILED AND DIMENSIONED TO PERMIT PLACING OF ALL REINFORCING WITHOUT REFERENCE TO DESIGN DRAWINGS.
5. THE OWNER WILL EMPLOY A TESTING COMPANY TO CONDUCT STRENGTH, SLUMP, MATERIAL AND AIR ENTRAINED TESTS ONCE FOR EVERY DAY CONCRETE IS POURED. STRENGTH TEST SHALL INCLUDE THREE CYLINDERS, ONE TESTED AT 7 DAYS AND TWO TESTED AT 28 DAYS IN ACCORDANCE WITH CAN3-A23.2. SLUMP AND AIR CONTENT TESTS SHALL CONSIST OF ONE SAMPLE EACH IN ACCORDANCE WITH CAN3-23.1 AND CAN3-A23.2.
6. ALL CONCRETE THAT WILL BE EXPOSED TO WEATHER SHALL HAVE A 5 TO 7% AIR ENTRAINMENT AT TIME OF PLACING.
7. BULL FLOAT CONCRETE SURFACES AND PROVIDE A LIGHT TROWEL FINISH TO PRODUCE A SMOOTH NON-SLIP SURFACE FREE FROM RIDGES, VOIDS AND MACHINE MARKS. EXTERIOR CONCRETE WALKING SURFACES SHALL HAVE A LIGHT BROOM FINISH TO CREATE A NON-SLIP SURFACE. PROVIDE ROUGH SURFACE AT COLD JOINTS.
8. KEEP CONTINUOUSLY MOIST ALL EXPOSED NON-FORMED SURFACES FOR A MINIMUM OF SEVEN CONSECUTIVE DAYS AFTER PLACEMENT OF CONCRETE UNLESS NOTED OTHERWISE.
9. ALL EXPOSED CONCRETE EDGES ARE TO HAVE A THREE-QUARTER INCH (3/4") CHAMFER UNLESS NOTED OTHERWISE.
10. WHERE NEW CONCRETE IS TO BE PLACED AGAINST EXISTING CONCRETE, EXISTING CONCRETE MUST BE THOROUGHLY CLEANED TO REMOVE OIL, GREASE AND DIRT AND BE SURFACE PREPPED TO A MINIMUM CSP-7 (AS PER INTERNATIONAL CONCRETE REPAIR INSTITUTE) PRIOR TO PLACEMENT OF NEW CONCRETE UNLESS NOTED OTHERWISE ON DRAWINGS.
11. PROVIDE HOT OR COLD WEATHER PROTECTION WHEN REQUIRED AS SPECIFIED IN CAN3-A23.1.
12. VIBRATE ALL CONCRETE. ENSURE ALL CONCRETE IS DENSE, FREE OF HONEY COMBING, AND THAT NO SEGREGATION OCCURS.
13. ENSURE ALL REBAR IS CLEAN SECURELY HELD IN CORRECT LOCATION DURING PLACING.
14. FOR ALL NEW OPENINGS IN SLAB-ON-GRADE PROVIDE MINIMUM 10M DOWELS AROUND PERIMETER OF OPENING, 12" LONG x 4" EMBEDMENT (FRICTION-FIT) SPACED @ 16" c/c. THE NEW CONCRETE INFILL SHALL HAVE A MINIMUM REINFORCEMENT OF WWM 6x6x$\frac{6}{6}$ (U.N.O.)

CONCRETE PROPERTIES

ELEMENT	COMPRESSIVE STRENGTH (MPa) 28 DAYS U.N.O.	EXPOSURE CLASS
FOOTINGS	25 MPa (56 DAYS)	N
SLAB-ON-GRADE (INTERIOR)	25 MPa	N
SLAB-ON-GRADE (EXTERIOR)	32 MPa	C-1
RETAINING/FOUNDATION WALLS	25 MPa	F-2
MECH./ HOUSEKEEPING PADS	20 MPa	N
GRADE BEAMS	30 MPa	N

15. SEE TABLE BELOW FOR SAWCUT SPACING.

SPACING OF SAWCUT JOINTS

SLAB THICKNESS	MAXIMUM SAWCUT SPACING	
	MAXIMUM SIZE AGGREGATE LESS THAN $\frac{3}{4}$"	MAXIMUM SIZE AGGREGATE $\frac{3}{4}$" AND LARGER
4"	8'-0"	10'-0"
5"	10'-0"	12'-0"
6"	12'-0"	14'-6"
7"	14'-0"	17'-0"
8"	16'-6"	19'-6"
9"	18'-0"	22'-0"
10"	19'-6"	24'-6"

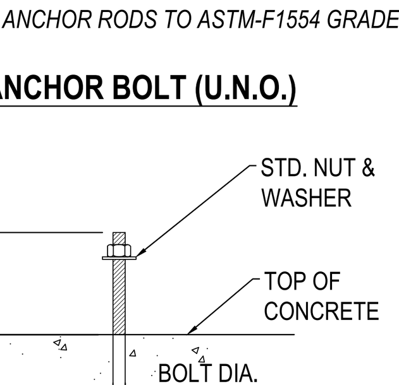
REINFORCING STEEL:

1. LAP ALL REINFORCING AS PER RSIO MANUAL, CLASS "B" TENSION LAP.
2. INTERSECTING REBAR SHALL BE TIED TOGETHER USING NO.16 U.S. WIRE GAUGE OR HEAVIER ANNEALED WIRE OR AN APPROVED PATENTED TYING SYSTEM.
3. ADEQUATELY SUPPORT REINFORCEMENT WITH PLASTIC CHAIRS, SPACERS OR HANGERS AND SECURE AGAINST DISPLACEMENT WITHIN THE TOLERANCES INDICATED IN LATEST EDITION CSA STANDARD A23.1. CONCRETE BRICKS MAY BE USED IN PLACE OF PLASTIC CHAIRS FOR SLABS ON GRADE.
4. NOTIFY THE CONSULTANT FOR SITE REVIEW OF REINFORCEMENT 24 HOURS PRIOR TO THE PLACEMENT OF CONCRETE.
5. MINIMUM COVER TO REINFORCEMENT SHALL BE 3" WHEN CONCRETE IS CAST AGAINST SOIL AND $1\frac{1}{2}$" FOR ALL OTHER APPLICATIONS. (UNLESS NOTED OTHERWISE)

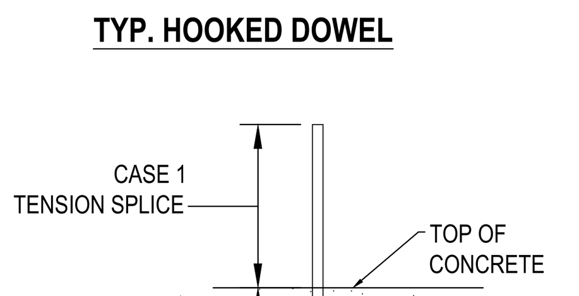
STRUCTURAL STEEL:

1. ALL WORK SHALL CONFORM TO CSA STANDARD S16 (LATEST EDITION) "LIMIT STATES DESIGN OF STEEL STRUCTURES". CONTRACTOR TO FABRICATE TO APPROVED SHOP DWGS. ONLY.
2. STEEL SHALL CONFORM TO CSA STANDARD G40.20 "GENERAL REQUIREMENTS FOR ROLLED OR WELDED STRUCTURAL QUALITY STEEL" AND TO CSA STANDARD G40.21 "STRUCTURAL QUALITY STEELS" TO THE FOLLOWING GRADES:
   HSS AND FLANGE SECTIONS - 350W (50 ksi)
   ALL OTHER HOT ROLLED SHAPES - 300W (44W)
   PLATES NOT GREATER THAN 1 1/2" THICKNESS - 300W (44W)
3. STRUCTURAL BOLTS TO BE ASTM F3125/F3125M LATEST EDITION. HEAT TREATED 120/105 KSI MIN. TENSILE STRENGTH. COMPLETE WITH HARDENED WASHERS AND HEAVY HEX NUTS.
4. ALL ANCHOR RODS TO ASTM-F1554 GRADE 50. ALL EXTERIOR ANCHOR RODS TO BE HOT-DIP GALVANIZED.

TYP. ANCHOR BOLT (U.N.O.)



TYP. HOOKED DOWEL



5. ALL WELDING TO BE DONE BY A CONTRACTOR CERTIFIED BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA-W47.1-03 CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES, DIVISION 1 OR 2. CONTRACTOR TO SUBMIT CURRENT CWB LETTER OF VALIDATION TO ENGINEER PRIOR TO PROCEEDING WITH ANY STEELWORK.
6. ALL ELECTRODES SHALL BE E70XX CONFORMING TO CSA STANDARD W48.
7. ALL WELDING TO BE METAL-ARC TO CSA-W59-18 - WELDED STEEL CONSTRUCTION. (METAL-ARC WELDING). ALL WELDS SHALL BE CONTINUOUS UNLESS NOTED. MINIMUM SIZE OF FILLET WELD TO BE $\frac{3}{16}$" (5mm) OR AS REQ'D BY MATERIAL THICKNESS OR PARTS JOINED.
8. CLEAN, PRIME AND FINISH PAINT ALL NEW STEEL WORK AS PER THE FOLLOWING:
   8.1. SHOP CLEAN ALL STEEL ACCORDING TO STEEL STRUCTURAL PAINTING COUNCIL SURFACE PREPARATION No. 6, "COMMERCIAL BLAST CLEANING", OR PREPARATION No.3 "POWER WIRE BRUSH CLEANING"
   8.2. SAME DAY AS CLEANED, APPLY ONE SHOP COAT OF DEVGUARD #4160 GREY OXIDE RUST INHIBITIVE PRIMER TO A DRY FILM THICKNESS OF 2.0 TO 2.4 MILS.
   8.3 FOR EXPOSED STEEL IN THE SHOP, APPLY TWO FINISH COATS OF DEVGUARD ALKYD SEMI-GLOSS ENAMEL #4306 SERIES, 1.5 TO 2 MILS DRY FILM THICKNESS, COLOURS BY OWNER.
   8.4 AFTER ERECTION, CLEAN ALL SURFACES. TOUCH-UP ANY DAMAGED OR UNPAINTED AREAS WITH PRIMER AND TWO FINISH COATS.
9. DO NOT PAINT CONNECTION SURFACES OR SURFACES TO BE WELDED.
10. SUBMIT SHOP DRAWINGS TO ENGINEER FOR APPROVAL.
   10.1 ALL SHOP DRAWINGS SHALL BEAR A SEAL OF A REGISTERED PROFESSIONAL ENGINEER FROM THE PROVINCE OF ONTARIO.
   10.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ALL CONNECTIONS.
   10.3 UNLESS OTHERWISE DETAILED OR SPECIFIED, BEAM CONNECTIONS SHALL BE DESIGNED TO RESIST THE FULL BENDING CAPACITY OF THE MEMBER IN ITS FULLY BRACED CONDITION FOR THE APPROPRIATE SPAN AS LISTED IN THE CISC HANDBOOK BEAM LOAD TABLES.
   10.4 CONNECTIONS SHALL CONFORM TO THE DETAILS IN THE CISC HANDBOOK.
   10.5 NON-STANDARD CONNECTIONS AND CONNECTIONS TO EXISTING STRUCTURAL MEMBERS SHALL BE DESIGNED AND BEAR THE SEAL OF A PROFESSIONAL ENGINEER.
   10.6 BEAM END CONNECTION DETAILS SHOWN ON THESE DRAWINGS ARE INTENDED TO SERVE AS A GUIDE ONLY. IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY ALL FINAL DIMENSIONS.
11. BEAM END CONNECTION DETAILS SHOWN ON THESE DRAWINGS ARE INTENDED TO SERVE AS A GUIDE ONLY. IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY ALL FINAL DIMENSIONS.
12. ALL EXTERIOR STEEL THAT IS EXPOSED TO WEATHER INCLUDING HANDRAILS AND GUARDS SHALL BE HOT-DIP GALVANIZED. THE CONTRACTOR SHALL ENSURE THE STEEL IS GALVANIZED TO EXPOSED STEEL FINISH STANDARDS (UNIFORM VISUAL APPEARANCE, FREE OF IMPERFECTIONS).
13. BOLTED CONNECTIONS SHALL HAVE A MINIMUM OF TWO BOLTS PER VERTICAL LINE IN EACH CONNECTED PIECE AND BE DESIGNED AS BEARING CONNECTIONS U.N.O.
14. U.N.O. COLUMN CAP PLATES SHALL BE $\frac{1}{4}$" THICK AND COLUMN BASE PLATES SHALL BE $\frac{3}{8}$" MINIMUM THICK.
15. DESIGN DRAWINGS INCLUDE ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS. SEE ALSO ARCHITECTURAL DRAWINGS FOR ADDITIONAL DIMENSIONS AND DETAILS. WHERE ELEVATIONS, ROOF SLOPES, ETC. ARE SHOWN ON THE STRUCTURAL DRAWINGS, THEY MUST BE CONFIRMED WITH THE ARCHITECTURAL DRAWINGS.
16. MISCELLANEOUS MATERIALS AND ACCESSORIES ASSOCIATED WITH GOOD PRACTICE THAT ARE NOT SHOWN SHALL BE PROVIDED.
17. U.N.O. DO NOT OVERSIZE HOLES IN STEEL TO FIT ANY ANCHOR LOCATIONS, FOR COLUMN BASE PLATE HOLES, UNLESS NOTED OTHERWISE ON DRAWINGS, SEE TABLE BELOW.

HOLE SIZES FOR ANCHOR BOLTS

BOLT SIZE (in.)	HOLE SIZE (in.)
$\frac{3}{4}$" UP TO INCLUDING 1"	DIAMETER + $\frac{5}{16}$"
OVER 1" UP TO INCLUDING 2"	DIAMETER + $\frac{1}{2}$"
OVER 2"	DIAMETER + 1"

18. PROVIDE MINIMUM L2x2x$\frac{3}{16}$" TRIMMER ANGLE (U.N.O. ON DRAWING) FOR STEEL DECK SUPPORT TYPICAL AROUND PERIMETER OF BUILDING, WELDED TO OWSJ AND/OR STEEL BEAM.
19. THE OWNER WILL EMPLOY A QUALIFIED PERSON TO INSPECT THE CONNECTIONS, INCLUDING BOLT TENSION AND WELDING, IN ACCORDANCE WITH CSA S16:19 SECTIONS 23 AND 30.

MASONRY:

1. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, AND SERVICES TO COMPLETE ALL THE MASONRY WORK INDICATED ON THE DWGS AND SPECIFIED HEREIN INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1.1 ALL CONC. BLOCK WALLS INCLUDING HORIZONTAL REINFORCING
   1.2 PROVIDE MASONRY PILASTER AROUND COLUMNS AS REQUIRED-MIN $3\frac{1}{2}$" THICK. FILL SPACE AROUND COLUMNS WITH GROUT.
   1.3 GROUTING TO RECEIVE STEEL BEAMS AND BLOCKING IN.
   1.4 SUPPLY AND INSTALL ALL LINTELS AND WALL SUPPORT CLIP ANGLES REQUIRED.
   1.5 INSTALL INSERTS, ANCHOR BOLTS, DOWELS, ETC. REQUIRED
   1.6 ALLOW FOR BLOCKING AROUND CONDUIT PIPING AND OTHER OBSTRUCTIONS.
   1.7 BUILD IN DOOR FRAMES, WINDOWS, LOUVRES, OTHER OPENINGS, SUPPORT FRAMES, PLUMBING, PIPING CONDUIT AND BOXES AS REQUIRED.
   1.8 ALL CONCRETE BLOCK WALLS SHALL BE CONSIDERED PARTIALLY GROUTED UNLESS NOTES OTHERWISE.
2. ALL WORK SHALL CONFORM TO CSA STANDARD S304.1 (LATEST EDITION) "MASONRY DESIGN FOR BUILDINGS (LIMIT STATES DESIGN)"; AND CSA STANDARD A370 "CONNECTORS FOR MASONRY"
3. BLOCK TO BE NORMAL WEIGHT HOLLOW, TYPE H/15/A/M TO CSA-A165.1M. INCLUDE ALL SPECIAL SHAPES SUCH AS END AND BULLNOSE, AS REQUIRED.
   3.1 HANDLE AND STORE UNITS TO PREVENT CHIPPING.
   3.2 DO NOT USE CHIPPED, CRACKED, OR DAMAGED UNITS.
4. MORTAR TO BE TYPE S. SHALL CONFORM TO CSA STANDARD A179 (LATEST EDITION). NO CALCIUM OR CHLORIDE OR OTHER CHLORIDE SALTS OR ADMIXTURES CONTAINING THESE TO BE ADDED TO MORTAR OR GROUT.
5. ALL MASONRY WALLS SHALL BE FULL MORTAR HEAD AND BED JOINTS HAVING A THICKNESS OF 3/8".
6. TOOL ALL MORTAR JOINTS AFTER MORTAR HAS BECOME THUMB PRINT HARD. ALL JOINTS ARE TO BE CONCAVE UNLESS OTHERWISE NOTED ON THE DRAWINGS.
7. ALL MASONRY UNITS ARE TO BE LAID IN A RUNNING BOND PATTERN, TRUE TO LINE, PLUMB, SQUARE AND LEVEL WITH VERTICAL JOINTS OF ALTERNATE COURSES IN LINE. THE MASON SHALL SET ALL CORNERS, LINES AND LEVELS AND CHECK ALIGNMENT AND PLUMBNESS DURING PROGRESS OF WORK.
8. SUPPORT TOP OF ALL WALLS WITH L3x3x$\frac{3}{16}$" x 4" LONG GALV. ANGLES BOTH SIDES WELDED TO U/S STEEL DECK AT 6'-0" O.C. MAX SPACING. LEAVE $\frac{1}{2}$" DEFLECTION GAP AT TOP
9. ALL MASONRY CONNECTORS AND TIES ARE TO BE STAINLESS STEEL UNLESS NOTED OTHERWISE ON DRAWINGS.
10. ALL LINTELS SUPPORTED ON MASONRY SHALL BEAR ON 2 COURSES OF SOLID MASONRY WITH A MINIMUM BEARING LENGTH OF 8" UNLESS NOTED OTHERWISE ON DRAWINGS.
11. ALL GROUT TO BE 25MPa COURSE GROUT WITH $\frac{3}{8}$" PEA GRAVEL AS PER CSA STANDARD A179 (LATEST EDITION)
12. CLEAN MASONRY AS FOLLOWS:
   12.1 RAKE AND REPLACE DEFECTIVE MORTAR JOINTS.
   12.2 ON COMPLETION, REMOVE EXCESS MORTAR, SMEARS, AND STAINS
   12.3 SCRUB SURFACES TO BE CLEANED WITH SUITABLE NON-ACID CLEANING SOLUTIONS.
   12.4 FINISHED PRODUCT TO HAVE UNIFORM CLEAN APPEARANCE.
13. PROVIDE REINFORCED CORES ON EACH SIDE OF CONTROL JOINTS AND ON EACH SIDE OF WINDOW AND DOOR OPENINGS. LOCATE AT SECOND CORE FROM WINDOW OR DOOR OPENING IN ORDER THAT VERTICAL REINFORCING BAR DOES NOT INTERFERE WITH STEEL LINTEL BEAM ABOVE.

OPEN WEB STEEL JOIST SYSTEMS:

1. SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER RESPONSIBLE FOR THE DESIGN AND REGISTERED IN ONTARIO SHALL BE SUBMITTED FOR REVIEW PRIOR TO FABRICATION.
2. ROOF DECK TO BE WELDED EVERY SECOND FLUTE WITH 19mm Ø ($\frac{3}{4}$") PLUG WELD OVER EVERY BEAM OR JOIST, OR EVERY 300mm (12") WHEN FLUTES ARE PARALLEL TO SUPPORTS. WELDS TO BE 150mm (6") O.C. WITHIN 1.8m OF CORNERS.
3. U.N.O. ON PLAN (EXCEPT UNDER SNOW DRIFT) ALL JOISTS SHALL BE EQUALLY SPACED BETWEEN GRIDS.
4. DESIGN OF JOISTS AND BRIDGING SHALL CONFORM TO THE REQUIREMENTS OF CSA-S16.1, CLAUSE 16. JOISTS SHALL BE DESIGNED FOR THE SMALLER OF: LIVE LOAD DEFLECTION OF L/260 OR TOTAL LOAD DEFLECTION OF L/180, WHICHEVER GOVERNS. BRIDGING HAS NOT BEEN SHOWN ON PLAN FOR CLARITY.
5. ALL JOISTS AT COLUMNS, AND WHERE NOTED "TJ" ON PLAN, SHALL BE TIE JOISTS I.E. EXTEND BOTTOM CHORD AND CONNECT TO COLUMN. DESIGN TIE JOISTS FOR AN ADDITIONAL 25 kN COMPRESSION LOAD IN BOTTOM CHORDS.
6. WHERE JOISTS SPAN ON TO A COMMON BEAM FROM TWO SIDES, THE JOISTS CAN BE PLACED END TO END OR SIDE BY SIDE ON THE BEAM SO AS TO BEAR DIRECTLY OVER THE WEB. IF THE JOISTS ARE DIFFERENT SPANS AND/OR LOADS ARE PLACED END TO END, THEN THE BEAM SHALL BE RESTRAINED FROM TWISTING BY THE ADDITION OF AN L $1\frac{1}{2}$" x $1\frac{1}{2}$" x $\frac{1}{8}$" NEAR THE CENTRE OF THE BEAM FROM THE JOIST BOTTOM CHORD TO THE BEAM BOTTOM FLANGE.
7. DESIGN OWSJ FOR ADDITIONAL 500lb VERTICAL POINT LOADS APPLIED AT ANY (3) ADJACENT PANEL POINTS FOR ALL JOISTS.
8. WHERE ROOF FRAMING IS SHOWN FOR MECHANICAL OPENINGS, DESIGN JOISTS SO FRAMING BEARS AT JOIST PANEL POINTS OR ACCOMMODATE CHORD FLEXURE IN DESIGN.
9. ALL OWSJ TO HAVE BUILDING SERVICES PASS THROUGH THEM. WEB MEMBERS OF ADJACENT OWSJ TO LINE UP TO ACCOMMODATE CONTINUOUS PENETRATION OF SERVICES.
10. WELDING SHALL CONFORM TO CSA W59.
11. OWSJ TO BE PAINTED SHALL BE CLEANED AND SHALL RECEIVE ONE COAT OF SHOP PRIMER IN ACCORDANCE WITH CAN/CSA-S16.
12. OWSJ TO BE EXPOSED IN FINISHED WORK SHALL BE PAINTED WITH SHOP PRIMER MEETING THE REQUIREMENTS OF CAN/CSA-S16. CLEANING, PREPARATION OF STEEL AND THE PAINT PRODUCT SHALL BE COMPATIBLE WITH THE REQUIREMENTS OF FINISHED PAINTING AS SPECIFIED IN ARCHITECTURAL FINISHES. REFER TO THE SPECIFICATIONS.
13. BOTTOM CHORD EXTENSIONS (B.C.E.) ARE EXTENSIONS OF THE BOTTOM CHORD WHICH TRANSMIT AN AXIAL FORCE TO EITHER A COLUMN, BEAM BOTTOM FLANGE, JOIST GIRDER BOTTOM CHORD OR WALL. THE EXTENSION MAY BE EITHER FLAT OR SLOPED. SEE PLANS, SCHEDULES, AND DETAILS FOR AXIAL FORCES.

PRECAST PRESTRESSED CONC. SLABS:

1. ALL PRECAST PRESTRESSED CONCRETE FLOOR SLABS SHALL BE DESIGNED, FABRICATED AND INSTALLED IN ACCORDANCE WITH CSA-A23.4 AND CSA-A23.3.
2. ALL WELDING WORK SHALL BE IN ACCORDANCE WITH CSA-W59 FOR WELDING TO STRUCTURAL STEEL AND CSA W88 FOR WELDING REINFORCEMENT.
3. MANUFACTURERS OF PRECAST PRESTRESSED CONCRETE SLABS TO BE CERTIFIED BY CSA REQUIREMENTS CSA-A23.4/A251.
4. PRECAST PRESTRESSED CONCRETE SLABS SHALL BE DESIGNED TO CSA-A23.3 IN ACCORDANCE WITH APPLICABLE CODES FOR LOADING AND LOADING INFORMATION PROVIDED ON DRAWINGS. SYSTEM TO PROVIDE FULL DIAPHRAGM ACTION.
5. MANUFACTURER TO CO-ORDINATE SIZE AND LOCATIONS OF ALL OPENINGS WITH ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND WITH APPLICABLE TRADE CONTRACTORS.
6. ADDITIONAL LOADING FROM MECHANICAL EQUIPMENT ON ROOF MEMBERS SHALL BE TAKEN INTO ACCOUNT FOR ROOF DESIGN.
7. STEEL BEAMS LOADED BY PRECAST SLABS ON ONE SIDE ONLY ARE TO BE FULLY SHORED UNTIL SLAB JOINT REINFORCING HAS BEEN WELDED TO BOTTOM FLANGE OF BEAM AND SLAB GROUT HAS FULLY CURED.
8. MANUFACTURER TO SUBMIT SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN ONTARIO FOR APPROVAL PRIOR TO FABRICATION. ALL PERTINENT INFORMATION TO BE PROVIDED ON SHOP DRAWINGS INCLUDING CAMBER, FINISHES, REINFORCING, ETC.

STEEL DECK:

1. STEEL DECKING SHALL CONFORM TO CAN/CSA-S136.
2. STEEL DECKING SHALL CONFORM TO CSSBI SPECIFICATION 10M MINIMUM GRADE 230 ZINC COATED STRUCTURAL QUALITY STEEL FOR ROOF AND FLOOR DECK. BASE STEEL NOMINAL THICKNESSES INDICATED ON THE DRAWINGS ARE MINIMUM REQUIREMENTS ONLY.
3. INTERIOR EXPOSURE DECK SHALL BE ZINC COATED WIPE COAT ZF075 FOR FLOORS AND FOR ROOFS. EXTERIOR EXPOSURE DECK SHALL BE Z275 ZINC COATED U.N.O.
4. STEEL DECKING SHALL BE INSTALLED SUCH THAT SHEETS ARE SET FOR A MINIMUM OF THREE SPANS CONTINUOUS U.N.O.. LAPS OF DECKING SHALL BE LIMITED OR DETAILED TO PREVENT UNDUE VERTICAL DEFORMATIONS AT THE END OF THE DECK DUE TO END ROTATIONS.
5. SEE DRAWINGS FOR DECK THICKNESS OR DESIGN LOADS.
6. WHERE DECK IS CALLED UP ON DRAWINGS, ALTERNATES MUST BE THE SAME DEPTH, BE EQUIVALENT FOR DEFLECTIONS, VERTICAL LOAD, AND SHEAR CAPACITY, AND BE PRE-APROVED.
7. SUBMIT SHOP DRAWINGS INDICATING THE DECK SPANS, THICKNESS, PROFILES, AND DETAILS. WHERE THE DECK THICKNESS AND CONNECTIONS ARE NOT SHOWN ON THE DRAWINGS, THE FABRICATOR SHALL DESIGN THE DECK AND CONNECTIONS FOR THE VERTICAL LOADS AND THE SHEAR/DIAPHRAGM LOADS NOTED ON THE DRAWINGS AND HAVE THE SHOP DRAWINGS SEALED BY THE CONTRACTOR'S SPECIALTY STRUCTURAL ENGINEER.
8. FASTENINGS - MINIMUM REQUIREMENTS U.N.O. ON DRAWINGS
   A. SIDE LAPS MECHANICALLY FASTENED (CLINCHED) AT NOT MORE THAN 12" c/c
   B. $\frac{3}{4}$" Ø FUSION WELDS AT DECK SUPPORTS SHALL BE AT 12" c/c ALONG SIDE EDGES AND AT EVERY OTHER FLUTE
10. REMOVE WATER BETWEEN THE DECK AND SUPPORTING STEEL BEFORE WELDING DECK.
11. IF NOT SHOWN OTHERWISE, ALL EDGES OF STEEL DECKING SHALL BE SUPPORTED ON CONTINUOUS L3x3x$\frac{3}{16}$" TRIMMER ANGLE (AROUND PERIMETER OF BUILDING) WELDED TO OWSJ AND/OR STEEL BEAM.
12. SEE ALSO MECHANICAL, ELECTRICAL AND ARCHITECTURAL DRAWINGS FOR ALL OPENINGS IN DECK.
13. STEEL DECK TO BE DESIGNED FOR A MINIMUM DIAPHRAGM SHEAR OF 3.5kN/m U.N.O.

DESIGN LOADS: (Pelham)

LATERAL LOAD RESISTANCE SYSTEMS (LLRS)
LLRS PRIMARILY CONSISTS OF A NETWORK OF STEEL MOMENT FRAMES AND/OR BRACING CONNECTED BY A DIAPHRAGM OF A METAL ROOF SYSTEM OR HOLLOW-CORE SLAB

DEAD LOAD:

SUPERIMPOSED ROOF LOADS:			SUPERIMPOSED FLOOR LOADS:		
3-PLY ROOF MEMBRANE	=	3 PSF	PARTITION ALLOWANCE	=	21 psf
INSULATION	=	1 PSF	TOPPING	=	24 psf
DENS DECK	=	1 PSF	$\frac{5}{8}$" DRYWALL	=	3 psf
DROP CEILING	=	4 PSF	FLOORING	=	17 psf
PATIO STONES	=	25 PSF	MECH./ELEC. ALLOWANCE	=	6 psf
MECH./ELEC. ALLOWANCE	=	3 PSF	TOTAL	=	71 psf
TOTAL	=	37 PSF	200mm CORE SLAB	=	62 psf
200mm CORE SLAB	=	62 PSF			

FUTURE SUPERIMPOSED ROOF LOADS:			FUTURE SUPERIMPOSED FLOOR LOADS:		
3-PLY ROOF MEMBRANE	=	3 PSF	PARTITION ALLOWANCE	=	21 psf
INSULATION	=	1 PSF	TOPPING	=	24 psf
DENS DECK	=	1 PSF	$\frac{5}{8}$" DRYWALL	=	3 psf
DROP CEILING	=	4 PSF	FLOORING	=	17 psf
PATIO STONES	=	25 PSF	MECH./ELEC. ALLOWANCE	=	6 psf
MECH./ELEC. ALLOWANCE	=	3 PSF	TOTAL	=	71 psf
TOTAL	=	37 PSF	200mm CORE SLAB	=	62 psf
200mm CORE SLAB	=	62 PSF			

OCCUPANCY LOAD:
MAIN FLOOR = 100 psf
SECOND FLOOR = 50 psf
ROOF = 21 psf
EXITS/STAIRS = 100 psf

SNOW LOAD: $S = I_S [S_s (C_b C_w C_s C_a) + S_r]$ S_s = 44 psf S_r = 9 psf I_S = 1.0 (ULS) 0.9 (SLS)
C_b = 0.8
C_w = 1.0
C_s = 1.0
C_a = (SEE PLAN VIEWS FOR SNOW ACCUMULATION)

WIND LOAD: $p = I_W\, q\, C_e\, C_t C_p\, C_g$ (AS REQUIRED) $q_{1/10}$ = 7 psf I_W = 1.0 (ULS) 0.7 (SLS)
$q_{1/50}$ = 9 psf
C_e = 0.9
C_t = 1.0
$C_p C_g$ = (SEE PLAN VIEWS FOR ADDITIONAL LOADING) ASSUME 2.0 FOR ALL OTHERS

SEISMIC: $V = \frac{S(T_A)\, M_V\, I_E\, W}{R_d\, R_0}$
$S_A(0.2)$ = 0.311 I_E = 1.0
$S_A(0.5)$ = 0.152 M_V = 1.0
$S_A(1.0)$ = 0.070 T_A = 0.5s
$S_A(2.0)$ = 0.031 R_d = 1.5
$S_A(5.0)$ = 0.0074 R_o = 1.3
$S_A(10.0)$ = 0.0028 W = DEAD + 25% BASIC SNOW
PGA = 0.201g

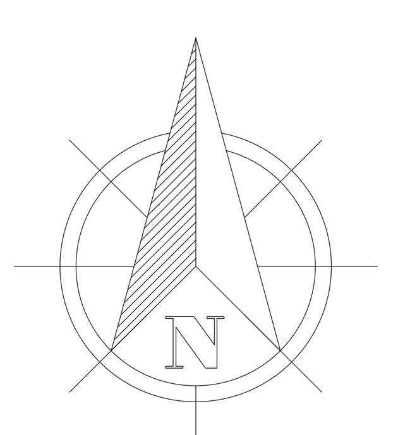
SEISMIC RESTRAINMENT:
AS PER 4.1.8.17. $I_E F_A S_A(0.2)$ = 0.459 (>0.35) THEREFORE MECHANICAL CONTRACTOR MUST SUBMIT SEALED PRE-ENGINEERED SEISMIC RESTRAINT DRAWINGS, AND/OR LETTER (FROM REGISTERED PROFESSIONAL ENGINEER FROM THE PROVINCE OF ONTARIO) TO ENGINEER-OF-RECORD FOR APPROVAL. THIS APPLIES TO ALL MECHANICAL UNITS, PIPING, CABLE TRAYS, LIGHTING, FIXTURES, ETC. IN ACCORDANCE WITH 4.1.8.18.

SOIL: DESIGN ALLOWABLE BEARING PRESSURE IS ASSUMED 3000 PSF (SLS) 5700 PSF (ULS) AND THE SITE CLASS IS 'D' TO BE CONFIRMED BY SOILS REPORT PERFORMED BY GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.

STRUCTURAL DRAWING LIST:

S0.1	DRAWING LIST, KEY PLAN & GENERAL NOTES
S0.2	STEEL STUD NOTES & DETAILS
S1	FOUNDATION PLAN
S2	GROUND FLOOR PLAN
S3	PARTIAL ROOF PLAN
S4	BUILDING SECTIONS
S5	DETAILS
S6	DETAILS
S7	DETAILS

LICENSED PROFESSIONAL ENGINEER
J. A. HALUCHA
June 7, 2022
220321
PROVINCE OF ONTARIO



HALLEX ENGINEERING LTD.
4999 Victoria Ave., Niagara Falls, ON L2E 4C9
Tel: 905-357-4015 Fax: 905-353-1105
745 South Service Rd. Unit 205, Stoney Creek, ON L8E 5Z2
Tel: 905-561-4016

REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT/TENDER	2022/05/31
1	PERMIT/TENDER	2022/06/07

CLIENT:
GRGURIC ARCHITECTS INC.
28 KING ST. EAST
STONEY CREEK, ON

PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
GENERAL NOTES & DRAWING LIST

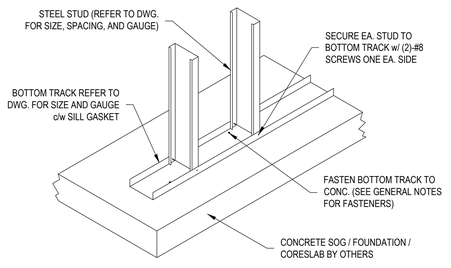
JOB NUMBER:	220321
DATE:	MARCH/2022
DRAWN BY:	AR/TA
DESIGNED BY:	AR/ML
CHECKED BY:	ML/JH
SCALE:	AS SHOWN
DWG.	S0.1
REV.	1

STEEL STUDS:

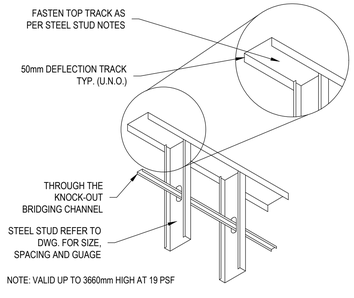
1. *STUD DESIGN IS BASED ON CANADIAN SHEET STEEL BUILDING INSTITUTE LIGHT WEIGHT STEEL FRAMING WALL STUD & FLOOR JOIST LOAD TABLES CSSB1 58-2004, AND WITH CAN - S136-01.*
2. *ALL METAL STUDS SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF CSA STANDARD CAN3-S136.*
3. *ALL METAL STUDS SHALL BE TO ASTM 446 STANDARD SPECIFICATIONS FOR SHEET STEEL, ZINC COATED (GALVANIZED) BY THE HOT-DIP PROCESS, STRUCTURAL QUALITY.*
4. *ALL STUD SCREWS SHALL BE ZINC COATED AND GALVANIZED BY HILTI OR BAILY. BLACK SCREWS ARE NOT ACCEPTABLE.*
5. *PARTITIONS AND NON LOAD BEARING WALLS TO HAVE A 200mm LONG LEG SLOTTED TOP TRACK TO PREVENT TRANSFER OF LOAD FROM ABOVE.*
6. *CONTRACTOR SHALL SUPPLY TO THE ENGINEER SHOP DRAWINGS SHOWING ALL LOAD-BEARING WALL AND FLOOR SYSTEMS COMPLETE WITH CONNECTION DETAILS OF BRIDGING, HEADERS, BRACING AND LATERAL SUPPORTS.*
7. *CONTRACTOR MAY CONSULT THE LIGHTWEIGHT STEEL FRAMING MANUAL PRODUCED BY THE CANADIAN SHEET STEEL BUILDING INSTITUTE (CSSBI) FOR STANDARD CONNECTION DETAILS.*
8. *DESIGN WIND PRESSURE FOR THE FOLLOWING WIND LOADING LEVELS:*
   a) *GROUND FLOOR TO ROOF = 25 PSF (1.2 kPa) UNFACTORED FOR STRENGTH AND DEFLECTION.*
8. *FASTEN ALL LIGHT GAUGE METAL TRACKS TO CONCRETE WITH HILTI METAL HIT ANCHORS 6.4mm Ø x 32mm LONG @ 406mm O.C. STAGGERED.*
9. *FASTEN ALL LIGHT GAUGE METAL TRACKS TO STRUCTURAL STEEL WITH THE FOLLOWING HILTI PINS:*
   i) *FOR BASE STEEL THICKNESSES BETWEEN 3mm AND 7.9mm USE HILTI ENP2K-20-L15 DRIVE PINS 3.7mm Ø AND 15mm Ø DOUBLE WASHER ATTACHED WITH MODEL DX750 FASTENING TOOL, 2 SPACED AT 300mm MINIMUM SPACING AND 9.5mm MIN EDGE DISTANCE.*
   ii) *FOR BASE STEEL THICKNESSES ABOVE 6.4mm USE HILTI ENP2-21-L15 DRIVE PINS 4.5mm Ø AND 15mm Ø DOUBLE WASHER ATTACHED WITH A MODEL DX750 FASTENING TOOL, 2 SPACED AT 300mm MINIMUM SPACING AND 9.5mm MIN EDGE DISTANCE.*
10. *ALL SCREWS ARE No. 8-16 BUILDEX 'TEKS' SELF TAPPING SELF DRILLING D=3.4mm ROOT DIAMETER OF THREADED PORTION (MINIMUM) U.N.O.*
11. *ALL STUDS AND ACCESSORIES SHALL HAVE A MINIMUM COATING OF Z275 IN ACCORDANCE WITH ASTM A525M-87.*
12. *ALL STUDS ARE MINIMUM 18 GAUGE @ 400mm C/C U.N.O. (TRACKS 18 GAUGE U.N.O.)*
13. *STEEL STUD CONTRACTOR IS TO CALL 'HALLEX ENGINEERING LTD.' FOR INSPECTION OF STEEL STUD FRAMING PRIOR TO ANY INSULATING DRYWALLING OR CLADDING ACTIVITIES.*
14. *STEEL STUDS ARE DESIGNED FOR A MAXIMUM DEFLECTION OF l/720 UNDER WIND LOAD OF 25 PSF UNLESS NOTED OTHERWISE*
15. *STEEL STUD WALLS AND EXTERIOR WALL SHEATHING ARE NOT DESIGNED TO SUPPLY LATERAL STABILITY TO THE BUILDING.*
16. *PROVIDE BRIDGING FOR LOAD-BEARING WALLS AT 1220mm MAXIMUM VERTICAL SPACING USING STANDARD BRIDGING CHANNELS (13mm X 38mm X 1.4mm). ATTACH CHANNELS TO STUDS WITH STANDARD ANGLE CLIPS (38mm X 38mm X 89mm LONG). SECURE EACH END OF BRIDGING TO STEEL COLUMNS OR MASONRY WALLS.*
17. *ENSURE CUT OUTS ARE 300mm MINIMUM AWAY FROM CONNECTIONS TOP AND BOTTOM OF STUD SPAN.*
18. *SCREW BUILT-UP STUD SECTIONS TOGETHER WITH #8-16 SCREWS WITH A VERTICAL SPACING OF 300mm C/C U.N.O.*
19. *PROVIDE A MINIMUM DOUBLE STUDS BESIDE ALL OPENINGS GREATER THAN 915mm UNLESS NOTED OTHERWISE.*
20. *DO NOT ATTACH LOOSE LINTELS TO STEEL STUDS.*
21. *PARTITIONS TO HAVE A NESTED TOP TRACK WITH A 25mm GAP TO PREVENT TRANSFER OF LOAD FROM CEILING.*

HILTI POWDER ACTUATED FASTENERS:

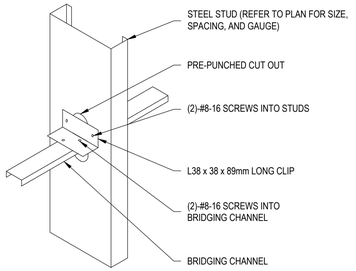
1. *ENSURE PROPER FASTENING TOOL IS USED TO ACHIEVE MINIMUM PENETRATION*
2. *MIN. CONC. STRENGTH ASSUMED = 20 MPa.*



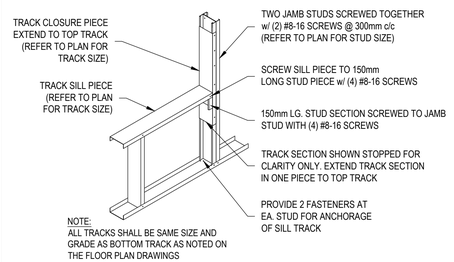
TYP. TRACK TO SLAB FASTENING



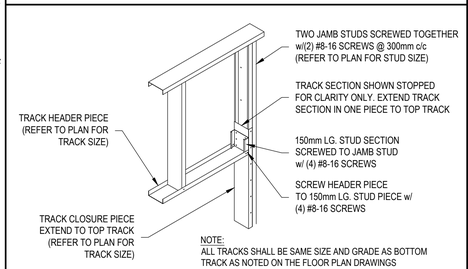
TYP. LONG LEG DEFLECTION TRACK THROUGH THE BRIDGING CHANNEL



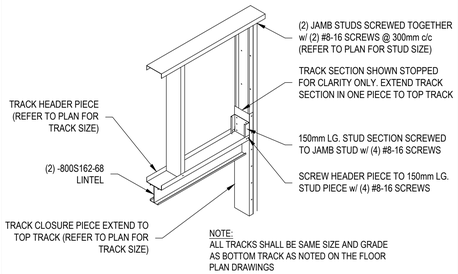
TYP. KNOCK-OUT BRIDGING CHANNEL



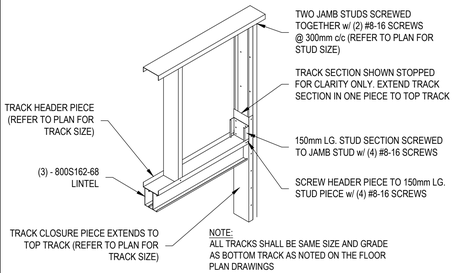
TYP. WINDOW SILL



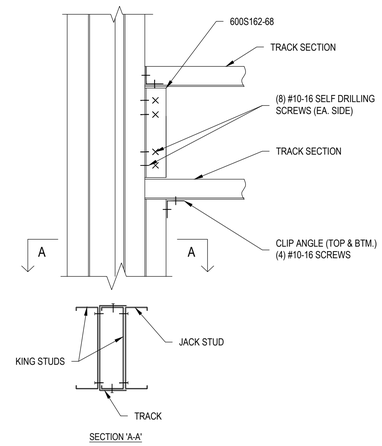
TYP. INTERIOR OPENING LINTEL



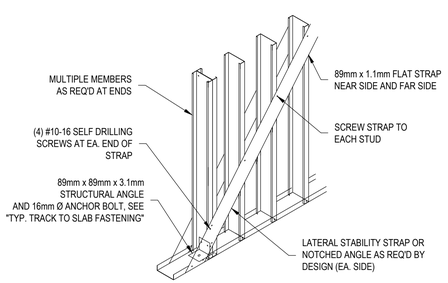
TYP. EXTERIOR OPENING LINTEL



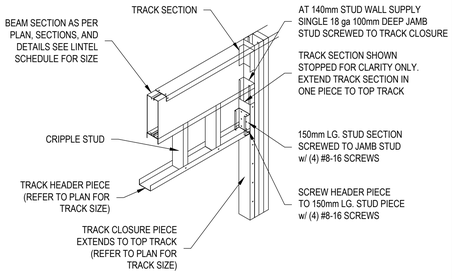
TYP. EXTERIOR OPENING LINTEL



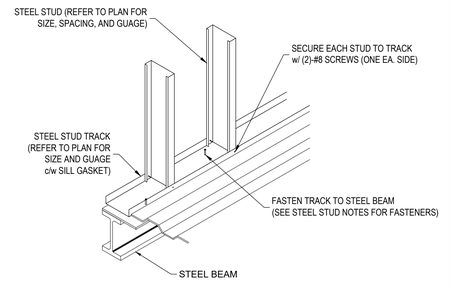
TYP. JAMB-HEADER CONNECTION



TYP. TENSION STRAP



TYP. BEAM TO STUD CONNECTION



TYP. TRACK FASTENING TO STEEL BEAM

LICENSED PROFESSIONAL ENGINEER
J. M. HALUCHA
June 7, 2022
220321
PROVINCE OF ONTARIO

HALLEX ENGINEERING LTD.
745 South Service Rd. Unit 205, Stoney Creek, ON L8E 5Z2 Tel: 905-561-4016
4999 Victoria Ave., Niagara Falls, ON L2E 4C9 Tel: 905-357-4015 Fax: 905-353-1105

REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT/TENDER	2022/05/31
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CLIENT:
GRGURIC ARCHITECTS INC.
28 KING ST. EAST
STONEY CREEK, ON

PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

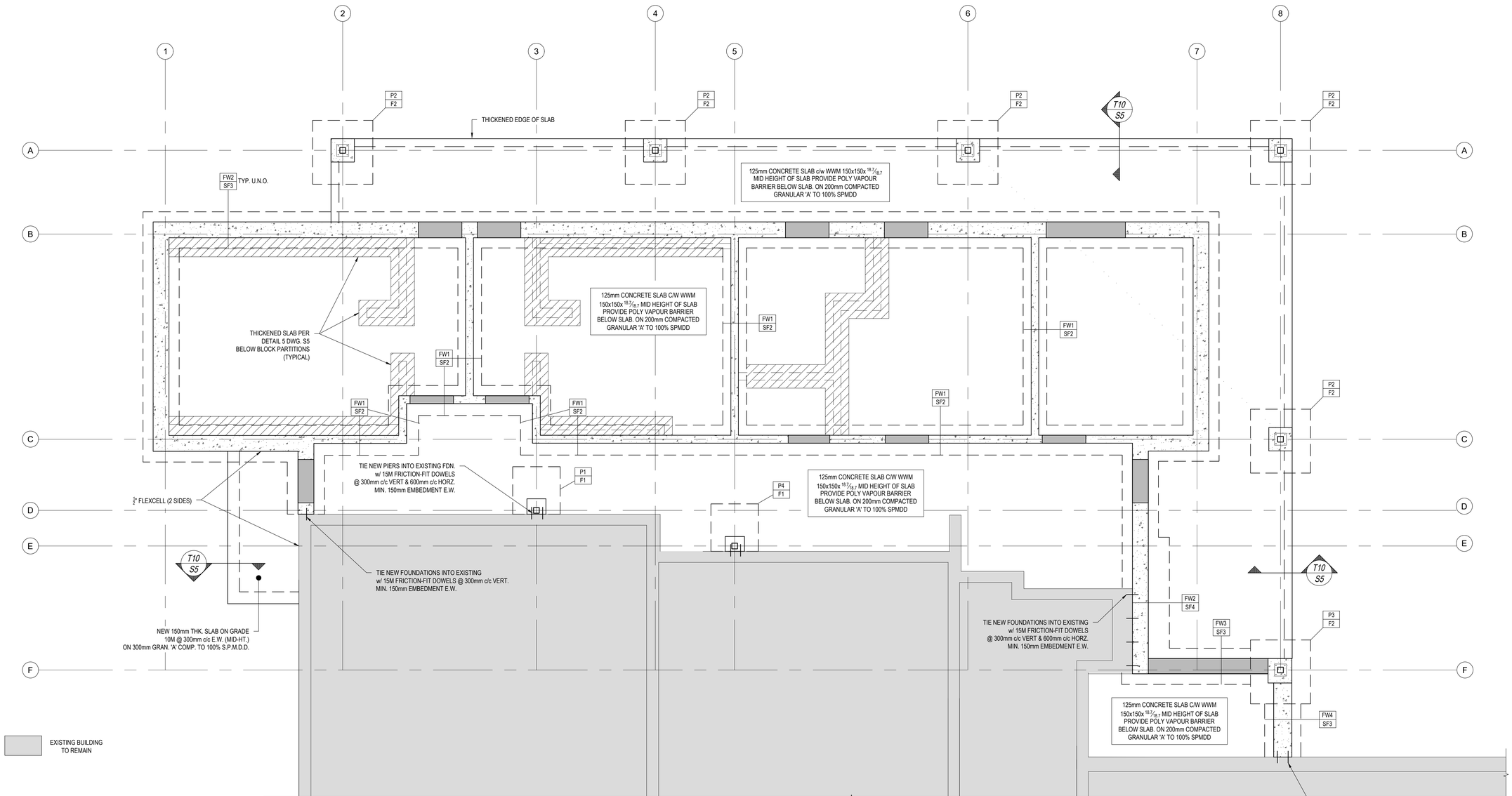
SHEET TITLE:
STEEL STUD NOTES & TYPICAL DETAILS

JOB NUMBER:	220321
DATE:	MARCH/2022
DRAWN BY:	AR/TA
DESIGNED BY:	AR/ML
CHECKED BY:	ML/JH
SCALE:	AS SHOWN
DWG.	S0.2
REV.	1

FOOTING SCHEDULE				
MARK	SIZE	REINFORCEMENT		NOTES
		LONG.	*TRANSVERSE*	
F1	1200 x 1200 x 300mm THK.	(5)-15M	(5)-15M	SEE PLAN
F2	1525 x 1525 x 300mm THK.	(6)-15M	(6)-15M	SEE PLAN
SF1	610mm x 300mm THK.	(3)-15M	N/A	SEE PLAN
SF2	800mm x 300mm THK.	(4)-15M	N/A	SEE PLAN
SF3	915mm x 300mm THK.	(4)-15M	15M @ 400mm c/c	SEE PLAN
SF4	1200mm x 300mm THK.	(5)-20M	N/A	OFFSET FOOTING @ EXISTING

FOUNDATION WALL SCHEDULE				
MARK	SIZE	REINFORCEMENT		COMMENTS
		VERTICAL	*HORIZONTAL*	
FW1	200mm	15M @ 400mm c/c	15M @ 400mm c/c	1 LAYER ON ℄ OF WALL
FW2	400mm	15M @ 400mm c/c E.F.	15M @ 400mm c/c E.F.	(2) LAYERS w/ 50mm COVER (EA. FACE)
FW3	385mm	15M @ 400mm c/c E.F.	15M @ 400mm c/c E.F.	(2) LAYERS w/ 50mm COVER (EA. FACE)
FW4	460mm	15M @ 400mm c/c E.F.	15M @ 400mm c/c E.F.	(2) LAYERS w/ 50mm COVER (EA. FACE)

PIER SCHEDULE				
MARK	SIZE	REINFORCEMENT		COMMENTS
		VERTICAL	*HORIZONTAL*	
P1	480mm x 390mm	(8)-15M	10M TIES @ 300mm c/c	SEE PLAN
P2	590mm x 590mm	(8)-15M	10M TIES @ 300mm c/c	SEE PLAN
P3	600mm x 608mm	(8)-15M	10M TIES @ 300mm c/c	SEE PLAN
P4	490mm x 375mm	(8)-15M	10M TIES @ 300mm c/c	SEE PLAN



FOUNDATION PLAN

SCALE: 1:50

DRAWING NOTES:

1. *SEE ARCHITECT DRAWINGS FOR WALL LOCATIONS, TYPES, ETC.*
2. *SEE DRAWING S0 FOR GENERAL NOTES.*

LICENSED PROFESSIONAL ENGINEER
J. M. HALUCHA
June 7, 2022
220321
PROVINCE OF ONTARIO

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HALLEX ENGINEERING LTD.
745 South Service Rd. Unit 205,
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REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT/TENDER	2022/05/31
1	PERMIT/TENDER	2022/06/07

CLIENT:
GRGURIC ARCHITECTS INC.
28 KING ST. EAST
STONEY CREEK, ON

PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
FOUNDATION PLAN

JOB NUMBER:	**220321**
DATE:	**MARCH/2022**
DRAWN BY:	**AR/TA**
DESIGNED BY:	**AR/ML**
CHECKED BY:	**ML/JH**
SCALE:	**AS SHOWN**
DWG.	**S1**
REV.	**1**

BLOCK WALL SCHEDULE

MARK	SIZE	REINFORCEMENT		NOTES
		VERTICAL	*HORIZONTAL*	
BW1	140mm	15M @ 800mm c/c	TRUSS REINFORCING EVERY OTHER COURSE 1-15M BOND BEAM @ TOP & MID.	SEE PLAN
BW2	190mm	15M @ 800mm c/c	TRUSS REINFORCING EVERY OTHER COURSE 1-15M BOND BEAM @ TOP & MID.	SEE PLAN
BW3	190mm	20M @ 400mm c/c	TRUSS REINFORCING EVERY OTHER COURSE 1-15M BOND BEAM @ TOP & MID.	SEE PLAN
BW4	240mm	15M @ 400mm c/c	TRUSS REINFORCING EVERY OTHER COURSE 1-15M BOND BEAM @ TOP & MID.	SEE PLAN
BW5	90mm	15M @ 800mm c/c	TRUSS REINFORCING EVERY OTHER COURSE 1-15M BOND BEAM @ TOP & MID.	SEE PLAN
NOTE: INTERIOR PARTITIONS LATERALLY SUPPORTED AT TOP				

NOTES:
1. ALL HORIZONTAL TRUSS REINFORCING TO BE DURAWALL SUPER HEAVY DUTY (4.8mm) HOT DIPPED GALVANIZED; OR APPROVED EQUAL.
2. PROVIDE VERTICAL BARS AT ALL INTERSECTIONS, WALLS, CORNERS, EACH SIDE OF OPENING OVER 900mm LG. FOR ALL MASONRY WALLS.
3. ALL STEEL EXPOSED TO EXTERIOR TO BE GALVANIZED.
4. SEE ARCHITECTURAL DRAWINGS FOR ALL OPENING WIDTHS.
5. ALL BLOCK WALLS PARTIALLY GROUTED U.N.O.

LINTEL SCHEDULE

MARK	SIZE	NOTES
L1	(2) - L152 x 89 x 13 (LLV)	B2B (USE 'L1b' AS ALT.); SEE PLAN
L1b	(2)-15M BOND BEAM	400mm DP. FULLY GROUTED; SEE PLAN
L2	(2) - L152 x 89 x 9.5 (LLV)	B2B (USE 'L2b' AS ALT.); SEE PLAN
L2b	(1)-15M BOND BEAM	400mm DP. FULLY GROUTED; SEE PLAN
L3	(3) - 800S162-68 BOX BEAM	SEE PLAN; SEE STEEL STUD NOTES
L4	W200x36	INFILL w/ BLOCK; SEE PLAN
L4	W200x36 c/w CONT. 6.4mm PL. x 254mm WELDED TO U/S BTM. FLANGE & 6mm GUSSETS SPACED @ 600mm c/c	INFILL w/ BLOCK; SEE PLAN

NOTES:
1. SEE DRAWING SX FOR TYPICAL LINTEL DETAILS
2. PROVIDE 9.5mm THK. PL. w/ 6mm FILLET WELD TO U/S ALL 'W' LINTELS AND BEAMS SHOWN ON PLAN SUPPORTING BLOCK (1" LESS WIDTH OF BLOCK) w/ 6mm GUSSETS SPACED @ 600mm c/c WHEN w/ BRICK.
3. SEE ARCHITECTURAL DRAWINGS FOR ALL OPENING LOCATIONS, WIDTHS, ETC.

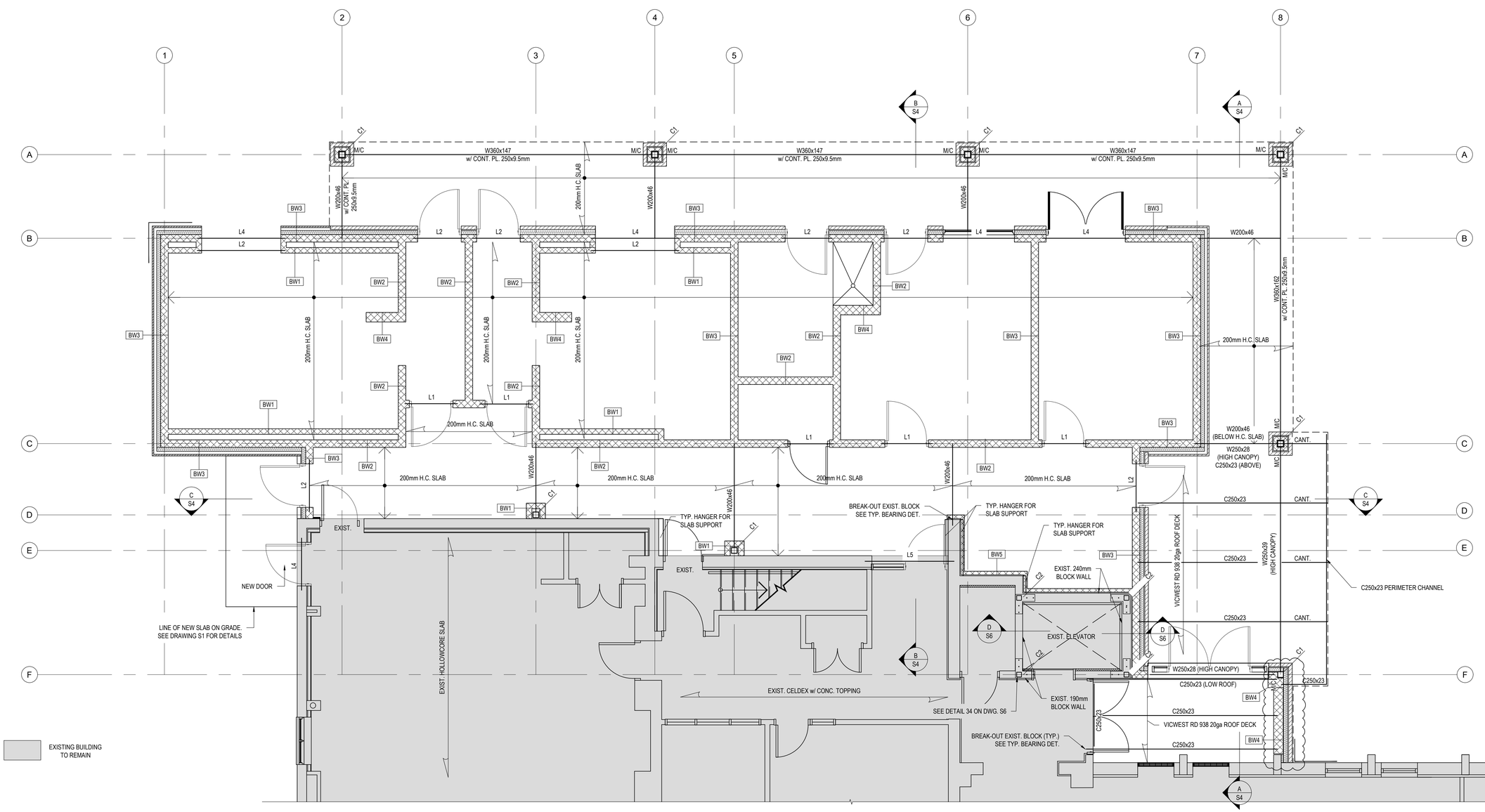
LOOSE LINTEL SCHEDULE (BRICK)

OPENING SIZE	LINTEL
1220mm SPAN AND UNDER	L89 x 89 x 6.4
1220mm TO 1830mm	L102 x 89 x 7.9
1830mm TO 2440mm	L152 x 89 x 13

STEEL COLUMN SCHEDULE

MARK	SIZE	BASE PLATE	ANCHOR BOLTS		NOTES
			SIZE	EMBEDMENT	
C1	HSS 152x152x6.4	304 x 304 x 19mm	(4) - 19mmØ	300mm	SEE PLAN
C2	HSS 127x127x6.4	SEE DETAIL BP2	(4) - 19mmØ	300mm	SEE PLAN

NOTES:
1. SEE DRAWING S6 FOR TYPICAL BASE PLATE DETAILS
2. ALL COLUMNS CENTERED ON BASE PLATE U.N.O.



GROUND FLOOR PLAN

SCALE: 1:50

DRAWING NOTES:

1. *SEE ARCHITECT DRAWINGS FOR WALL LOCATIONS, TYPES, ETC.*
2. *SEE DRAWING S0 FOR GENERAL NOTES.*

LICENSED PROFESSIONAL ENGINEER
J. M. HALUCHA
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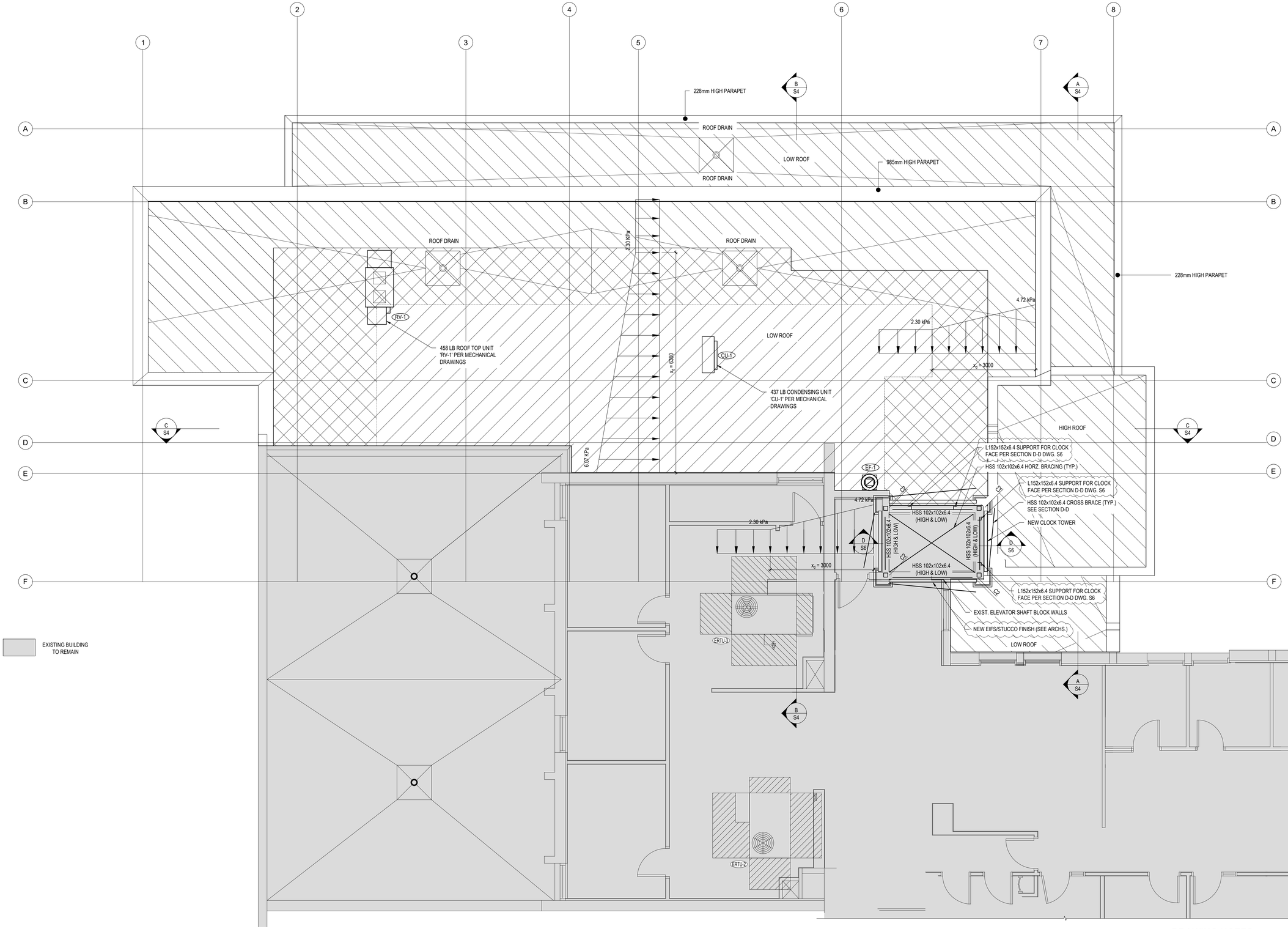
28 KING ST. EAST
STONEY CREEK, ON

PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
GROUND FLOOR PLAN

JOB NUMBER:	220321
DATE:	MARCH/2022
DRAWN BY:	AR/TA
DESIGNED BY:	AR/ML
CHECKED BY:	ML/JH
SCALE:	AS SHOWN
DWG.	S2
REV.	1



PARTIAL ROOF PLAN

SCALE: 1:50

DRAWING NOTES:

1. *SEE ARCHITECT DRAWINGS FOR WALL LOCATIONS, TYPES, ETC.*
2. *SEE DRAWING S0 FOR GENERAL NOTES.*

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June 7, 2022
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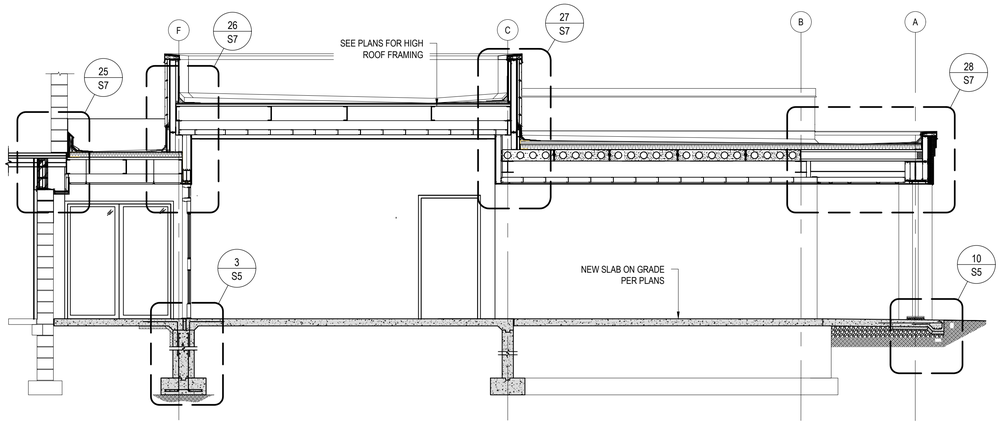
28 KING ST. EAST
STONEY CREEK, ON

PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

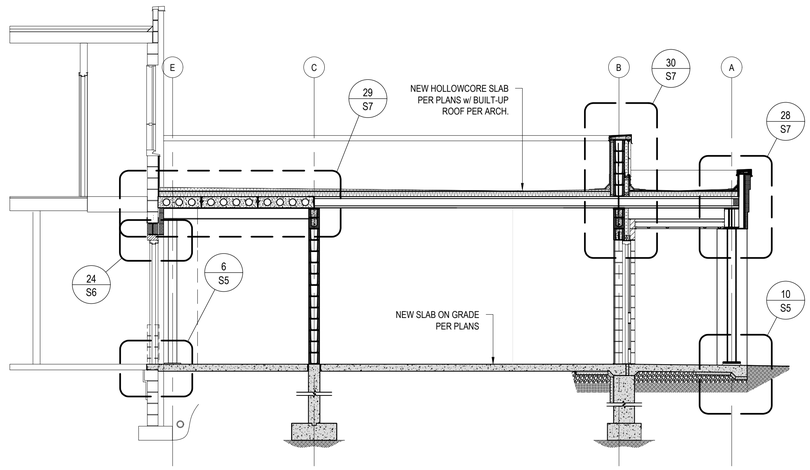
SHEET TITLE:
PARTIAL ROOF PLAN

JOB NUMBER:	220321
DATE:	MARCH/2022
DRAWN BY:	AR/TA
DESIGNED BY:	AR/ML
CHECKED BY:	ML/JH
SCALE:	AS SHOWN
DWG.	S3
REV.	1



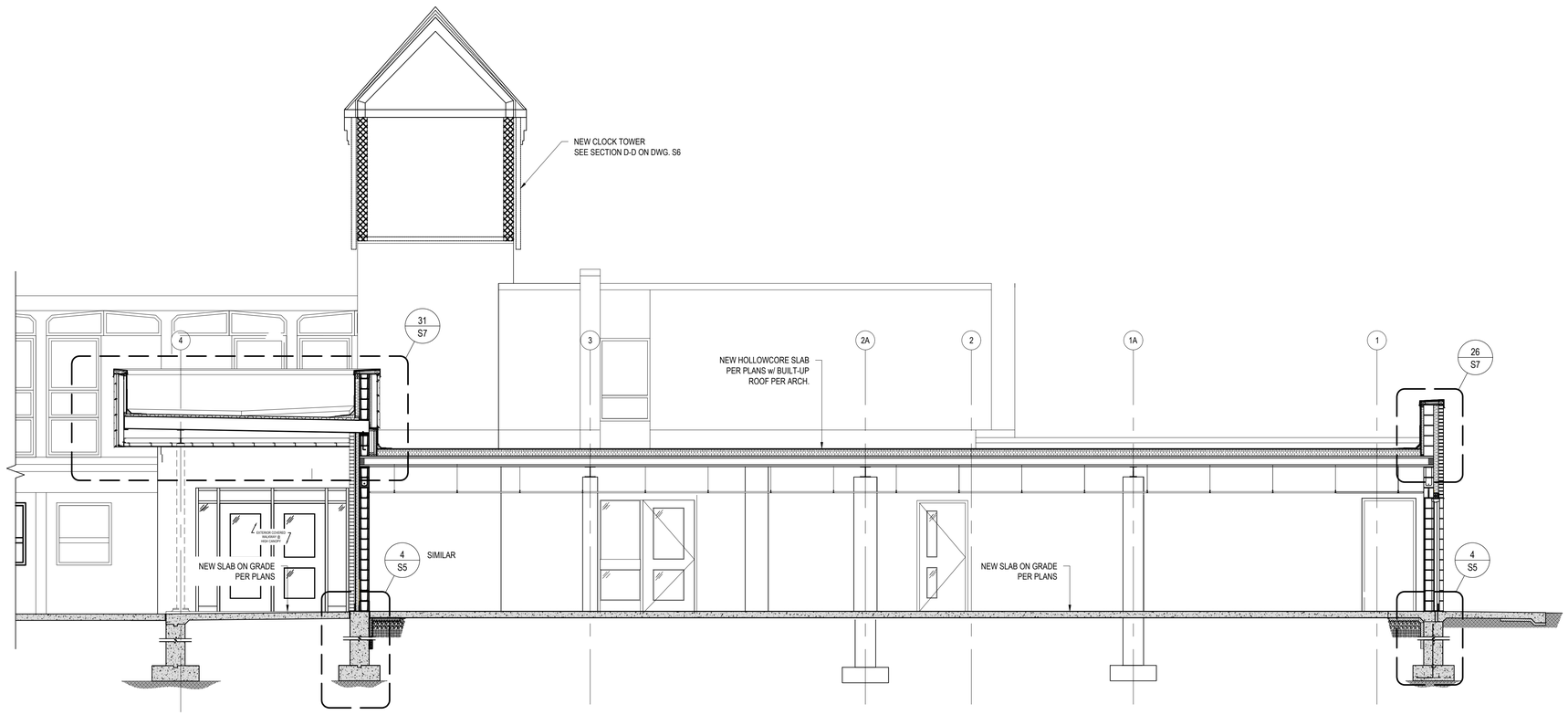
A-A (S1 | S3) **SECTION THROUGH NEW ADDTION**

SCALE: 1:50



B-B (S1 | S3) **SECTION THROUGH NEW ADDTION**

SCALE: 1:50



C-C (S1 | S3) **SECTION THROUGH NEW ADDTION AT HIGH CANOPY LOCATION**

SCALE: 1:50

LICENSED PROFESSIONAL ENGINEER
J. A. HALUCHA
June 7, 2022
220321
PROVINCE OF ONTARIO

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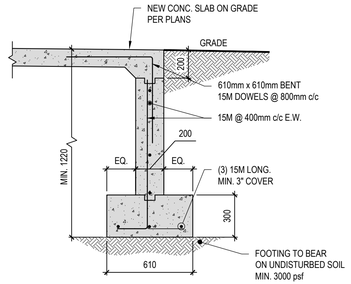
GRGURIC ARCHITECTS INC.
28 KING ST. EAST
STONEY CREEK, ON

PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
BUILDING SECTIONS

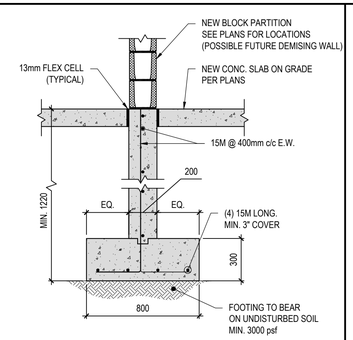
JOB NUMBER:	220321
DATE:	MARCH/2022
DRAWN BY:	AR/TA
DESIGNED BY:	AR/ML
CHECKED BY:	ML/JH
SCALE:	AS SHOWN

DWG. S4 | REV. 1



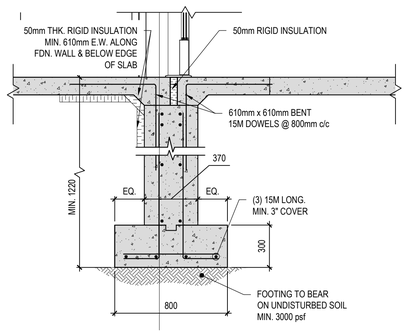
1 FW1 BELOW EXTERIOR SLAB

S4 | S3 SCALE: 1:20



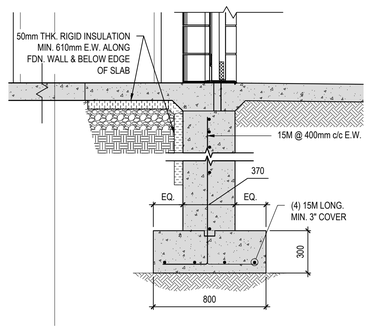
2 FW1 @ INTERIOR WALLS

S4 | S3 SCALE: 1:20



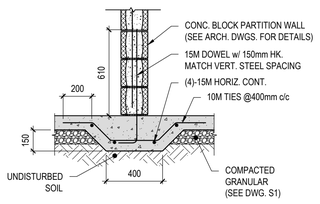
3 FW2 AT INTERIOR WALLS

S4 | S3 SCALE: 1:20



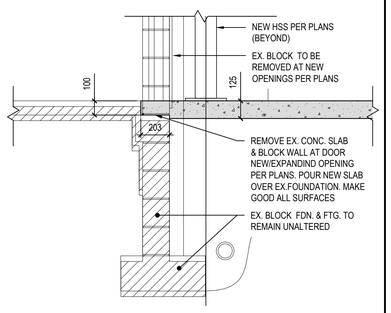
4 FW2 @ EXTERIOR WALLS

S4 | S3 SCALE: 1:20



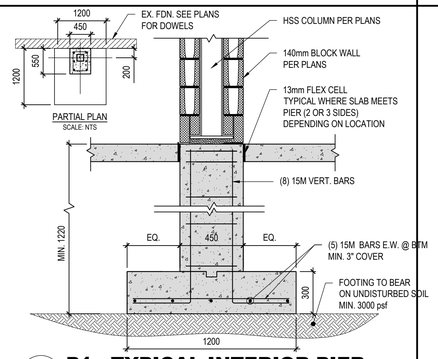
5 THICKENED SLAB @ INTERIOR PARTITIONS

S4 | S3 SCALE: 1:20



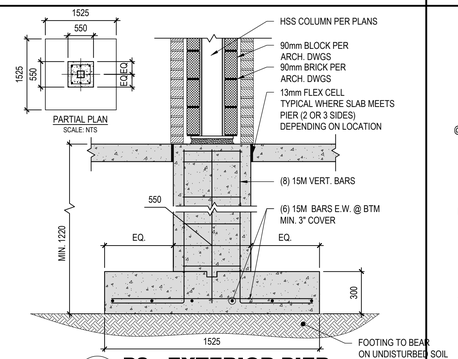
6 NEW SLAB ON GRADE @ EXISTING CMU FOUNDATION

S4 | S3 SCALE: 1:20



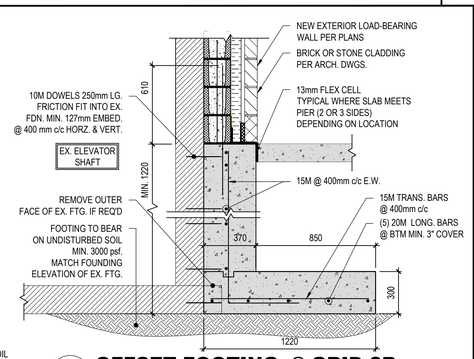
7 P1 - TYPICAL INTERIOR PIER

S4 | S3 SCALE: 1:10



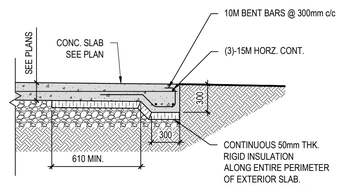
8 P2 - EXTERIOR PIER

S4 | S3 SCALE: 1:10



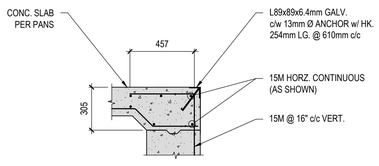
9 OFFSET FOOTING @ GRID 3B

S4 | S3 SCALE: 1:20



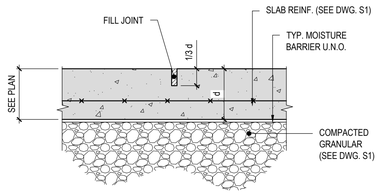
10 THICKENED SLAB

S4 | S3 SCALE: 1:20



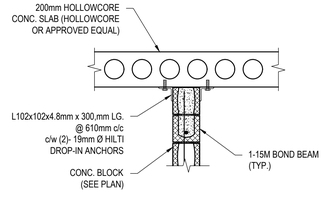
11 TYPICAL DOOR BUCK

S4 | S3 SCALE: 1:10



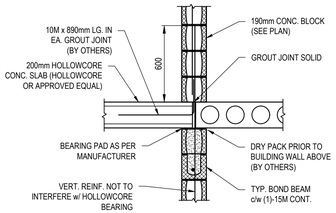
12 TYPICAL SAW CUT

S4 | S3 SCALE: 1:10



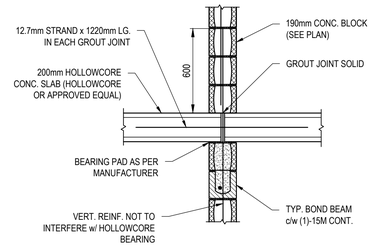
13 BLOCK PARTITION @ HOLLOWCORE CEILING

S4 | S3 SCALE: 1:20



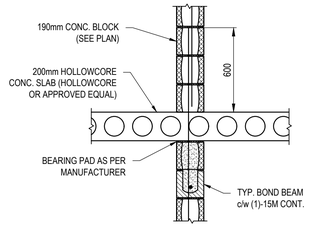
14 HOLLOWCORE SLAB CONNECTION @ BLOCK WALL

S4 | S3 SCALE: 1:20



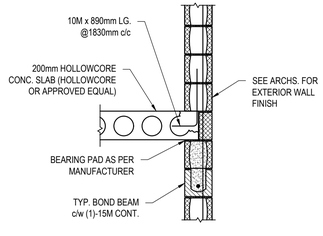
15 HOLLOWCORE SLAB CONNECTION @ BLOCK WALL

S4 | S3 SCALE: 1:20



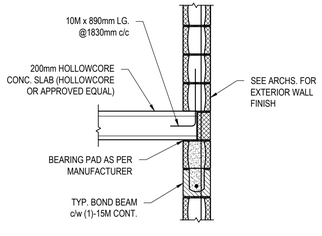
16 HOLLOWCORE SLAB CONNECTION @ BLOCK WALL

S4 | S3 SCALE: 1:10



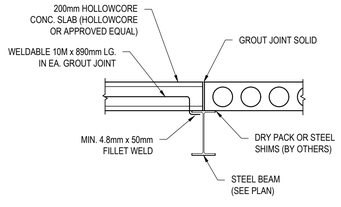
17 HOLLOWCORE SLAB CONNECTION @ EXTERIOR WALL

S4 | S3 SCALE: 1:20



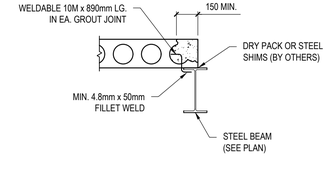
18 HOLLOWCORE SLAB CONNECTION @ EXTERIOR WALL

S4 | S3 SCALE: 1:20



19 HOLLOWCORE SLAB CONNECTION @ STEEL BEAM

S4 | S3 SCALE: 1:20



20 HOLLOWCORE SLAB CONNECTION @ STEEL BEAM

S4 | S3 SCALE: 1:20

LICENSED PROFESSIONAL ENGINEER
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PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
DETAILS

JOB NUMBER:	220321
DATE:	MARCH/2022
DRAWN BY:	AR/TA
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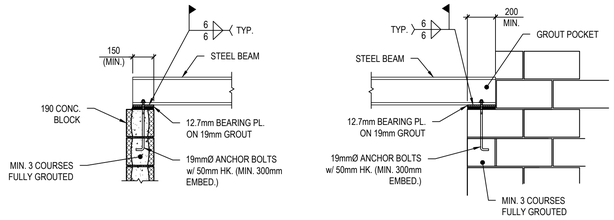
CHECKED BY:	ML/JH
SCALE:	AS SHOWN
DWG.	S5
REV.	1

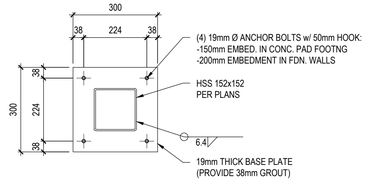


BEAM PERPENDICULAR TO WALL

BEAM PARALLEL TO WALL

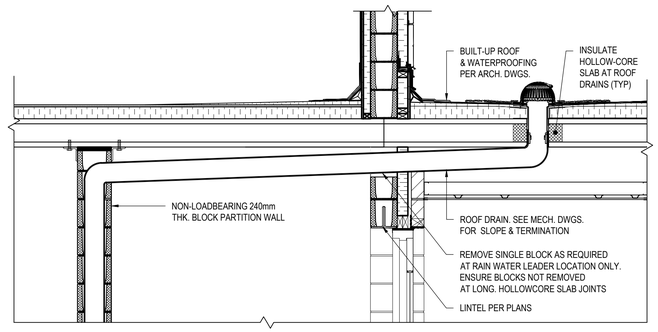
21 BEAM BEARING ON BLOCK

S2 | S4 SCALE: 1:20



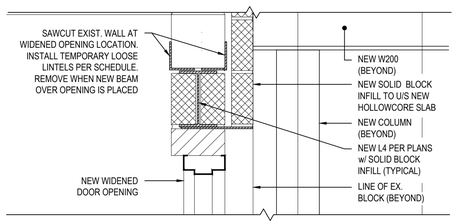
22 TYP. BASEPLATE 'BP1'

S2 SCALE: 1:10



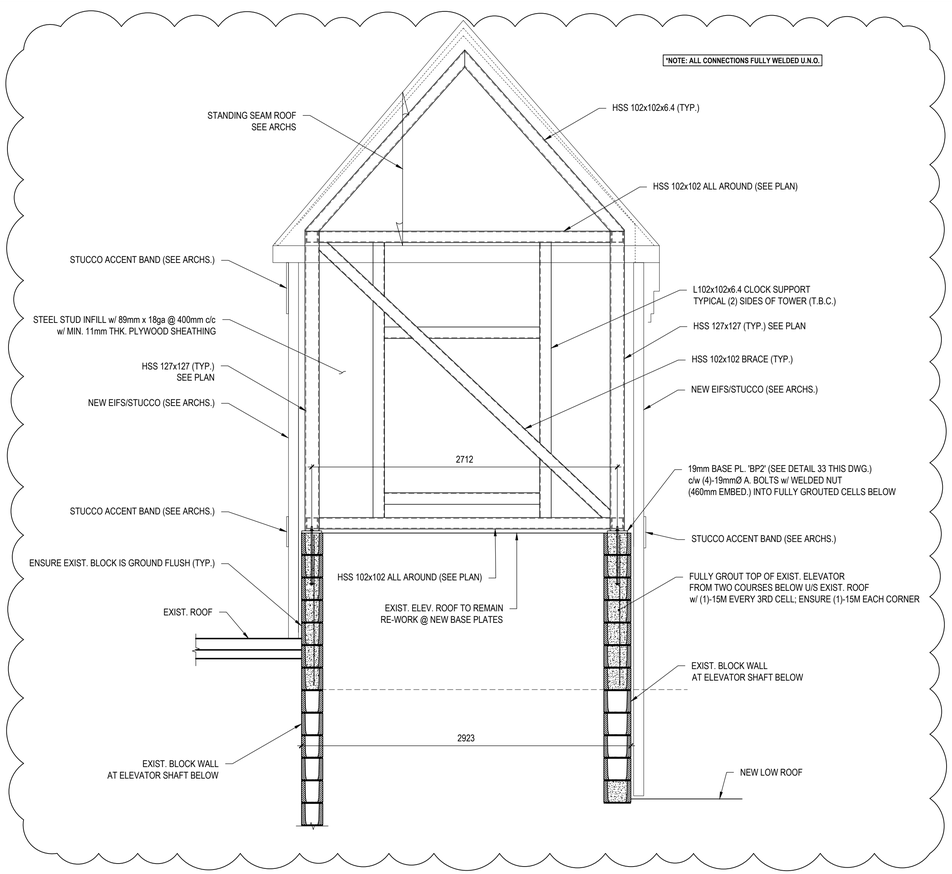
23 BEAM @ RAINWATER LEADER

S2 SCALE: 1:20



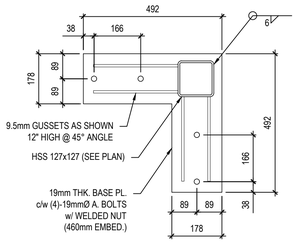
24 NEW L5 LINTEL AT EXIST. WALLS

S2 | S4 SCALE: 1:10



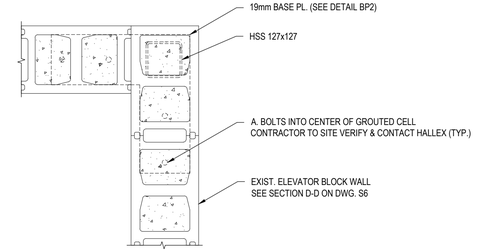
D-D CLOCK TOWER SECTION

S2 | S4 SCALE: 1:25



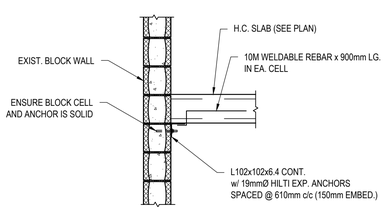
33 BASEPLATE 'BP2' DETAIL

S2 SCALE: 1:10



34 BASE PL. @ CORNER DETAIL

S2 SCALE: 1:10



32 TYP. H.C. SLAB SUPPORT DETAIL

S2 | S4 SCALE: 1:20

LICENSED PROFESSIONAL ENGINEER
J. P. HALUCHA
June 7, 2022
220321
PROVINCE OF ONTARIO

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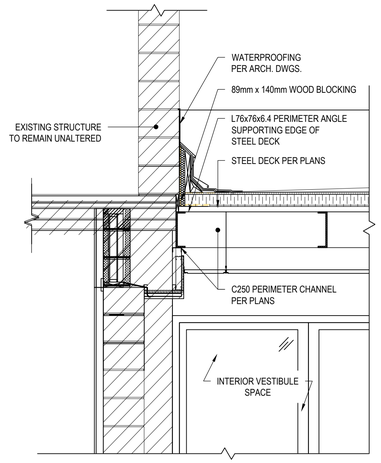
REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT/TENDER	2022/05/31
1	PERMIT/TENDER	2022/06/07

CLIENT:
GRGURIC ARCHITECTS INC.
28 KING ST. EAST
STONEY CREEK, ON

PROJECT:
EVENT FACILITY ADDITION
TOWN OF PELHAM
20 PELHAM TOWN SQUARE
FONTHILL, ON

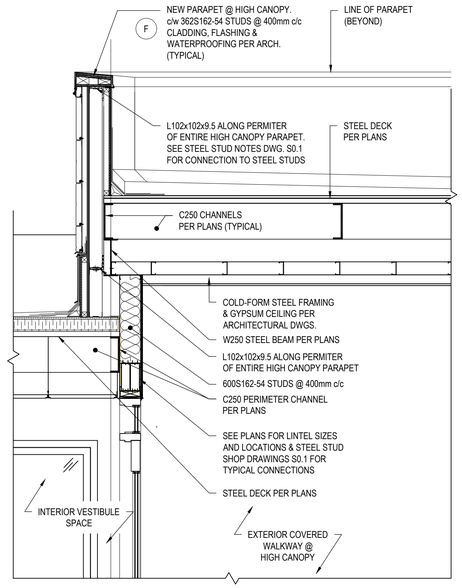
SHEET TITLE:
DETAILS

JOB NUMBER:	220321
DATE:	MARCH/2022
DRAWN BY:	AR/TA
DESIGNED BY:	AR/ML
CHECKED BY:	ML/JH
SCALE:	AS SHOWN
DWG.	S6
REV.	1



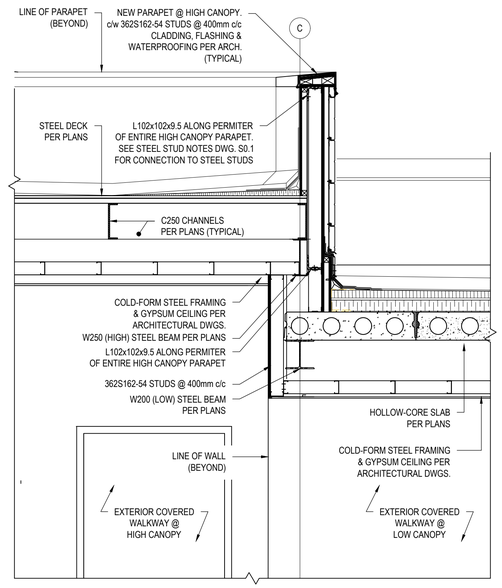
25 NEW LOW ROOF @ VESTIBULE CONNECTION TO EXISTING STRUCTURE

S1 | S4 SCALE: 1:20



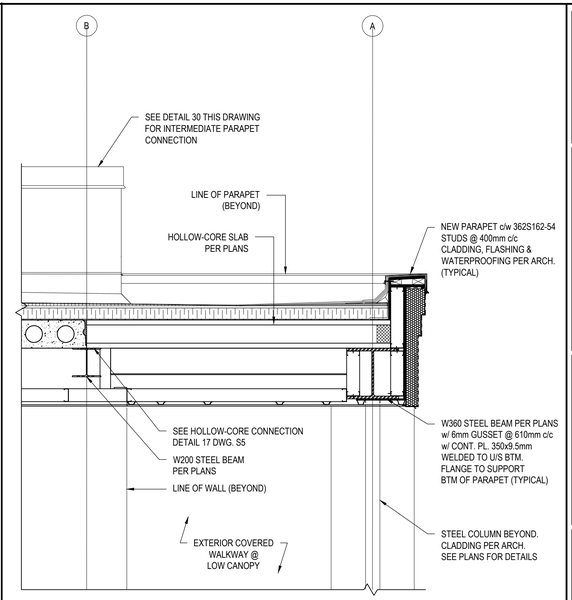
26 NEW LOW ROOF @ VESTIBULE CONNECTION TO NEW HIGH CANOPY

S1 | S4 SCALE: 1:20



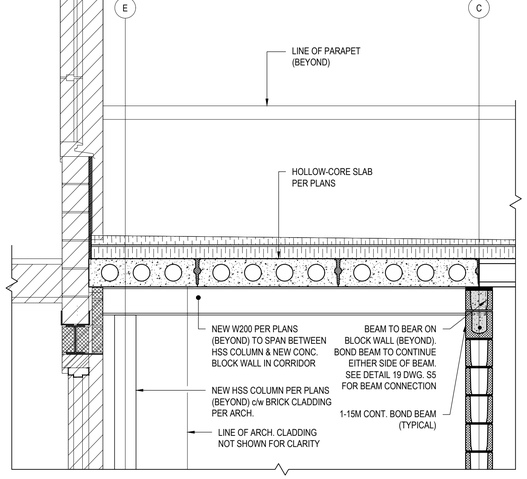
27 NEW HIGH CANOPY ROOF CONNECTION TO NEW HOLLOWCORE ROOF

S1 | S4 SCALE: 1:20



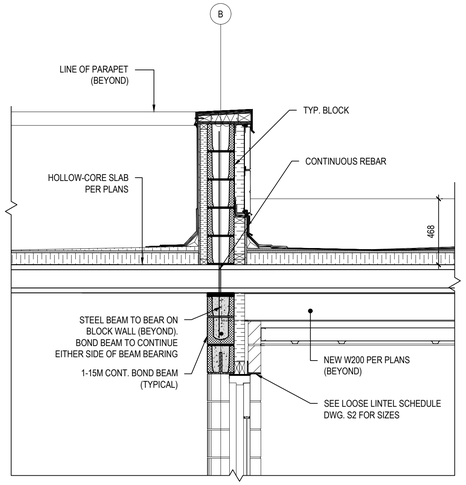
28 NEW HOLLOWCORE ROOF CONNECTION AT LOW PARAPET

S1 | S4 SCALE: 1:20



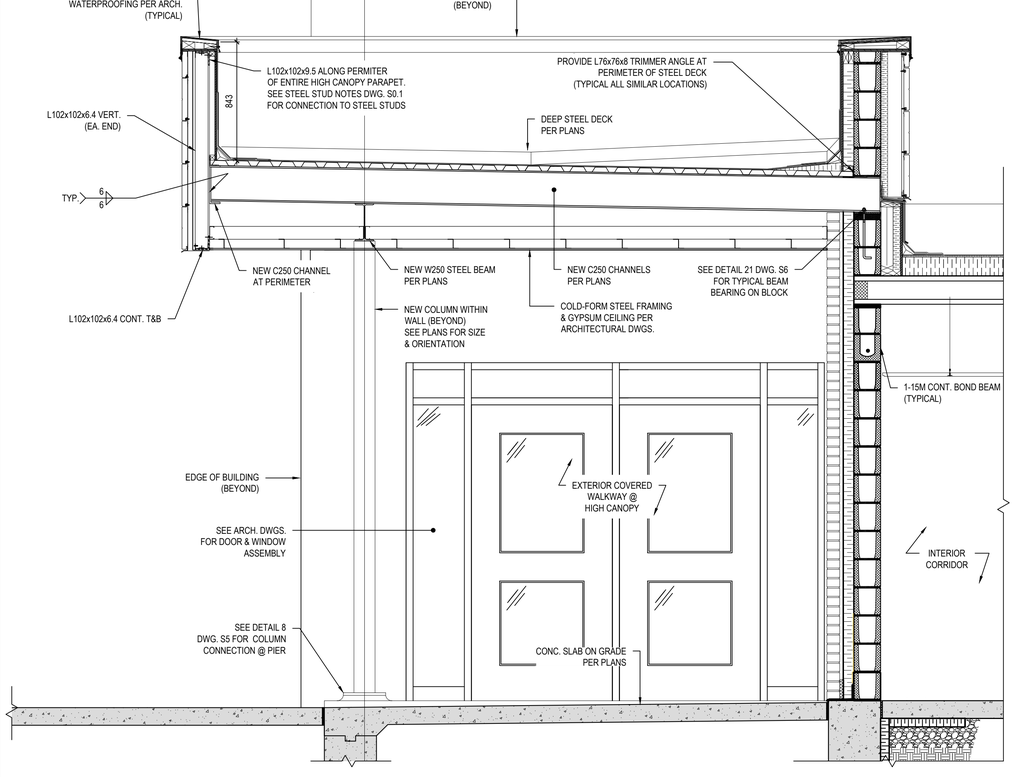
29 NEW HOLLOWCORE ROOF CONNECTION AT EXISTING EXTERIOR WALL

S1 | S4 SCALE: 1:20



30 STEEL BEAM CONNECTION AT ENCLOSED WALKWAY

S1 | S4 SCALE: 1:20



31 NEW HIGH CANOPY DETAIL

S1 | S4 SCALE: 1:20

LICENSED PROFESSIONAL ENGINEER
J. D. HALUCHA
June 7, 2022
220321
PROVINCE OF ONTARIO

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DWG.	S7
REV.	1

ELECTRIC DUCT HEATER SCHEDULE

TAG	MANUFACTURER	MODEL	DIMENSIONS	POWER (KW)	AIRFLOW (CFM)	AIR P.D. (IN WC)	VOLTAGE	PANEL DIMENSIONS WxHxD (IN)	WEIGHT (LBS)	REMARKS
EDH-1	NEPTRONIC	TF10H	SUITABLE FOR 8"Ø DUCT	1.5	155	0.02"	120 / 1 / 60	11" x 14" x 5"	65	FLANGED DUCT HEATER c/w PNEUMATIC OR ELECTRIC ON/OFF MODULATING CONTROL SIGNAL, ONE MINUTE ON, 30 SECOND OFF CONTACT DELAY, DUCT THERMOSTAT.
EDH-2	NEPTRONIC	TF10H	SUITABLE FOR 6"Ø DUCT	0.5	50	0.02"	120 / 1 / 60	11" x 14" x 5"	65	FLANGED DUCT HEATER c/w PNEUMATIC OR ELECTRIC ON/OFF MODULATING CONTROL SIGNAL, ONE MINUTE ON, 30 SECOND OFF CONTACT DELAY, DUCT THERMOSTAT.

ENERGY RECOVERY VENTILATOR SCHEDULE

TAG	MANUFACTURER	MODEL	AIRFLOW (CFM)	ESP (IN WG)	ELECTRICAL			DIMENSIONS WxHxD (IN)	WEIGHT (LBS)	REMARKS
					VOLTAGE	MCA	MOCP			
ERV-1	RENEWAIRE	HE1XRT	901	0.3	208/1/60	10.80	15.0	81" x 47 $\frac{3}{4}$" x 40 $\frac{1}{4}$""	458	ENERGY RECOVERY VENTILATOR c/w NON-FUSED DISCONNECT, 24VAC TRANSFORMER/RELAY PACKAGE, CROS-CORE DIFFERENTIAL PRESSURE PORTS, QTY 2 MERV8 FILTERS, DIRECT DRIVE EC BLOWER/MOTOR.
ERV-2	RENEWAIRE	EV PREMIUM M	155	1.0	120/1/60	10.00	10.0	22 $\frac{1}{2}$" x 25 $\frac{1}{2}$" x 13 $\frac{3}{8}$"	48	ENERGY RECOVERY VENTILATOR c/w WHITE PAINTED CABINET, LINE-CORD POWER SUPPLY, LOW-VOLTAGE CIRCUIT FOR CONTROLS, CROSS-CORE DIFFERENTIAL PRESSURE PORTS, DIAL-A-FLOW BALANCE AND AIR FLOW ADJUSTMENT, VARIABLE SPEED, ONBOARD DIGITAL CONTROLLER w/ INDEPENDENT VARIABLE SPEEDS, QTY 2 MERV 8 SPUN-POLYESTER MEDIA & BACKDRAFT DAMPER. INTERLOCK WITH EDH-1.
ERV-3	RENEWAIRE	EV PREMIUM S	50	1.3	120/1/60	10.00	10.0	22 $\frac{1}{2}$" x 25 $\frac{1}{2}$" x 9 $\frac{5}{8}$"	38	ENERGY RECOVERY VENTILATOR c/w WHITE PAINTED CABINET, LINE-CORD POWER SUPPLY, LOW-VOLTAGE CIRCUIT FOR CONTROLS, CROSS-CORE DIFFERENTIAL PRESSURE PORTS, DIAL-A-FLOW BALANCE AND AIR FLOW ADJUSTMENT, VARIABLE SPEED, ONBOARD DIGITAL CONTROLLER w/ INDEPENDENT VARIABLE SPEEDS, QTY 2 MERV 8 SPUN-POLYESTER MEDIA & BACKDRAFT DAMPER. INTERLOCK WITH EDH-2.

GAS FIRED DUCT FURNACE SCHEDULE

TAG	INTERLOCK	MANUFACTURER	MODEL	GAS INPUT (MBH)	GAS OUTPUT (MBH)	AIRFLOW (CFM)	WEIGHT	ELECTRICAL			REMARKS
								VOLTAGE	MCA	MOCP	
GF-1	ERV-1	RENEWAIRE	GH50 OUTDOOR	50	40	901	127	120 / 1 / 60	<6	15	DUCT MOUNTED GAS FURNACE c/w CONTINUOUS 5:1 ELECTRONIC MODULATION, DUCT THERMOSTAT FOR MODULATION CONTROL, TUBULAR HEATERS, INDIRECT NATURAL GAS FIRED, SUITABLE FOR OUTDOOR INSTALLATION, 80% THERMAL EFFICIENCY, 409 S.S. HEAT EXCHANGER & BURNERS, HORIZONTAL SEPARATED w/ HOODS, DIRECT SPARK IGNITION, INDUCED DRAFT VENTING, TERMINAL BLOCK FOR POWER & CONTROL WIRING, AUTOMATIC HIGH LIMIT SAFETY SHUT OFF, AUXILIARY MANUAL HIGH LIMIT SWITCH, AIR PROVING SWITCH, COMBINATION GAS VALVE w/ SHUTOFF, FLAME ROLLOUT SWITCH, MANUAL SHUT OFF VALVE & $\frac{3}{8}$" CONDENSATE DRAIN CONNECTION.

DUCTLESS HEAT PUMP UNIT SCHEDULE

TAG	MANUFACTURER	MODEL	NOM. TONS	COOLING CAP. (MBH)	HEATING CAP. (MBH)	ELECTRICAL			WT. (LBS)	DIMENSIONS WxHxD (IN)	REMARKS
						VOLTAGE	MCA	MOCP			
AC-1	DAIKIN	FXAQ12PVJU	1.0	12.0	13.5	208 / 1 / 60	0.4	15	26.5	33 $\frac{5}{16}$" x 11 $\frac{7}{16}$" x 9 $\frac{5}{16}$"	- OUTDOOR CONDENSING UNIT TO BE INSTALLED ABOVE SNOW LEVEL - PIPING INSTALLATION TO BE DONE ACCORDING TO MANUFACTURER RECOMMENDATIONS - SYSTEM TO BE COMMISSIONED BY MANUFACTURER REPRESENTATIVE. - PROVIDE STAND, DRAIN PAN HEATER, WIND BAFFLE & REAR SNOW INTAKE HOOD FOR CONDENSING UNIT - INTERLOCK HEATING/COOLING OF INDOOR UNITS (AC) w/ FORCED FLOW HEATERS (FFH) OR BASEBOARD HEATERS (BBH) SERVING SAME SPACE SO FFH/BBH DO NOT HEAT DURING AC COOLING. - PROVIDE DAIKIN BRC1E73 THERMOSTAT FOR EACH INDOOR UNIT c/w CLEAR LOCKABLE THERMOSTAT GUARD. SEE DRAWING M2.1 FOR LOCATIONS.
AC-2		FXAQ12PVJU	1.0	12.0	13.5	208 / 1 / 60	0.4	15	26.5	33 $\frac{5}{16}$" x 11 $\frac{7}{16}$" x 9 $\frac{5}{16}$"	
AC-3		FXZQ12TAVJU	1.0	12.0	13.5	208 / 1 / 60	0.4	15	36.4	22 $\frac{5}{8}$" x 10 $\frac{1}{4}$" x 22 $\frac{5}{8}$"	
AC-4		FXZQ12TAVJU	1.0	12.0	13.5	208 / 1 / 60	0.4	15	36.4	22 $\frac{5}{8}$" x 10 $\frac{1}{4}$" x 22 $\frac{5}{8}$"	
AC-5		FXAQ12PVJU	1.0	12.0	13.5	208 / 1 / 60	0.4	15	26.5	33 $\frac{5}{16}$" x 11 $\frac{7}{16}$" x 9 $\frac{5}{16}$"	
CU-1		RXYQ72XATJA	6.0	69.0	73.0	208 / 3 / 60	27.6	35	436.5	36 $\frac{3}{4}$" x 66 $\frac{3}{4}$" x 30 $\frac{1}{4}$"	

ELECTRIC WATER HEATER SCHEDULE

TAG	MANUFACTURER	MODEL	CAPACITY (US GALS)	RECOVERY @90°F RISE	HEATING ELEMENT (W)	WATER CONN.	ELECTRICAL	REMARKS
HWT-1	BRADFORD WHITE	LE265T-3	65	14	3,000	3/4"	208/1/60	COMMERCIAL ELECTRIC WATER HEATER c/w NON-SIMULTANEOUS OPERATION, $\frac{3}{4}$"Ø WATER CONNECTIONS, AQUASTAT, SEDIMENT REDUCTION DEVICE, NON-CFC INSULATED TANK, FACTORY INSTALLED HEAD TRAPS, PROTECTIVE ANODE ROD & T&P VALVE INSTALLED. SET WATER HEATER TO 140°F. PROVIDE PLT-5 EXPANSION TANK. PROVIDE THERMOSTATIC MIXING VALVE & SET WATER TEMPERATURE TO 120°F.

AIR DISTRIBUTION SCHEDULE

TAG	MANUFACTURER	MODEL	DESCRIPTION
A	EH-PRICE	510D / F / L / A / B12	SUPPLY LOUVER , STEEL, $\frac{3}{4}$" BLADE SPACING, 45° DEFLECTION, DRYWALL MOUNTING, CONCEALED MOUNTING. c/w OPPOSED BLADE BALANCING DAMPER.
B	EH-PRICE	510Z / F / L / A / B12	LOUVER RETURN AIR GRILLE, STEEL, $\frac{3}{4}$" BLADE SPACING, 0° DEFLECTION, DRYWALL MOUNTING, CONCEALED MOUNTING. c/w OPPOSED BLADE BALANCING DAMPER.
C	EH-PRICE	530FR / F / L / A / B12	LOUVER RETURN AIR GRILLE, STEEL, $\frac{3}{4}$" BLADE SPACING, 45° DEFLECTION, SUITABLE FOR SURFACE MOUNTING.

EXHAUST FAN SCHEDULE

TAG	MANUFACTURER	MODEL	AIRFLOW (CFM)	ESP (IN WC)	FAN RPM	SONES	ELECTRICAL		REMARKS
							VOLTAGE	AMPS	
EF-1, EF-2	PANASONIC	FV-0511VQ1	53	0.25	1,093	0.4	120/1/60	0.13	c/w WALL SWITCH, BACK DRAFT DAMPER. (COLOUR BY ARCHITECT)
EF-3	GREENHECK	G-070-VG	235	0.25	1,452	3.8	115/1/60	2.00	c/w BACK DRAFT DAMPER. CONTROLLED BY REVERSE ACTING THERMOSTAT.

PLUMBING FIXTURE SCHEDULE

TAG	DESCRIPTION	SPECIFICATION	CW (IN)	HW (IN)	SAN (IN)	VENT (IN)	REMARKS
WCH	FLOOR MOUNTED WATER CLOSET, VITREOUS CHINA, FLUSH VALVE, BARRIER- FREE DESIGN	- AMERICAN STANDARD #3461.001.020, 'MADERA FLOWISE RIGHT HEIGHT ELONGATED', 419 MM HIGH TOILET, WHITE VITREOUS CHINA, FLOOR MOUNTED, OPERATES IN THE RANGE OF 4.2 L TO 6 L (1.1 US GAL TO 1.6 US GAL) PER FLUSH, ELONGATED BOWL. - CENTOCO #500STSCC.001, HEAVY DUTY TOILET SEAT, WHITE SOLID PLASTIC, OPEN FRONT LESS COVER. - SLOAN #111 ES-S-CP, 'REGAL OPTIMA', EXPOSED FLUSHOMETER FOR TOP SPUD TOILET, 6 L (1.6 US GAL) FACTORY SET FLOW. - SLOAN #EL-154, HARD WIRED TRANSFORMER. - FRANKE COMMERCIAL 'MIDLAND' #CM16104 BACK REST. - PROVIDE FLOOR FLANGE, (SAME MATERIAL AS THE CONNECTING PIPE DRAIN), WITH ALL BRASS BOLTS AND WITH RUBBER GASKET.	$\frac{3}{4}$"	-	3"	1$\frac{1}{2}$"	- ANTIMICROBIAL, BARRIER-FREE INSTALLATION - REFER TO ELECTRICAL DRAWING FOR TRANSFORMER QUANTITIES. - MAX OF 3 FIXTURES ON ONE TRANSFORMER
WC	FLOOR MOUNTED WATER CLOSET, VITREOUS CHINA, FLUSH VALVE	- AMERICAN STANDARD #3461.001.020, 'MADERA FLOWISE RIGHT HEIGHT ELONGATED', 419 MM HIGH TOILET, WHITE VITREOUS CHINA, FLOOR MOUNTED, OPERATES IN THE RANGE OF 4.2 L TO 6 L (1.1 US GAL TO 1.6 US GAL) PER FLUSH, ELONGATED BOWL. - CENTOCO #500STSCC.001, HEAVY DUTY TOILET SEAT, WHITE SOLID PLASTIC, OPEN FRONT LESS COVER. - SLOAN #111 ES-S-CP, 'REGAL OPTIMA', EXPOSED FLUSHOMETER FOR TOP SPUD TOILET, 6 L (1.6 US GAL) FACTORY SET FLOW. - SLOAN #EL-154, HARD WIRED TRANSFORMER. - FRANKE COMMERCIAL 'MIDLAND' #CM16104 BACK REST. - PROVIDE FLOOR FLANGE, (SAME MATERIAL AS THE CONNECTING PIPE DRAIN), WITH ALL BRASS BOLTS AND WITH RUBBER GASKET.	$\frac{3}{4}$"	-	3"	1$\frac{1}{2}$"	- ANTIMICROBIAL - REFER TO ELECTRICAL DRAWING FOR TRANSFORMER QUANTITIES. - MAX OF 3 FIXTURES ON ONE TRANSFORMER
CLAVH	BASIN, COUNTERTOP, VITREOUS CHINA	- KOHLER #K-2611-SU, 'BOLERO', 20 GAUGE S.S., TOP OR UNDER MOUNT, NO OVERFLOW, c/w INSTALLATION HARDWARE, ASME A112.19.3/CSA B45.4, ADA, ICC/ANSI A117.1 - SLOAN #EFX-600-000-020, 'BASYS', ELECTRONIC 'NO TOUCH' FAUCET. - SLOAN #EAF-11, PLUG-IN TRANSFORMER. - MCGUIRE #155WC OFFSET OPEN GRID DRAIN. - MCGUIRE #LFH170BV, POLISHED BRASS FAUCET SUPPLIES. - MCGUIRE #8872C, P-TRAP. - MCGUIRE 'PROWRAP' #PW2000WC SANITARY COVERING.	$\frac{3}{4}$"	$\frac{1}{2}$"	1$\frac{1}{4}$"	1$\frac{1}{4}$"	- BARRIER-FREE INSTALLATION - REFER TO ELECTRICAL DRAWING FOR TRANSFORMER QUANTITIES. - MAX OF 6 FIXTURES ON ONE TRANSFORMER
LAVH	BASIN, WALL HUNG, VITREOUS CHINA, BARRIER-FREE DESIGN	- AMERICAN STANDARD #9134001EC 'DECORUM WITH EVERCLEAN' BASIN. - SLOAN #EFX-600-000-020, 'BASYS', ELECTRONIC 'NO TOUCH' FAUCET. - SLOAN #EAF-11, PLUG-IN TRANSFORMER. - MCGUIRE #155A OPEN GRID DRAIN. - MCGUIRE #LFH170BVRB, POLISHED BRASS FAUCET SUPPLIES. - MCGUIRE #8872C, P-TRAP. - WATTS #WCA-411-CA-481, BASIN CARRIER.	$\frac{3}{4}$"	$\frac{1}{2}$"	1$\frac{1}{2}$"	1$\frac{1}{4}$"	- REFER TO ELECTRICAL DRAWING FOR TRANSFORMER QUANTITIES. - MAX OF 6 FIXTURES ON ONE TRANSFORMER
UR	URINAL	- AMERICAN STANDARD #6590.001/7301242-100, 'WASHBROOK FLOWISE', URINAL, VITREOUS CHINA, OPERATES IN THE RANGE OF 0.5 L TO 3.8 L (0.125 US GAL TO 1.0 US GAL) PER FLUSH, WALL HUNG, #7301242-100 CHROME PLATED, NON-METALLIC STRAINER. - SLOAN #186-1.0 XL ES-S-CP, 'REGAL OPTIMA', EXPOSED FLUSHOMETER FOR TOP SPUD URINAL, 3.8 L (1.0 US GAL) FACTORY SET FLOW. - SLOAN #EL-154, HARD WIRED TRANSFORMER. - WATTS #CA-321, MOUNTED ON CONCRETE FLOOR, FIXTURE CARRIER. - WATTS #WUCO URINAL WALL ACCESS CLEANOUT.	$\frac{3}{4}$"	-	3"	1$\frac{1}{2}$"	- REFER TO ELECTRICAL DRAWING FOR TRANSFORMER QUANTITIES.
SH	SHOWER	- MOEN CHROME ECO PERFORMANCE HAND SHOWER HANDHELD SHOWER S12107EP - TRANSFER VALVE TRIM MODEL T532205-3375 - SHOWER BASE SELECTION BY OTHERS	$\frac{1}{2}$"	$\frac{1}{2}$"	2"	1$\frac{1}{2}$"	CONTRACTOR TO VERIFY PLUMBING CONNECTIONS PRIOR TO INSTALLATION.
MS	MOP SINK, FLOOR MOUNTED, MOULDED STONE, TWO-HANDLE FAUCET	- AMERICAN STANDARD #0954.004EC/0059.020EC 'MURRO WITH EVERCLEAN' BASIN. - CHICAGO FAUCETS #897-RCF, TWO (2) HANDLE FAUCET, WALL MOUNTED UNRESTRICTED HOSE END OUTLET. - STERN WILLIAMS T-35 HOSE AND WALL HOOK 36" (914 MM) LONG HOSE WITH 3/4" (19 MM) CHROME COUPLING, STAINLESS STEEL WALL BRACKET. - STERN WILLIAMS T-40 MOP HANGER STAINLESS STEEL #4 FINISH, 24" (610 MM) LONG WITH 3 RUBBER SPRING LOADED CLIPS. - STERN WILLIAMS BP BACK SPLASH PANEL 20 GA. (0.9 MM) TYPE 304 STAINLESS STEEL. - PROVIDE P-TRAP.	$\frac{1}{2}$"	$\frac{1}{2}$"	3"	2"	
KS	SINK	- FRANKE COMMERCIAL #S4206-1, COUNTERTOP MOUNT SINK. - CHICAGO FAUCETS #430-ABCP, SINGLE LEVER FAUCET, 5.7 LPM (1.5 GPM) AERATOR OUTLET. - MCGUIRE #LFH170BV, POLISHED BRASS FAUCET SUPPLIES. - MCGUIRE #8912CB, P-TRAP.	$\frac{1}{2}$"	$\frac{1}{2}$"	1$\frac{1}{4}$"	1$\frac{1}{4}$"	
DW	DISHWASHER	- PROVIDED BY OWNER	$\frac{1}{2}$"	$\frac{1}{2}$"	1$\frac{1}{4}$"	1$\frac{1}{4}$"	
WM	WATER METER	- WATER METER PURCHASE FROM CITY WATER DEPARTMENT	2"	-	-	-	
BFP-1	DOMESTIC COLD WATER BACKFLOW PREVENTER (DCVA)	- WATTS 2 $\frac{1}{2}$"Ø DOUBLE CHECK WATER ASSEMBLIES MODEL LF007	2$\frac{1}{2}$"	-	-	-	
FD	FLOOR DRAIN	- ZURN ZN-211-B-P, CAST IRON FLOOR DRAIN WITH 5" ROUND NICKEL BRONZE STR. LINER AND $\frac{1}{2}$" TRAP PRIMER CONNECTION	-	-	3"	2"	'P' TRAP AND TRAP PRIMER
CO	CLEAN OUT	- ZURN ZN-1602 CAST IRON CLEAN OUT WITH 5" NICKEL BRONZE COVER	-	-	-	-	SEE PLAN FOR SIZE
RD	ROOF DRAIN	- ZURN ZCF121, 12"Ø "CONTROL FLO" ROOF DRAIN, DURA-COATED CAST IRON BODY, 4"Ø PIPE SIZE	-	-	4"		
HD	HUB DRAIN	- ZURN Z-211-S-P HUB DRAIN, DURACOTED IRON BODY WITH BOTTOM OUTLET	-	-	3"	2"	
NFHB	NON-FREEZE HOSE BIB	- ZURN Z1321-C ECOLOTROL WALL HYDRANT, NON-FREEZE TYPE, ANTI-SIPHON, AUTOMATIC DRAINING, C/W INTEGRAL BACKFLOW PREVENTER, 3/4" HOSE CONNECTION	$\frac{3}{4}$"	-	-	-	
DF	EZH20 BOTTLE FILLING STATION WITH BI-LEVEL REVERSE FILTERED LZ COOLER, ADA COMPLIANT	- ELKAY EZH20 BOTTLE FILLING STATION WITH BI-LEVEL REVERSE FILTERED LZ COOLER, MODEL # LZSTLR8WS. - BOTTLE FILLING STATION TO HAVE ELECTRONIC SENSOR FOR NO-TOUCH ACTIVATION WITH AUTOMATIC 20-SECOND SHUT-OFF TIMER. - 1.1 TO 1.5 GPM FLOW RATE WITH LAMINAR FLOW. - CHILLING CAPACITY OF 8 GPH. - PUSHBAR ACTIVATION.	$\frac{1}{2}$"	-	2"	1$\frac{1}{2}$"	UNIT REQUIRES ELECTRICAL CONNECTION (120 / 1 / 60, 5.0 FLA). REFER TO PLAN FOR QUANTITY.
TMX	THERMOSTATIC MASTER MIXING VALVE	- WATTS LFMM433, LEAD FREE BRASS BODY & CHECKSTOPS, PARAFFIN-BASED THERMAL ACTUATION, DIRT & LIME RESISTANT POPPET & SEAT DESIGN, VANDAL RESISTANT LOCKING MECHANISM, ROTATABLE UNION TRIPLE DUTY CHECK STOPS, ROUGH BRONZE FINISH.	1$\frac{1}{4}$"	1$\frac{1}{4}$"	-	-	

SPECIAL BID INSTRUCTION

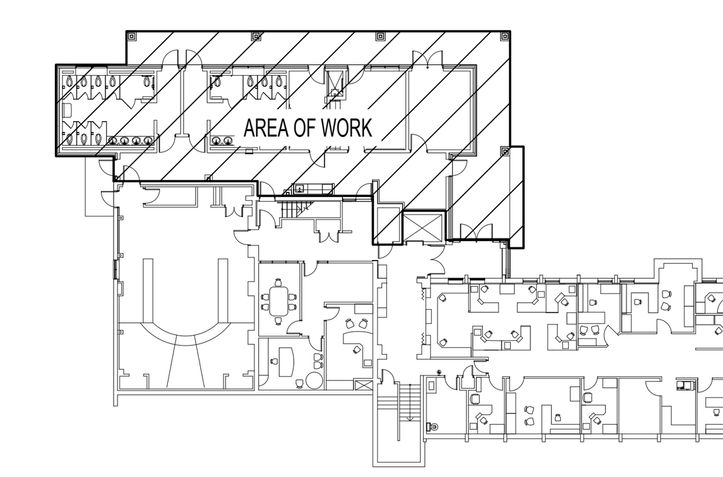
THESE DRAWINGS ARE PREPARED BASED ON AVAILABLE RECORD DRAWINGS AND NON-INVASIVE, NO-INSTRUMENT ASSISTED, VISUAL, FIELD OBSERVATION ONLY. THE INTENT OF THESE DRAWINGS ARE TO DEFINE THE SCOPE OF WORK AND CONVEY DESIGN CONCEPT ONLY.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTING UTILITIES, PLUMBING, DUCTWORK AND ANY OTHER SYSTEM BEING TOUCHED, THROUGH AN INVASIVE, INSTRUMENT ASSISTED OR OTHER ACCEPTED AND RELIABLE SURVEYING METHOD, AND PREPARE SHOP DRAWINGS THAT ARE IN COMPLIANCE WITH THE CONCEPT DOCUMENTS FOR SUBMITTAL TO THE ENGINEER OF RECORD.

REQUEST FOR CHANGE ORDERS WILL NOT BE CONSIDERED FOR DEVIATION OF THE LOCATION OR SIZE OF THE EXISTING UTILITIES FROM THE CONCEPT DRAWINGS.

DRAWING LIST

M1.0	M&E COORDINATION TABLE, MECHANICAL SCHEDULES LEGEND, DRAWING LIST & KEY PLAN
M1.1	MECHANICAL DETAILS
M2.1	PROPOSED DEMOLITION PLAN
M2.2	PROPOSED MECHANICAL PLAN
M2.3	PROPOSED ROOF PLAN
P1.1	PROPOSED STORM & SANITARY PLAN
P1.2	PROPOSED DOMESTIC WATER PLAN



KEY PLAN

SCALE: NTS

PUMP SCHEDULE

TAG	MANUFACTURER	MODEL	CONN. SIZE (IN)	MEDIA	FLOW (GPM)	HEAD (FT)	POWER (HP)	RPM	ELECTRICAL	REMARKS
P-1	TACO	008-IQSF6	$\frac{3}{4}$"Ø FLANGE	100% WATER	1.5	12	1/25	3,250	115 / 1 / 60	DOMESTIC HOT WATER CIRCULATION PUMP c/w STAINLESS STEEL CONSTRUCTION, NSF CERTIFIED, STEEL STATOR HOUSE, STAINLESS STEEL CARTRIDGE, NORYL IMPELLER, CERAMIC SHAFT, CARBON BEARINGS, EPDM O-RINGS, STAINLESS STEEL CASING (VOLUTE), 125 PSI MAX. PRESSURE, 110°C (230°F) MAX. TEMPERATURE & CONTINUOUS DUTY.

SYMBOL LEGEND

SYMBOL	DESCRIPTION
— — SAN — —	SANITARY LINE
— — STM — —	STORM LINE
- - - - GAS - - - -	GAS LINE
	DOMESTIC COLD WATER LINE
	DOMESTIC HOT WATER LINE
	DOMESTIC HOT WATER RETURN LINE
— — CD — —	CONDENSATE DRAIN
WC	WATER CLOSET
LAV	WALL-HUNG LAVATORY
CLAV	COUNTERTOP LAVATORY
KS	KITCHEN SINK
MS	MOP SINK
UR	URINAL
HWT	WATER HEATER
WM	WATER METER
SH	SHOWER
HB / NFHB	HOSE BIB / NON FREEZE HOSE BIB
CO	CLEAN OUT
FD	FLOOR DRAIN
HD	HUB DRAIN
RD	ROOF DRAIN
	SHUT-OFF VALVE
RTU	ROOF TOP UNIT
ERV	ENERGY RECOVERY VENTILATOR
CU	CONDENSING UNIT
AC	INDOOR SPLIT HEAT PUMP UNIT
F EF	EXHAUST FAN
	SUPPLY AIR DUCT UP
	SUPPLY AIR DUCT DOWN
	SIDEWALL SUPPLY AIR GRILLE
	RETURN/EXHAUST AIR DUCT UP
	RETURN/EXHAUST AIR DUCT DOWN
	RETURN/EXHAUST AIR GRILLE (EGGCRATE)
F/D	FIRE DAMPER
	ACOUSTIC INSULATION
T	THERMOSTAT
$	SWITCH
	BALANCE DAMPER
A 12"x6" 200	DIFFUSER / GRILLE SIZE DIFFUSER TYPE AIR QUANTITY (CFM)
exx	PREFIX "e" DENOTES EXISTING (LINE TYPES WILL APPEAR THINNER)
Uxx	PREFIX "U" DENOTES UNDERGROUND (LINE TYPES REMAIN THE SAME)
Cxx	PREFIX "C" DENOTES CEILING (LINE TYPES REMAIN THE SAME)
xxH	SUFFIX "H" DENOTES HANDICAP PLUMBING FIXTURES

MECHANICAL / ELECTRICAL COORDINATION SCHEDULE

DEVICE DETAILS			ELECTRICAL CHARACTERISTICS							F/A SHUTDOWN (BY DIV. 16.)	REMOTE CONTROL (THIS COLUMN REFERS TO INTERLOCKING ONLY. NOT THE EQUIPMENT ITSELF)										NOTES
TAG	DESCRIPTION	LOCATION	HORSEPOWER	KW	FULL LOAD AMPS	MINIMUM CIRCUIT AMPS	VOLTAGE	PHASE	ISOLATING DEVICE	EQUIPMENT TO SHUTDOWN	THERMOSTAT	R/A THERMOSTAT	BMS	SWITCH	SENSOR	TIMER	INTERLOCKED WITH	CONTROL INTERLOCKED BY	CONTROL SUPPLIED BY	CONTROL INSTALLED BY	LEGEND: E = ELECTRICAL CONTRACTOR M = MECHANICAL CONTRACTOR O = OTHER
AC-1	INDOOR VRF UNIT	WOMENS WASHROOM				0.40	208	1	PANEL B		X						CU-1, FFH-2	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-2.
AC-2	INDOOR VRF UNIT	MENS WASHROOM				0.40	208	1	PANEL B		X						CU-1, FFH-3	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-3.
AC-3	INDOOR VRF UNIT	COMMUNITY ROOM				0.40	208	1	PANEL B		X						CU-1, FFH-4	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-4.
AC-4	INDOOR VRF UNIT	CORRIDOR				0.40	208	1	PANEL B		X						CU-1, FFH-1, FFH-6	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-1 & FFH-6.
AC-5	INDOOR VRF UNIT	STORAGE ROOM				0.40	208	1	PANEL B		X						CU-1, FFH-5	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16.PROVIDE DDC INTERLOCK WITH FFH-5.
CU-1	OUTDOOR VRF CONDENSING UNIT	ROOFTOP				27.6	208	3	PANEL B		X						AC-1, AC-2, AC-3, AC-4, AC-5	M	M	M	INTERLOCKED WITH INDOOR UNITS BY DIV. 15. HIGH VOTLAGE CONNECTIONS BY DIV. 16.
EF-1	EXHAUST FAN	JANITOR CLOSET				0.1	120	1	PANEL B					X				E	E	E	INTERLOCKED w/ LIGHT SWITCH BY DIV. 16.
EF-2	EXHAUST FAN	STORAGE ROOM				2.0	120	1	PANEL B					X				E	E	E	INTERLOCKED w/ LIGHT SWITCH BY DIV. 16.
EF-3	EXHAUST FAN	ROOFTOP				2.0	115	1	PANEL B			X						E	M	M	CONTROLLED BY REVERSE ACTING THERMOSTAT
GF-1	DUCT GAS FURNACE	ROOFTOP				6.0	120	1	PANEL B		X						ERV-1	M	M	M	INTERLOCKED TO OPERATE WITH ERV-1
ERV-1	ENERGY RECOVERY VENTILATIOR	ROOFTOP				10.8	208	1	PANEL B							X	GF-1	M	M	M	CONTROLLED BY SCHEDULED TIMER, OVERRIDE BY SWITCH. INTERLOCKED TO OPERATE WITH GF-1.
ERV-2	ENERGY RECOVERY VENTILATIOR	COMMUNITY ROOM				10.0	120	1	PANEL B							X	EDH-1	M	M	M	CONTROLLED BY SCHEDULED TIMER, OVERRIDE BY SWITCH
ERV-3	ENERGY RECOVERY VENTILATIOR	CORRIDOR				10.0	120	1	PANEL B							X	EDH-2	M	M	M	CONTROLLED BY SCHEDULED TIMER, OVERRIDE BY SWITCH
EDH-1	ELECTRIC DUCT HEATER	WASHROOMS		1.5			120	1	PANEL B		X						ERV-2	E	M	M	CONTROLLED BY DUCT HEATER THERMOSTAT & INTERLOCKED TO OPERATE DURING ERV-2 HOURS OF OPERATION.
EDH-2	ELECTRIC DUCT HEATER	WASHROOMS		0.5			120	1	PANEL B		X						ERV-3	E	M	M	CONTROLLED BY DUCT HEATER THERMOSTAT & INTERLOCKED TO OPERATE DURING ERV-3 HOURS OF OPERATION.
HWT-1	ELECTRIC HOT WATER TANK	ELECTRICAL ROOM		3.0			208	1	PANEL A									-	-	-	CONTROLLED BY INTEGRAL AQUASTAT
P-1	DOMESTIC HOT WATER CIRCULATION PUMP	ELECTRICAL ROOM	1/25			0.84	115	1	PANEL A									M	M	M	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
CLAVH	BASINS	WASHROOMS					6	1	PANEL B						X			E	M	E	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
UR	URINALS	WASHROOMS					24	1	PANEL B						X			E	M	E	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
WCH	WATER CLOSETS	WASHROOMS					24	1	PANEL B						X			E	M	E	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
BBH-1	BASEBOARD HEATER	BF WASHROOM		0.5			120	1	PANEL B									E	E	E	SUPPLY AND INSTALL BY DIV. 16.
FFH-1	FORCED FLOW HEATER	CORRIDOR		1.5			120	1	PANEL B								AC-4	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-4.
FFH-2	FORCED FLOW HEATER	MENS WASHROOM		1.5			120	1	PANEL B								AC-1	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-1.
FFH-3	FORCED FLOW HEATER	WOMENS WASHROOM		1.5			120	1	PANEL B								AC-2	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-2.
FFH-4	FORCED FLOW HEATER	COMMUNITY ROOM		1.5			120	1	PANEL B								AC-3	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-3.
FFH-5	FORCED FLOW HEATER	STORAGE ROOM		1.5			120	1	PANEL B								AC-5	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-5.
FFH-6	FORCED FLOW HEATER	CORRIDOR		1.5			120	1	PANEL B								AC-4	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-4.
FFH-7	FORCED FLOW HEATER	VESTIBULE		4.0			120	1	PANEL B									E	E	E	SUPPLY AND INSTALL BY DIV. 16.
DF	BOTTLE FILLING STATION	CORRIDOR			5.0		120	1	PANEL B									M	M	M	120V WIRING BY DIV.16, 24V WIRING BY DIV.15.

LICENSED PROFESSIONAL ENGINEER
T. A. KESZTHELYI
06 / 07 / 2022
PROVINCE OF ONTARIO

HALLEX ENGINEERING LTD.

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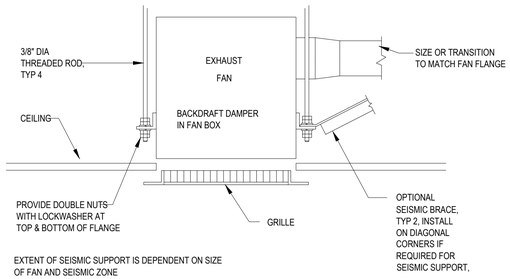
REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT	2022/05/31
1	PERMIT/TENDER	2022/06/07

CLIENT:
GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
M&E COORDINATION TABLE, MECHANICAL SCHEDULES, LEGEND, DRAWING LIST & KEY PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BB
DESIGNED BY:	BB
CHECKED BY:	TZ
SCALE:	AS SHOWN
DWG. M1.0	REV. 1



1 / M1.2 M2.1 **TYP. CEILING EXHAUST FAN**

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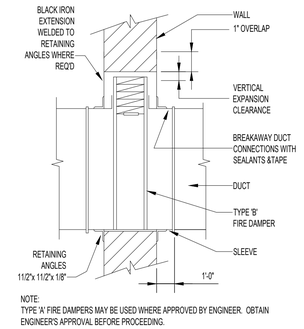

2 / M1.2 2.1 **TYP. FIRE DAMPER DETAIL**

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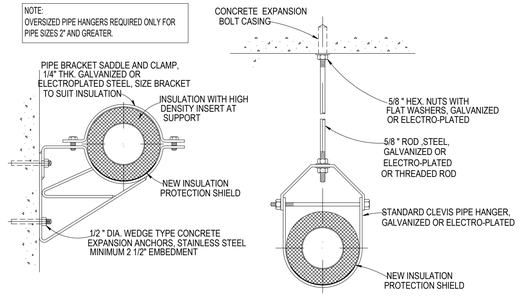

3 / M1.2 P1.2 **TYP. PIPE SUPPORT DETAILS**

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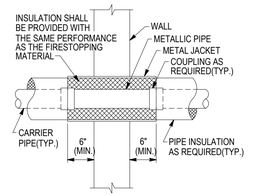

4 / M1.2 P1.2 **PIPE SLEEVE DETAILS**

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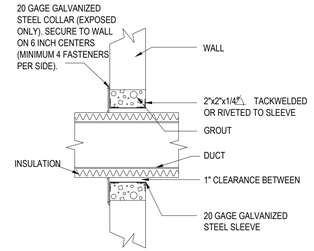

5 / M1.2 M2.1 **DUCT SLEEVE DETAILS**

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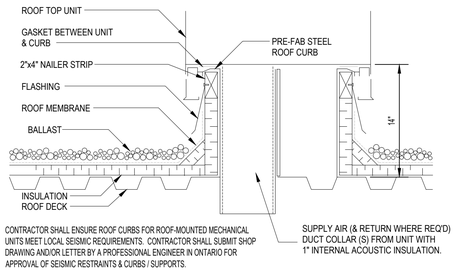

6 / M1.2 M2.1 **TYP. ROOF CURB DETAIL**

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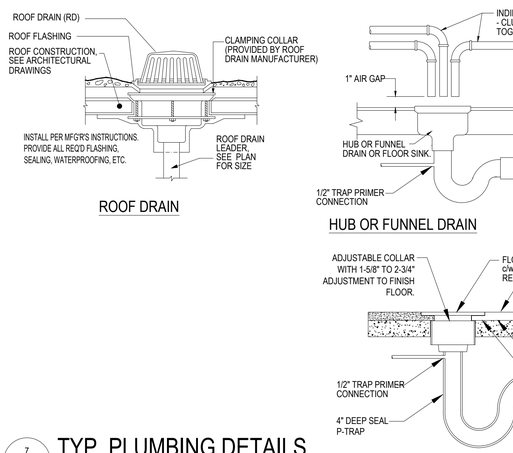

7 / M1.2 P1.1 **TYP. PLUMBING DETAILS**

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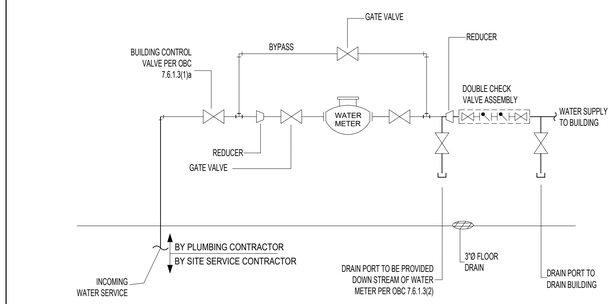

8 / M1.2 P1.1 **WATER METER INSTALLATION DETAIL**

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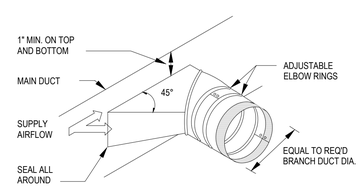
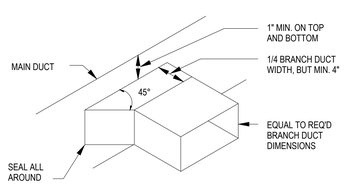
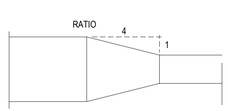


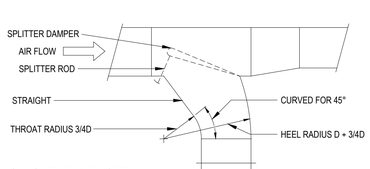
ROUND TAKE - OFF



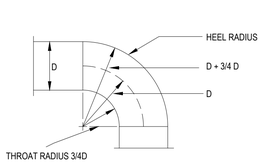
SQUARE TAKE - OFF



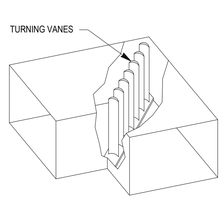
DUCT TRANSITION



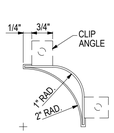
SINGLE TAKE - OFF



FULL-RADIUS ELBOW



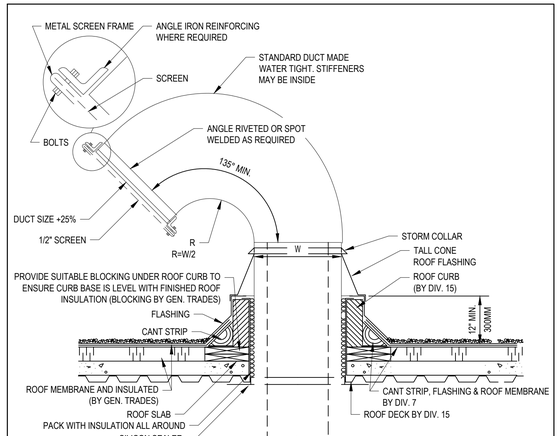
SQUARE ELBOW



TURNING VANE

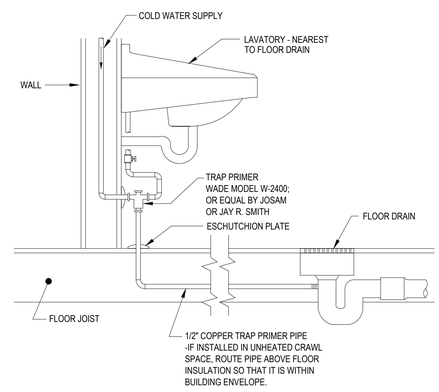
9 / M1.2 M2.1 **TYP. DUCT FITTING DETAILS**

SCALE: N.T.S.



10 / M1.2 M2.1 **TYP. GOOSENECK OUTLET DUCT**

SCALE: N.T.S.



11 / M1.2 P1.2 **FLOOR DRAIN TRAP PRIMER DETAIL**

SCALE: N.T.S.

LICENSED PROFESSIONAL ENGINEER
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REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT	2022/05/31
1	PERMIT/TENDER	2022/06/07

CLIENT:
GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
MECHANICAL DETAILS

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BB
DESIGNED BY:	BB
CHECKED BY:	TZ
SCALE:	AS SHOWN

DWG. M1.1 REV. 1

GENERAL DEMOLITION NOTES:

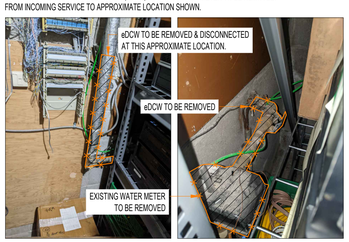
1. THIS DRAWING IS INTENDED TO ASSIST THE CONTRACTOR WITH COSTING THE DEMOLITION NECESSARY FOR THE CONTRACT. IT IS NOT TO BE TAKEN AS AN ALL INCLUSIVE INVENTORY OF THE WORK. THE CONTRACTOR MUST ESTABLISH THE FULL EXTENT OF THIS WORK FROM ON SITE EXAMINATION. ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO PROPERLY ASSESS THE SCOPE OF WORK.
2. DEMOLITION SHALL BE COORDINATED WITH SITE ENGINEER AND CARRIED OUT SO THAT THE WORK WILL NOT INTERFERE WITH THE OWNER'S BUSINESS OPERATIONS.
3. LIMIT ACCESS BY CONSTRUCTION PERSONNEL TO ONLY THOSE AREAS REQUIRED FOR NEW WORK OR TO ACCESS NEW WORK. MAKE GOOD ALL EXISTING SURFACES DISTURBED BY NEW WORK.
4. LIMIT REMOVAL OF ITEMS TO SMALLEST AREA POSSIBLE AND MAKE GOOD ALL EXISTING SURFACES DISTURBED BY NEW WORK.
5. TAKE ALL PRECAUTIONS NECESSARY TO PROTECT THE EXISTING STRUCTURE, ETC. NOT PART OF THE DEMOLITION WORK. PROVIDE AND PLACE BRACING OR SHORING AS REQUIRED. BE RESPONSIBLE FOR SAFETY AND SUPPORT ALL PARTS OF THE BUILDING STRUCTURE, UTILITIES OR PARTS OF SUCH BUILDING OR STRUCTURE AND BE LIABLE FOR ANY MOVEMENT, SETTLEMENT, DAMAGE OR INJURY.
6. CONTROL DUST WITH DUSTPROOF PARTITION AROUND WORKING AREAS.
7. ALL WASTE MATERIALS SHALL BE REMOVED FROM SITE AND DISPOSED OF, UNLESS OTHERWISE SPECIFIED BY THE OWNER.
8. PATCH AND MAKE GOOD ALL SURFACES WHERE DEMOLITION, REMOVAL OR ALTERATIONS OCCUR. SURFACES TO BE FINISHED FLUSH WITH ADJACENT PLANES. TEXTURE AND PAINT TO MATCH EXISTING ADJACENT SURFACES.
9. ALL DEMOLITION WORK TO BE CARRIED OUT WITH RESPECT TO CANADIAN SAFETY RULES.
10. ALL REMOVED EQUIPMENT TO BE REMOVED FROM SITE AND DISPOSED OF UNLESS OTHERWISE SPECIFIED BY THE OWNER. SCRAP MATERIAL TO BE REMOVED FROM SITE AND DISPOSED OF.
11. ANY AND ALL EXISTING EQUIPMENT WHICH IS TO REMAIN SHALL BE MAINTAINED IN GOOD WORKING ORDER DURING THE ENTIRE CONSTRUCTION PHASE. ANY REWORKING OF EXISTING PIPING, DUCTWORK, WIRING, ETC. REQUIRED TO MAINTAIN EXISTING SYSTEM OPERATION AND FUNCTIONALITY SHALL BE INCLUDED IN THIS CONTRACT REGARDLESS OF WHETHER SUCH ITEMS ARE EXPLICITLY SHOWN IN THIS DRAWING PACKAGE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY FINAL REQUIREMENTS FOR REWORKING ON SITE AND INCLUDE SUCH ITEMS IN THE TENDER PRICE.
12. ALL DEMOLITION WORK TO BE CARRIED OUT WITH RESPECT TO EXISTING SITE CONDITION.
13. SITE VERIFY ALL EXISTING PIPING AND DUCT LOCATIONS AND SIZES BEFORE PROCEEDING. REPORT ANY DISCREPANCIES TO ENGINEER.

SPECIFIC DEMOLITION NOTES

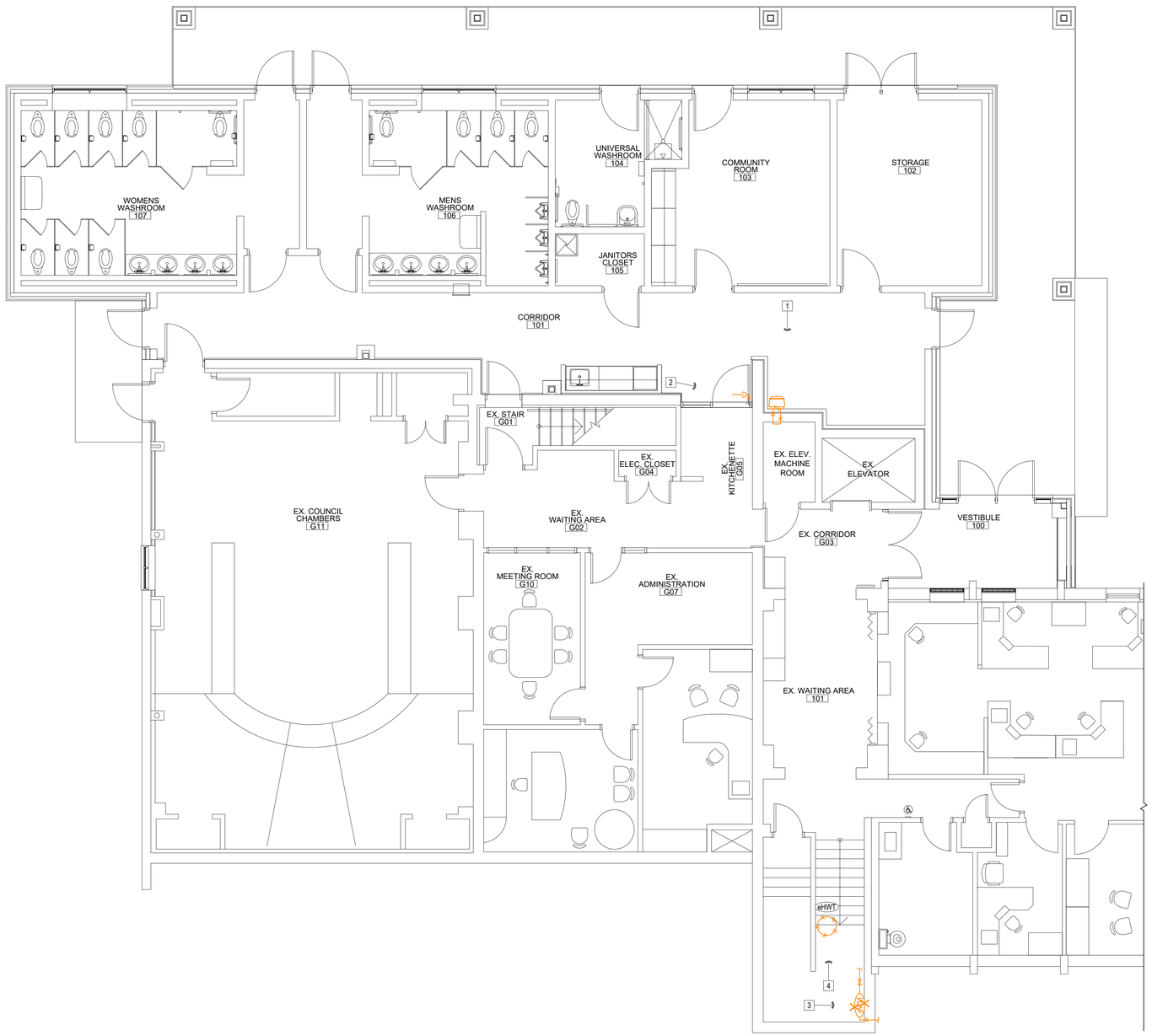
1. EXISTING SIDE WALL EXHAUST FAN AND ALL ASSOCIATED DUCTWORK FOR ELEVATOR MACHINE ROOM TO BE REMOVED .

2. EXISTING ROOF DRAIN PIPING TO BE DISCONNECTED & REMOVED AT THIS LOCATION.

3. EXISTING 1"Ø DOMESTIC COLD WATER (eDCW) PIPING & WATER METER TO BE REMOVED. FROM INCOMING SERVICE TO APPROXIMATE LOCATION SHOWN.



4. EXISTING ELECTRIC DOMESTIC HOT WATER HEATER TO BE REMOVED.



PROPOSED DEMOLITION PLAN

SCALE: 3/16" = 1'-0"

LICENSED PROFESSIONAL ENGINEER
T. A. KESZTHELYI
06 / 07 / 2022
PROVINCE OF ONTARIO

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REV.	ISSUED FOR:	YYYY/MM/DD
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CLIENT:
GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
PROPOSED DEMOLITION PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BB
DESIGNED BY:	BB
CHECKED BY:	TZ
SCALE:	AS SHOWN

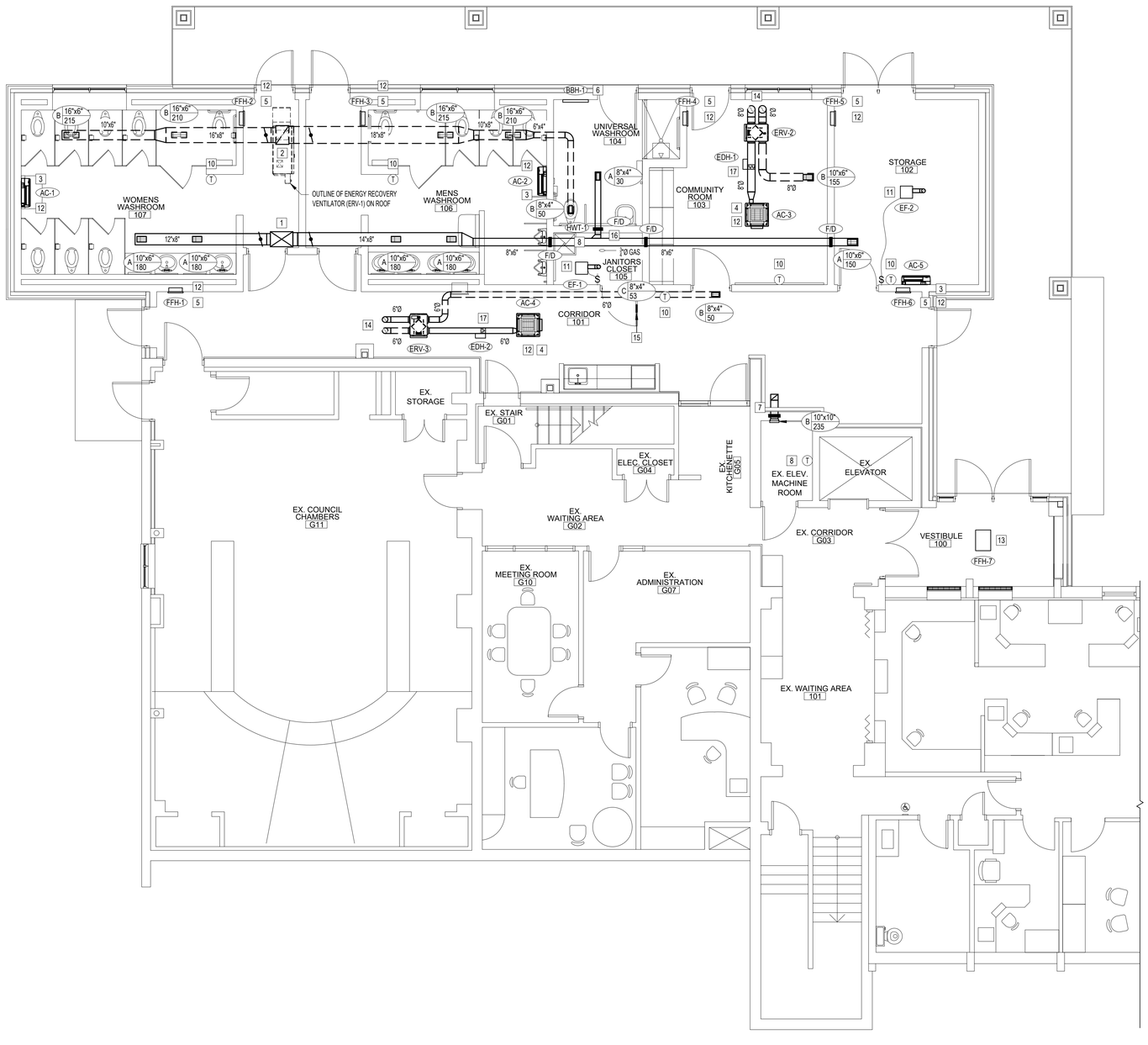
DWG. M2.1 REV. 1

GENERAL MECHANICAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND APPROXIMATE AND ARE SUBJECT TO REARRANGEMENT FOR PROPER INSTALLATION. THEY ARE NOT INTENDED TO SHOW EVERY ITEM IN ITS EXACT LOCATION, THE EXACT DIMENSIONS, OR ALL THE DETAILS OF THE EQUIPMENT. CERTAIN RUNS OF DUCTWORK AND PIPING SHOWN DISTORTED TO AVOID CONFUSION. COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO INSTALLATION.
2. CONTRACTOR TO COORDINATE WITH ALL DISCIPLINES PRIOR TO CONSTRUCTION TO ENSURE NO INTERFERENCES OF EQUIPMENT WITH OTHER TRADES.
3. MECHANICAL CONTRACTOR TO COORDINATE WITH GENERAL CONTRACTOR AND ALL EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION OF MECHANICAL SERVICES TO EQUIPMENT SUPPLIED BY OTHERS.
4. ALL EXHAUST TERMINATIONS TO BE A MINIMUM OF 10 FEET AWAY (ANY DIRECTION) FROM ANY MECHANICAL AIR INTAKE. ALL FLUE VENT TERMINATIONS FROM ANY GAS FIRED EQUIPMENT TO BE A MINIMUM OF 6 FEET AWAY (ANY DIRECTION) FROM ANY MECHANICAL AIR INTAKE.
5. ALL LOW VOLTAGE WIRING AND CONDUIT SHALL BE BY DIV 15.
6. CONTRACTOR SHALL ENSURE MECHANICAL SERVICES, INCLUDING MECHANICAL UNITS, DUCTWORK, PIPING, CONDUIT, ETC. MEET LOCAL SEISMIC REQUIREMENTS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR LETTER BY A PROFESSIONAL ENGINEER IN ONTARIO FOR APPROVAL.
7. ALL EXHAUST TERMINATIONS TO BE A MINIMUM OF 10 FEET AWAY (ANY DIRECTION) FROM ANY MECHANICAL AIR INTAKE. ALL FLUE VENT TERMINATIONS FROM ANY GAS FIRED EQUIPMENT TO BE A MINIMUM OF 6 FEET AWAY (ANY DIRECTION) FROM ANY MECHANICAL AIR INTAKE.
8. CONTRACTOR SHALL INSTALL TEMPORARY CAPS OR CLOSURES ON THE ENDS OF ALL PIPES, CONDUITS, ETC TO PREVENT THE ENTRY OF DEBRIS. CONTRACTOR TO PRESSURE TEST ALL SYSTEMS THAT WILL BE UNDER POSITIVE OR NEGATIVE PRESSURE.
9. INSTALL ALL DUCTWORK AT THE HIGHEST LEVEL.
10. CONTRACTOR SHALL PROVIDE FIRE DAMPERS IN ALL NEW AND EXISTING DUCTWORK AT ALL DUCT PENETRATIONS OF FIRE SEPARATIONS, INCLUDING LOCATIONS NOT SPECIFICALLY INDICATED ON THESE DRAWINGS. SEE DETAIL 2 DWG M1.2. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE SEPARATION LOCATIONS AND RATINGS.

SPECIFIC MECHANICAL NOTES

1. 24"X16" SUPPLY AIR DUCT FROM ENERGY RECOVERY UNIT (ERV-1) LOCATED ON ROOF LEVEL. PROVIDE ACOUSTIC INSULATION.
2. 20"X14" RETURN AIR DUCT FROM ENERGY RECOVERY UNIT (ERV-1) LOCATED ON ROOF LEVEL. PROVIDE ACOUSTIC INSULATION.
3. INSTALL NEW WALL MOUNT INDOOR SPLIT DUCTLESS UNIT TO BE INSTALLED AT HIGHEST LEVEL. REFER TO MANUFACTURES INSTRUCTIONS FOR INSTALLATION REQUIREMENTS. REFRIGERANT PIPE RUN TO BE SITE VERIFIED.
4. CEILING MOUNTED SPLIT DUCTLESS UNIT TO BE INSTALLED AT CEILING LEVEL. INSTALL AS PER MANUFACTURES INSTRUCTION. REFRIGERANT PIPE RUN TO BE SITE VERIFIED. (TYP. 2).
5. 1.5kW FORCE FLOW HEATER TO BE SUPPLIED AND INSTALLED BY DIV. 16 (FFH-1 TO FFH-6).
6. 500 WATT BASEBOARD HEATER TO BE SUPPLIED AND INSTALLED BY DIV. 16 (BBH-1)
7. CONTRACTOR TO RE-USE THE EXISTING WALL OPENING FOR NEW 8"x8" EXHAUST DUCT. NEW EXHAUST DUCT TO RUN IN CEILING SPACE & UP TO NEW EXHAUST FAN (EF-3). NEW EXHAUST DUCT TO CONNECT TO NEW WALL GRILLE. PROVIDE FIRE DAMPER AT WALL PENETRATION.
8. PROVIDE NEW REVERSE ACTING THERMOSTAT AND INSTALLED AT SAME LOCATION. THERMOSTAT TO CONTROL ROOF MOUNTED EXHAUST FAN (EF-3).
9. RESERVED
10. NEW THERMOSTAT TO BE INSTALLED 4' AFF. PROVIDE CLEAR, LOCKABLE THERMOSTAT GUARD SUITABLE FOR NEW THERMOSTAT.
11. NEW EXHAUST FAN DUCT TO BE RUN UP TO ROOF. PROVIDE GOOSENECK TERMINATION & WATERPROOF NEW ROOF PENETRATION. SEE DETAIL 10 ON DWG M1.2.
12. PROVIDE DDC INTERLOCK HEATING/COOLING OF FORCED FLOW HEATER (FFH) WITH VRF INDOOR UNIT (AC) SERVING SAME SPACE SO FFH INACTIVE DURING AC COOLING.
13. 4kW CEILING MOUNTED FORCE FLOW HEATER TO BE SUPPLIED AND INSTALLED BY DIV. 16
14. PROVIDE GOOSENECK TERMINATIONS FOR ENERGY RECOVERY VENTILATOR (ERV) EXHAUST AIR AND OUTDOOR AIR DUCTS.
15. PROVIDE AIR TRANSFER GRILLE IN JANITOR CLOSET DOOR & TO BE INSTALLED AT 12" AFF.
16. NEW 2"Ø GAS LINE FROM ROOF TO NEW GAS WATER HEATER (HWT-1). SEE DRAWING M2.3 FOR CONTINUATION.
17. PROVIDE MINIMUM 3x DUCT DIAMETERS OF UNOBSTRUCTED DUCT LENGTH UPSTREAM & DOWNSTREAM OF ELECTRIC DUCT HEATER (EDH). REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS.



PROPOSED MECHANICAL PLAN

SCALE: 3/16" = 1'-0"

LICENSED PROFESSIONAL ENGINEER
T. A. KESZTHELYI
06 / 07 / 2022
PROVINCE OF ONTARIO

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L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
PROPOSED MECHANICAL PLAN

JOB NUMBER:	220321
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DWG.	M2.2
REV.	1

GENERAL MECHANICAL NOTES

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2. CONTRACTOR TO COORDINATE WITH ALL DISCIPLINES PRIOR TO CONSTRUCTION TO ENSURE NO INTERFERENCES OF EQUIPMENT WITH OTHER TRADES.
3. MECHANICAL CONTRACTOR TO COORDINATE WITH GENERAL CONTRACTOR AND ALL EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION OF MECHANICAL SERVICES TO EQUIPMENT SUPPLIED BY OTHERS.
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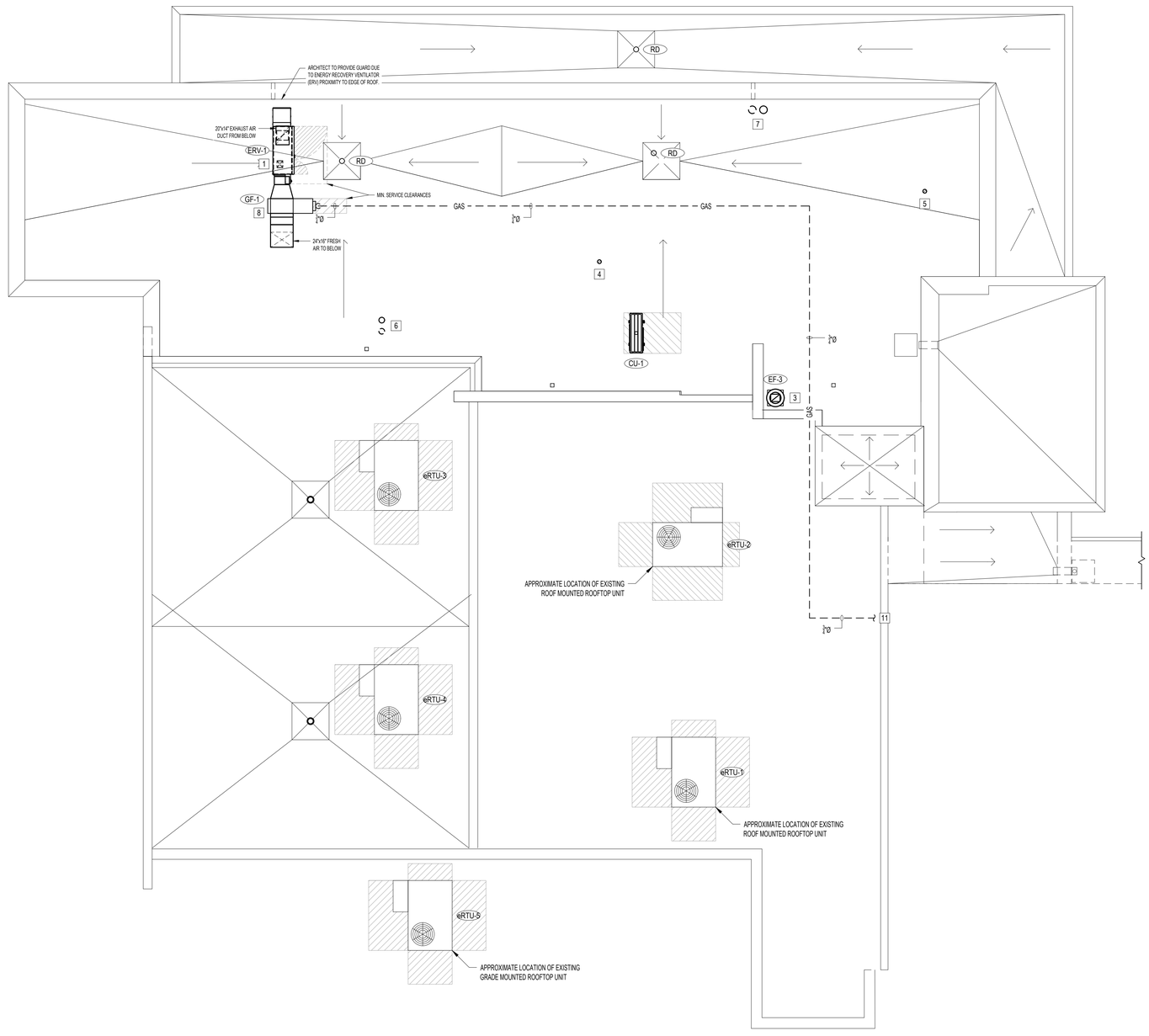
6. CONTRACTOR SHALL ENSURE MECHANICAL SERVICES, INCLUDING MECHANICAL UNITS, DUCTWORK, PIPING, CONDUIT, ETC. MEET LOCAL SEISMIC REQUIREMENTS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR LETTER BY A PROFESSIONAL ENGINEER IN ONTARIO FOR APPROVAL.
7. ALL EXHAUST TERMINATIONS TO BE A MINIMUM OF 10 FEET AWAY (ANY DIRECTION) FROM ANY MECHANICAL AIR INTAKE. ALL FLUE VENT TERMINATIONS FROM ANY GAS FIRED EQUIPMENT TO BE A MINIMUM OF 6 FEET AWAY (ANY DIRECTION) FROM ANY MECHANICAL AIR INTAKE.
8. CONTRACTOR SHALL INSTALL TEMPORARY CAPS OR CLOSURES ON THE ENDS OF ALL PIPES, CONDUITS, ETC TO PREVENT THE ENTRY OF DEBRIS. CONTRACTOR TO PRESSURE TEST ALL SYSTEMS THAT WILL BE UNDER POSITIVE OR NEGATIVE PRESSURE.
9. INSTALL ALL DUCTWORK AT THE HIGHEST LEVEL.
10. CONTRACTOR SHALL PROVIDE FIRE DAMPERS IN ALL NEW AND EXISTING DUCTWORK AT ALL DUCT PENETRATIONS OF FIRE SEPARATIONS, INCLUDING LOCATIONS NOT SPECIFICALLY INDICATED ON THESE DRAWINGS. SEE DETAIL 2 DWG M1.2. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE SEPARATION LOCATIONS AND RATINGS.
11. SITE VERIFY ALL EXISTING DUCTWORK AND PIPING LOCATIONS AND SIZES BEFORE PROCEEDING. REPORT ANY DISCREPANCIES TO ENGINEER.

SPECIFIC MECHANICAL NOTES

1. NEW ENERGY RECOVERY VENTILATOR (ERV-1) TO BE INSTALLED AS PER MANUFACTURERS INSTRUCTIONS.
2. APPROXIMATE LOCATION OF NEW OUTDOOR HEAT PUMP UNIT. UNIT TO BE INSTALLED ON A NEOPENE KINETIC NOISE CONTROL PAD MODEL NGS-4-45
3. NEW EXHAUST FAN TO BE INSTALLED AS PER MANUFACTURES INSTRUCTIONS. FAN TO BE CONTROLLED BY REVERSE ACTING THERMOSTAT LOCATED IN ELEVATOR MECHANICAL ROOM.
4. NEW 4"Ø ROOF PENETRATION FOR JANITOR CLOSET EXHAUST FAN (EF-1). SEE DRAWING M2.1 FOR CONTINUATION. PROVIDE GOOSENECK TERMINATION & WATERPROOF ROOF PENETRATION. SEE DETAIL 10 ON DWG M1.2.
5. NEW 6"Ø ROOF PENETRATION FOR STORAGE EXHAUST FAN (EF-2). SEE DRAWING M2.1 FOR CONTINUATION. PROVIDE GOOSENECK TERMINATION & WATERPROOF ROOF PENETRATION. SEE DETAIL 10 ON DWG M1.2.
6. NEW 4"Ø ROOF PENETRATION FOR CORRIDOR ENERGY RECOVERY VENTILATOR (ERV-3). SEE DRAWING M2.1 FOR CONTINUATION. PROVIDE GOOSENECK TERMINATION & WATERPROOF ROOF PENETRATION. SEE DETAIL 10 ON DWG M1.2.
7. NEW 8"Ø ROOF PENETRATION FOR COMMUNITY ROOM ENERGY RECOVERY VENTILATOR (ERV-2). SEE DRAWING M2.1 FOR CONTINUATION. PROVIDE GOOSENECK TERMINATION & WATERPROOF ROOF PENETRATION. SEE DETAIL 10 ON DWG M1.2.
8. NEW GAS FIRED DUCT FURNACE TO BE INSTALLED AS PER MANUFACTURERS INSTRUCTIONS.
9. RESERVED
10. RESERVED
11. NEW ¾"Ø GAS LINE FROM EXISTING GAS METER ON ROOF. CONTRACTOR TO PROVIDE NEW ¾"Ø CONNECTION TO EXISTING GAS LINE, RUN UP AND ALONG ROOF TO NEW GAS DUCT FURNACE.



PROPOSED ROOF PLAN

SCALE: 3/16" = 1'-0"

LICENSED PROFESSIONAL ENGINEER
T. A. KESZTHELYI
06 / 07 / 2022
PROVINCE OF ONTARIO

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GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
PROPOSED ROOF PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BB
DESIGNED BY:	BB
CHECKED BY:	TZ
SCALE:	AS SHOWN
DWG.	M2.3
REV.	1

GENERAL PLUMBING NOTES

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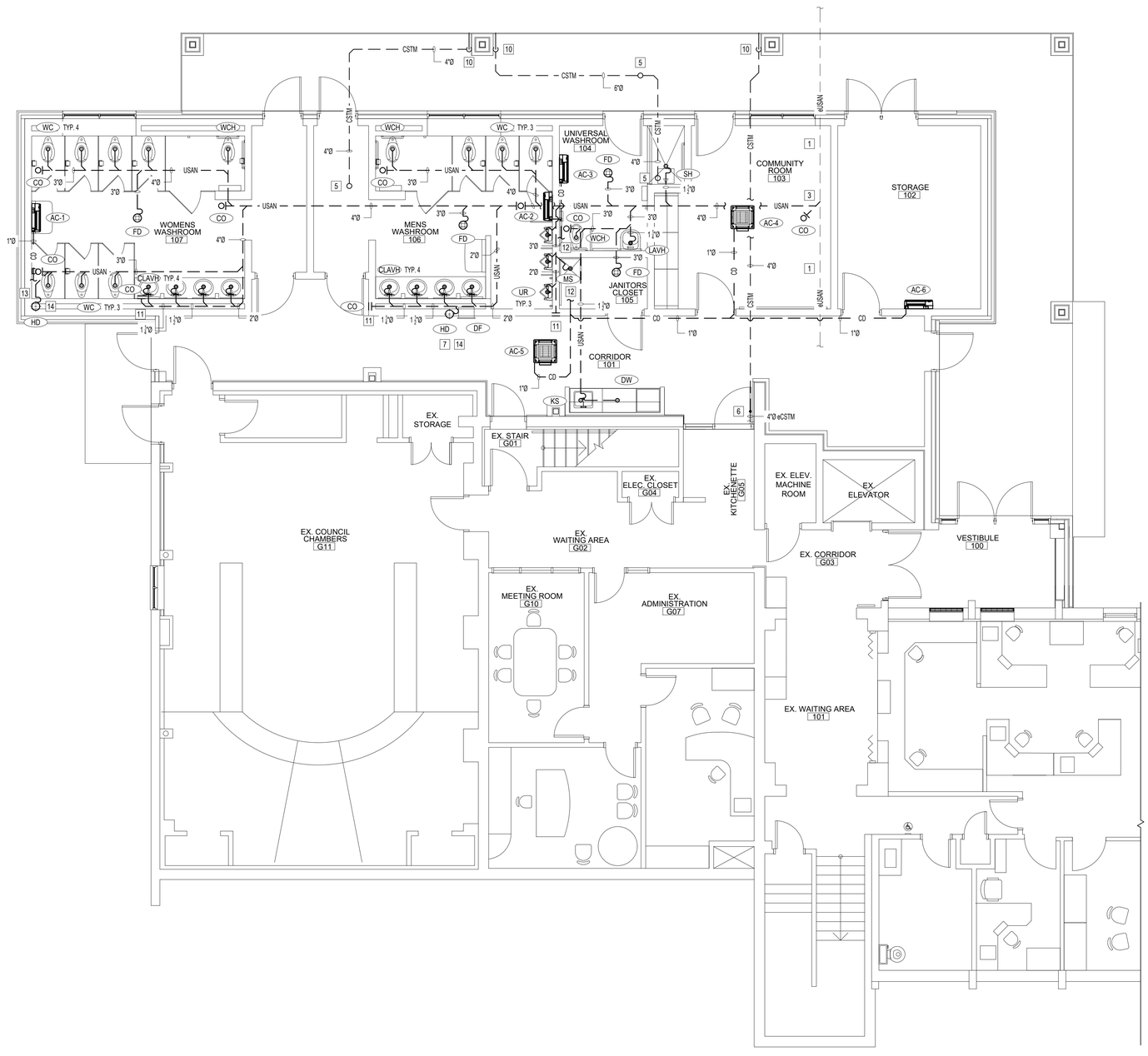
2. SITE VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES BEFORE PROCEEDING. REPORT ANY DISCREPANCIES TO ENGINEER..
3. CONTRACTOR SHALL PROVIDE FIRE STOPPING OF ALL NEW PLUMBING AT ALL PENETRATIONS OF FIRE SEPARATIONS, INCLUDING LOCATIONS NOT SPECIFICALLY INDICATED ON THESE DRAWINGS. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE SEPARATION LOCATIONS AND RATINGS.
4. VENTING FOR SANITARY SYSTEM (NOT SHOWN ON DRAWING) SHALL BE FIELD-RUN BY CONTRACTOR IN ACCORDANCE WITH ONTARIO BUILDING CODE REQUIREMENTS. CONTRACTOR SHALL ENSURE ALL VENT PENETRATIONS THROUGH ROOF ARE PROPERLY FLASHED AND WATERPROOFED.
5. MECHANICAL CONTRACTOR TO COORDINATE WITH GENERAL CONTRACTOR AND ALL EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION OF MECHANICAL SERVICES TO EQUIPMENT SUPPLIED BY OTHERS.
6. CONTRACTOR SHALL ENSURE MECHANICAL SERVICES, INCLUDING MECHANICAL UNITS, DUCTWORK, PIPING, CONDUIT, ETC. MEET LOCAL SEISMIC REQUIREMENTS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR LETTER BY A PROFESSIONAL ENGINEER IN ONTARIO FOR APPROVAL.

SPECIFIC PLUMBING NOTES

1. APPROXIMATE LOCATION OF EXISTING 6"Ø SANITARY. SITE VERIFY EXACT LOCATION AND SIZE. ADVICE ENGINEER WITH ANY DISCREPANCY.
2. ROUTE CONDENSATE LINE IN CEILING SPACE TO HUB DRAIN WITH PROPER SLOPE. INDIRECT CONNECT CONDENSATE DRAIN TO HUD DRAIN.
3. NEW 4"Ø SANITARY LINE TO CONNECT TO EXISTING SANITARY MAIN AT THIS APPROXIMATE LOCATION. CONTRACTOR TO CARRY COST FOR SCOPING OF EXISTING SANITARY. CONTRACTOR TO ADVISE ON PIPE SIZE & ELEVATION PRIOR TO MOVING FORWARD.
4. RESERVED
5. 4"Ø STORM WATER PIPING FROM ROOF DRAIN (RD) ABOVE.
6. CONNECT NEW 4"Ø STORM WATER PIPING TO EXISTING STORM WATER PIPING. SITE VERIFY EXACT LOCATION & SIZE OF EXISTING STORM WATER PIPING.
7. HUB DRAIN TO BE INSTALLED IN WALL CAVITY C/W ACCESS PANEL. DRINKING FOUNTAINS TO INDIRECTLY DRAIN TO HUB DRAIN AS PER OBC. CONNECT HUB DRAIN TO SANITARY DRAIN.
8. RESERVED
9. ROUTE CONDENSATE LINE IN CEILING SPACE TO MOP SINK WITH PROPER SLOPE. INDIRECT CONNECT CONDENSATE DRAIN.
10. NEW STORM DRAIN PIPING TO BE RUN TO LOW LEVEL AT THIS LOCATION & DISCHARGE 3FT PAST COVERED WALKWAY TO SPLASH PAD.
11. PROVIDE CLEAN OUT WALL CLEAN OUT AT LOW LEVEL.
12. INDIRECTLY CONNECT CONDENSATE DRAIN LINE TO MOP SINK.
13. INDIRECTLY CONNECT CONDENSATE DRAIN LINE TO HUB DRAIN WITHIN PLUMBING CHASE.
14. PROVIDE SERVICE ACCESS PANEL FOR HUB DRAIN.



PROPOSED STORM & SANITARY PLAN

SCALE: 3/16" = 1'-0"

LICENSED PROFESSIONAL ENGINEER
T. A. KESZTHELYI
16 / 07 / 2022
PROVINCE OF ONTARIO

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STONEY CREEK, ON
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
PROPOSED STORM & SANTIARY PLAN

JOB NUMBER:	220321
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DESIGNED BY:	BB
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DWG.	P1.1
REV.	1

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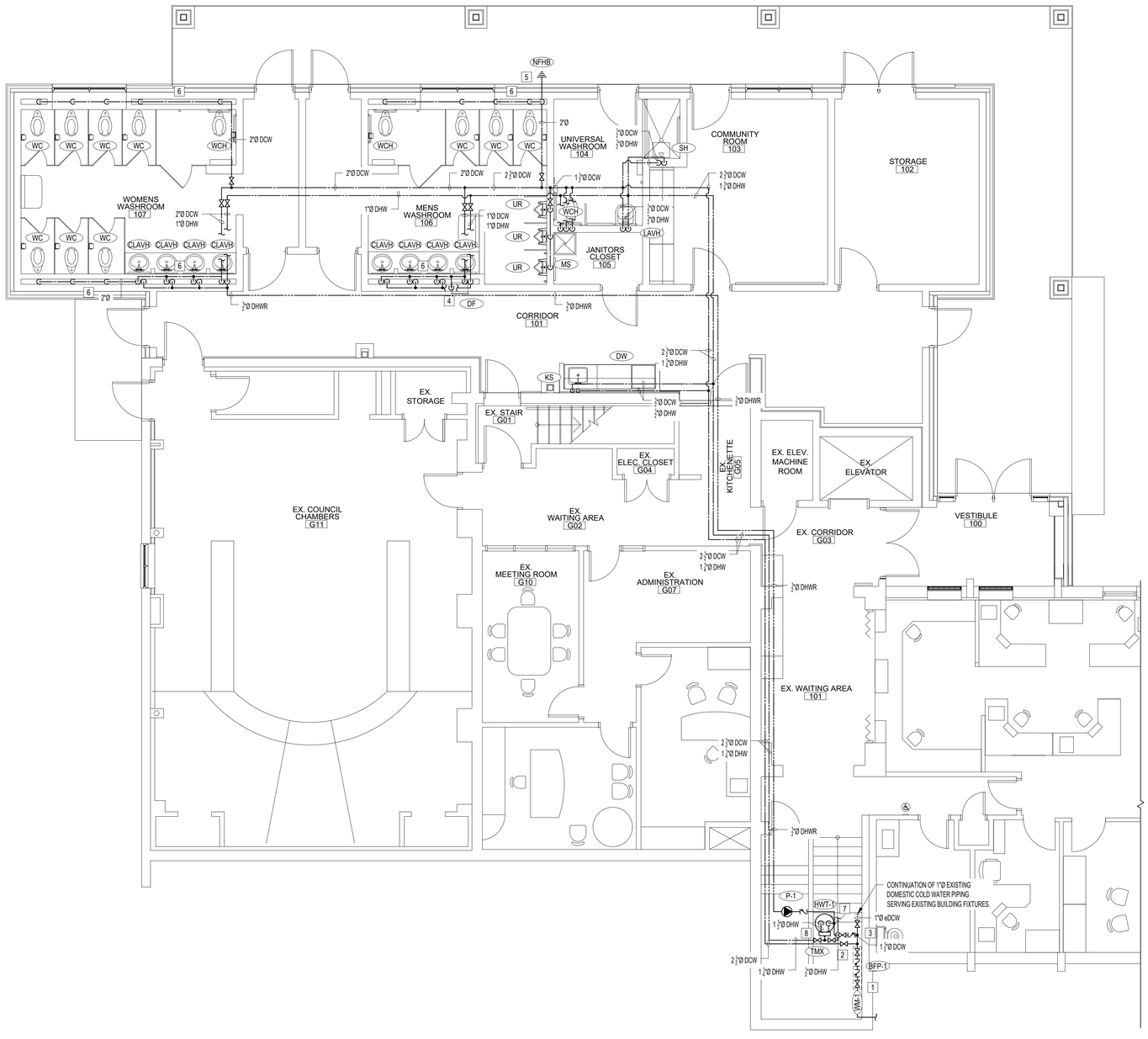
2. ALL DOMESTIC COLD AND HOT WATER PIPING TO BE INSTALLED AT THE HIGHEST LEVEL.
3. SITE VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES BEFORE PROCEEDING. REPORT ANY DISCREPANCIES TO ENGINEER..
4. CONTRACTOR SHALL PROVIDE FIRE STOPPING OF ALL NEW PLUMBING AT ALL PENETRATIONS OF FIRE SEPARATIONS, INCLUDING LOCATIONS NOT SPECIFICALLY INDICATED ON THESE DRAWINGS. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE SEPARATION LOCATIONS AND RATINGS.
5. VENTING FOR SANITARY SYSTEM (NOT SHOWN ON DRAWING) SHALL BE FIELD-RUN BY CONTRACTOR IN ACCORDANCE WITH ONTARIO BUILDING CODE REQUIREMENTS. CONTRACTOR SHALL ENSURE ALL VENT PENETRATIONS THROUGH ROOF ARE PROPERLY FLASHED AND WATERPROOFED.
6. MECHANICAL CONTRACTOR TO COORDINATE WITH GENERAL CONTRACTOR AND ALL EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION OF MECHANICAL SERVICES TO EQUIPMENT SUPPLIED BY OTHERS.
6. CONTRACTOR SHALL ENSURE MECHANICAL SERVICES, INCLUDING MECHANICAL UNITS, DUCTWORK, PIPING, CONDUIT, ETC. MEET LOCAL SEISMIC REQUIREMENTS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR LETTER BY A PROFESSIONAL ENGINEER IN ONTARIO FOR APPROVAL.

SPECIFIC PLUMBING NOTES

1. EXISTING WATER SERVICE TO BUILDING TO BE UPGRADED TO 2 ½"Ø. PROVIDE NEW 2"Ø WATER METER (WM-1) & 2 ½"Ø BACKFLOW PREVENTER (BFP-1). REFER TO DETAIL 8 ON M1.3 FOR WATER METER INSTALLATION DETAIL.
2. PROVIDE NEW ISOLATION VALVE FOR NEW 2 ½"Ø DOMESTIC COLD WATER PIPING & TO BE INSTALLED AT THE HIGHEST LEVEL.
3. PROVIDE NEW ISOLATION VALVE FOR EXISTING 1"Ø DOMESTIC COLD WATER PIPING.
4. PROVIDE ¾"Ø DOMESTIC COLD WATER PIPING FOR DRINKING FOUNTAIN.
5. PROVIDE ¾"Ø NON-FREEZE HOSE BIB. INSTALL NEW HOSE BIB AT 4FT AFF.
6. DOMESTIC COLD WATER & DOMESTIC HOT WATER PLUMBING TO BE INSTALLED WITHIN PROVIDED PLUMBING CHASE.
7. RECONNECT NEW ¾"Ø DOMESTIC HOT WATER PLUMBING TO EXISTING ¾"Ø DOMESTIC HOT WATER PLUMBING.
8. PROVIDE 1 ½"Ø DOMESTIC HOT WATER HEADER. PROVIDE ¾"Ø DOMESTIC HOT WATER LINE TO CONNECT TO EXISTING DOMESTIC HOT WATER PIPING. PROVIDE NEW 1 ½"Ø DOMESTIC HOT WATER PIPING FROM DOMESTIC HOT WATER HEADER FOR NEW ADDITION.



PROPOSED DOMESTIC WATER PLAN

SCALE: 3/16" = 1'-0"

LICENSED PROFESSIONAL ENGINEER
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16 / 07 / 2022
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GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON

SHEET TITLE:
PROPOSED DOMESTIC WATER PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BB
DESIGNED BY:	BB
CHECKED BY:	TZ
SCALE:	AS SHOWN
DWG.	P1.2
REV.	1

ELECTRICAL LEGEND	
	DUPLEX RECEPTACLE, 15A/120V
	DUPLEX RECEPTACLE, 20A/120V
	DUPLEX RECEPTACLE MOUNTED OVER COUNTER, COORDINATE WITH ARCHITECTURAL DRAWINGS FOR EXACT MOUNTING HEIGHT, 15A/120V
	GROUND FAULT TYPE DUPLEX RECEPTACLE, , 15A/120V, 15A/120V OVER COUNTER, 20A/120V, 20A/120V OVER COUNTER
	SPECIAL RATED RECEPTACLE, AMP & VOLT RATING INDICATED OR DIRECT CONNECTION AS REQUIRED
	ELECTRICAL PANEL, RECESSED MTD., SEE SCHEDULE FOR DETAILS
	ELECTRICAL PANEL, SURFACE MTD., SEE SCHEDULE FOR DETAILS
	OCCUPANCY SENSOR, REFER TO LIGHTING NOTES 3 & 4 ON THIS DRAWING
	TOGGLE SWITCH, 'D' - DIMMER SWITCH
	3-WAY SWITCH
	4-WAY SWITCH
D#	DATA OUTLET, # INDICATES QUANTITY OF JACKS, C/W 1/2" EMT CONDUIT FROM JUNCTION BOX TO CEILING SPACE, MOUNTED 18" A.F.F. UNLESS NOTED OTHERWISE. IF OUTLET IS IN A ROOM WITH AN OPEN CEILING, RUN CONDUIT ALONG CEILING TO NEAREST DROP CEILING OR DATA RACK, WHICHEVER IS CLOSER
T#	TELEPHONE OUTLET, # INDICATES QUANTITY OF JACKS, C/W 1/2" EMT CONDUIT FROM JUNCTION BOX TO CEILING SPACE, MOUNTED 18" A.F.F. UNLESS NOTED OTHERWISE. IF OUTLET IS IN A ROOM WITH AN OPEN CEILING, RUN CONDUIT ALONG CEILING TO NEAREST DROP CEILING OR DATA RACK, WHICHEVER IS CLOSER
D/T	COMBINATION DATA & TELEPHONE OUTLET, C/W 1/2" EMT CONDUIT FROM JUNCTION BOX TO CEILING SPACE, MOUNTED 18" A.F.F. UNLESS NOTED OTHERWISE. IF OUTLET IS IN A ROOM WITH AN OPEN CEILING, RUN CONDUIT ALONG CEILING TO NEAREST DROP CEILING OR DATA RACK, WHICHEVER IS CLOSER
V#	TELEVISION OUTLET, # INDICATES QUANTITY OF JACKS, C/W 1/2" EMT CONDUIT FROM JUNCTION BOX TO CEILING SPACE, MOUNTED 18" A.F.F. UNLESS NOTED OTHERWISE. IF OUTLET IS IN A ROOM WITH AN OPEN CEILING, RUN CONDUIT ALONG CEILING TO NEAREST DROP CEILING OR DATA RACK, WHICHEVER IS CLOSER
JB	JUNCTION BOX
T	REVERSE ACTING THERMOSTAT PROVIDED AND INSTALLED BY DIV 15, INTERLOCKED BY THIS CONTRACTOR
	AUTOMATIC DOOR OPERATOR PUSH BUTTON, MOUNTED BETWEEN 900mm & 1100mm A.F.F. PROVIDE 2"X4" BOX AND 16mm EMT CONDUIT AS REQUIRED. FOR W/R POWER DOOR REFER TO DOOR/CALL SYSTEM WIRING DIAGRAM. POWER SUPPLIES AND 120/24V TRANSFORMERS MOUNTED IN CEILING SPACE
PL	AUTOMATIC DOOR OPERATOR PUSH BUTTON & PUSH TO LOCK BUTTON, MOUNTED BETWEEN 900mm & 1100mm A.F.F. PROVIDE 2"X4" BOX AND 16mm EMT CONDUIT AS REQUIRED. REFER TO DOOR/CALL SYSTEM WIRING DIAGRAM, POWER SUPPLIES AND 120/24V TRANSFORMERS MOUNTED IN CEILING SPACE
TM	INTERMATIC 7-DAY TIMER, ET1705C OR EQUIVALENT
PB	DOOR CONTROLS RESTROOM ASSISTANCE PUSHBUTTON & BUZZER/STROBE. REFER TO DOOR/CALL SYSTEM WIRING DIAGRAM. POWER SUPPLIES AND 120/24V TRANSFORMERS MOUNTED IN CEILING SPACE. MOUNT AT SAME HEIGHT AS TOILET TISSUE DISPENSER, COORDINATE WITH ARCHITECTURAL DRAWINGS.
	DOOR CONTROLS BUZZER/STROBE, REFER TO DOOR/CALL SYSTEM WIRING DIAGRAM, POWER SUPPLIES AND 120/24V TRANSFORMERS MOUNTED IN CEILING SPACE
	WEATHERPROOF NON-FUSED DISCONNECT SWITCH
DC	DOOR CONTACT BY OTHERS - THIS CONTRACTOR IS TO INSTALL CONDUIT TO INTERIOR, ABOVE FINISHED CEILING

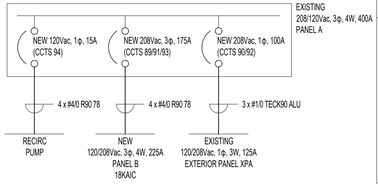
ELECTRICAL WALL MOUNTED FORCE FLOW HEATER SCHEDULE						
TAG	MANUFACTURER	MODEL	ELECTRICAL			NOTES
			KW	VOLT./PH.	AMPS	
FFH1	OUELLET	OVS1502	1.5	120/1	12.5	WALL MOUNTED, C/W THERMOSTAT KIT-OVS-TB26-AV

ELECTRICAL CEILING MOUNTED FORCE FLOW HEATER SCHEDULE						
TAG	MANUFACTURER	MODEL	ELECTRICAL			NOTES
			KW	VOLT./PH.	AMPS	
FFH2	OUELLET	OACP4008	4	208/1	16.7	CEILING MOUNTED, C/W THERMOSTAT KIT-OACP-T

BASEBOARD HEATER SCHEDULE						
TAG	MANUFACTURER	MODEL	ELECTRICAL			DESCRIPTION
			KW	VOLT./PH.	AMPS	
BBH1	OUELLET	OFM0502	0.5	120/1	4.2	WALL MOUNT C/W THERMOSTAT KIT-OFM-TB6-AV

HAND DRYER SCHEDULE						
TAG	MANUFACTURER	MODEL	ELECTRICAL			DESCRIPTION
			KW	VOLT./PH.	AMPS	
HD	OUELLET	OAF1102	1.1	120/1	9.2	ARCHITECT/OWNER TO APPROVE PRIOR TO PURCHASE

STANDARD MOUNTING HEIGHT	
LOCAL SWITCHES	1150 mm
WALL RECEPTACLES - GENERAL	350 mm
WALL RECEPTACLES - ABOVE TOP OF COUNTERS OR COUNTER SPLASH BACKS	175 mm
WALL RECEPTACLES - IN ELECTRICAL/MECHANICAL SERVICE ROOMS	700 mm
TELEPHONE AND DATA OUTLETS	350 mm
POWER DOOR OPERATOR CONTROLS	1000 mm
MANUAL PULL STATION, THERMOSTATS, BARRIER - FREE	1200 mm
OTHER DEVICES,SWITCHES,ETC., IN BARRIER - FREE PATH OF TRAVEL	1000 mm
FIRE ALARM HORN /STROBE , EMERGENCY CALL SYSTEM VISUAL INDICATOR	2350 mm TO TOP OF DEVICE (ADJUST IN ANY CASE FOR A MINIMUM OF 150mm SPACE BETWEEN THE CEILING AND THE TOP OF DEVICE)
EMERGENCY LIGHTING REMOTE HEADS	2450 mm
PANELBOARDS	AS REQUIRED BY CODE OR AS INDICATED



PARTIAL SINGLE LINE DIAGRAM

SCALE: N.T.S.

CONDUCTOR TAG LEGEND
4 x #350 RW90 78
→ CONDUIT SIZE IN mm (2 OR 3 CHARACTERS)
→ CONDUCTOR TYPE (3 TO 6 CHARACTERS)
→ CONDUCTOR SIZE (1 TO 3 CHARACTERS)
→ QUANTITY OF CONDUCTORS (1 CHARACTER)

EX. ABOVE
4 x #350 RW90 78
- 4 CONDUCTORS
- #350kcmil CONDUCTOR SIZE
- CONDUCTOR TYPE RW90
- CONDUIT SIZE 78mm

CONDUCTOR TAG LEGEND NOTES:
1. CONDUCTOR SIZES ABOVE 4/0 ARE DESIGNATED kcmil.
2. ALL WIRING CONDUCTING UP TO AND INCLUDING 100 AMPS TO BE COPPER UNLESS NOTED OTHERWISE. ALL WIRING CONDUCTING GREATER THAN 100 AMPS TO BE ALUMINUM UNLESS NOTED OTHERWISE.
3. CONDUITS SIZED IN mm.
4. FOR UNDERGROUND CONDUITS USE DB2 (MINIMUM SIZE OF 53mm).
5. FOR ALL INDOOR, ABOVE GRADE CONDUITS USE EMT (MINIMUM SIZE 21mm).
6. COPPER CONDUCTORS IN PLACE OF SPECIFIED ALUMINUM IS PERMITTED HOWEVER DOING SO SHALL INCUR NO EXTRA COSTS, SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE IN ACCORDANCE WITH THE ONTARIO ELECTRICAL SAFETY CODE.

ABBREVIATION TABLE	
CM	CEILING MOUNTED
DF	DOUBLE FACE
DM	DIMMING SWITCH
DP	DISTRIBUTION PANEL
EF	EXHAUST FAN
ER	EXISTING TO RELOCATED
EX	EXISTING TO REMAIN
FD	FUSED DISCONNECT SWITCH
HWT	HOT WATER TANK
MD	MOTORIZED DAMPER
MAU	MAKE-UP AIR UNIT
NL	NIGHT LIGHT
OC	MOUNTED OVER COUNTER/SINK
OS	OCCUPANCY SENSOR
RL	RELOCATED ITEM
RM	EXISTING TO BE REMOVED
SP	SPLITTER
WP	WEATHER PROOF

NOTE:
1. REFER TO MECHANICAL DRAWINGS FOR ALL MECHANICAL/PLUMBING EQUIPMENT ABBREVIATIONS

LIGHT SCHEDULE							
ITEM	SYMBOL	NO. LAMPS	VOLTS	LAMP TYPE	WATTS	DESCRIPTION
A		-	120	LED	34	VISIONEERING 2'X4' RECESSED LED, LRTC2X4-LED940K041LUNV
B		-	120	LED	17	VISIONEERING 2'X2' RECESSED LED, LRTC2X2-LED940K020LUNV
C		-	120	LED	39	LITHONIA 1'X4' SURFACE MOUNTED LED, CPANL-1X4-AL01-SWW7-M4, SELECT 4400 LUMEN OUTPUT & 40K COLOUR TEMPERATURE C/W SURFACE MOUNT KIT 1X4SMKSH
D	xx	-	120	LED	11	JUNO LIGHTING WET LOCATION 6" DOWNLIGHT, WF6-LED-30K40K50K-90CRI-MW-M6, SET FIXTURE TO 40K COLOUR TEMPERATURE
E		-	120	-	-	EXISTING DOWNLIGHT
F	EX	-	120	-	-	EXISTING UNDERCABINET LIGHT
G	EX	-	120	-	-	EXISTING EXTERIOR WALL PACK
H	EX	-	120	-	-	EXISTING EXTERIOR WALL CYLINDER LIGHT
J		-	120	LED	14	LITHONIA LIGHTING OUTDOOR CYLINDER LIGHT, OLLWU-LED-P1-40K-MVOLT-DDB
K		-	120	LED	11	JUNO LIGHTING 6" DOWNLIGHT, WF6-LED-30K40K50K-90CRI-MW-M6, SET FIXTURE TO 40K COLOUR TEMPERATURE
EA		-	120	LED	3	STANPRO RUNNING MAN EXIT SIGN, RMS1WH-IB, 'DF' - DOUBLE FACE FIXTURE RMS2WH-IB
EB		2	120/12	LED	36	STANPRO RUNNING MAN EXIT SIGN/EMERGENCY LIGHT COMBO PACK, PRMXL10361-2SSLA
EC		2	120/24	LED	350	STANPRO BATTERY PACK, SLD24350-2SSWLAWH, LOWER CASE LETTER IS BATTERY PACK DESIGNATION
ED		2	24	LED	10	STANPRO REMOTE DOUBLE HEAD FIXTURE, M2-06-245WLAWH, LOWER CASE LETTER DESIGNATES WHICH BATTERY PACK HEAD IS SUPPLIED FROM
EE		1	24	LED	5	STANPRO REMOTE SINGLE HEAD FIXTURE, M1-06-245WLAWH, LOWER CASE LETTER DESIGNATES WHICH BATTERY PACK HEAD IS SUPPLIED FROM
EG		1	120/-	-	-	EXISTING

LIGHT TAG LEGEND
A- C 07 a
→ CONTROLLING LIGHT SWITCH REFERENCE (1 TO 3 CHARACTERS), 'PC' = PHOTOCONTROL, 'NL' = NIGHT LIGHT
→ CIRCUIT NUMBER (2 CHARACTERS)
→ PANEL DESIGNATION (1 TO 3 CHARACTERS)
→ LIGHT SCHEDULE ITEM REFERENCE (1 OR 2 CHARACTERS)

EX. ABOVE
A-C07a
- ITEM A IN LIGHT SCHEDULE
- PANEL C
- CIRCUIT 7
- SWITCH a

LIGHTING NOTES:
1. LIGHT SWITCHES WITH THE SAME LIGHTING DESIGNATION, BUT NOT SHOWN AS 3-WAY SWITCHES ARE TO BE WIRED IN SERIES.
2. COORDINATE FINAL LOCATION OF ALL LIGHTING WITH MECHANICAL DRAWINGS.
3. ALL EXTERIOR LIGHTS ARE TO BE CONTROLLED BY A PHOTOCELL / TIMER.
4. CEILING MOUNTED OCCUPANCY SENSORS TO BE SENSORSWITCH CMR-PDT-10 UNLESS NOTED OTHERWISE. ALTERNATIVES TO BE APPROVED BY ENGINEER.
5. WALL MOUNTED OCCUPANCY SENSORS TO BE SENSORSWITCH WSX-PDT-D-WH UNLESS NOTED OTHERWISE. LIGHTS TO TURN ON TO 50% LIGHT LEVEL UPON INITIAL OCCUPANCY. ALTERNATIVES TO BE APPROVED BY ENGINEER.

FIRE DETECTION LEGEND	
FACP	SINGLE STAGE, CONVENTIONAL FIRE ALARM CONTROL PANEL USED AS ANNUNCIATOR PANEL C/W VISUAL INDICATION. CIRCUIT BREAKER TO BE PAINTED RED.
CR	CONTROL RELAY
	SMOKE DETECTOR
	HEAT DETECTOR, RATE-OF-RISE
	MANUAL PULL STATION
	END-OF-LINE (EOL) TERMINATOR RESISTOR
V	FIRE ALARM HORN, 'V' INDICATES C/W VISUAL STROBE DEVICE
V	FIRE ALARM VISUAL STROBE DEVICE

NOTES: REF SPEC # CXWC13AXWEC10K2

BARRIER FREE EQUIPMENT PACKAGE:
1 CX-33 Multi-Function Relay
2 CM-2520/4855SE1 "PUSH TO OPEN" AND "PUSH TO LOCK" COMBO SWITCH, WITH ENCLOSURE AND SIGN
3 CM-45/4555E1 - 4 1/2" ILLUMINATED PUSH PLATE WITH ENCLOSURE AND SIGN
4 CX-MDA - MAGNETIC DOOR CONTACT
9 CX-E02079 - GRADE2 UNIVERSAL ELECTRIC STRIKE
10 CX-PS13 - 12/24 VDC LINEAR POWER SUPPLY
11 CX-TRX-4024 - 40VA, 24 VAC TRANSFORMER

EMERGENCY CALL EQUIPMENT PACKAGE:
5 CM-AF540SO - 'PRESS FOR EMERGENCY ASSISTANCE' SWITCH & 'ASSISTANCE REQUESTED' LED ANNUNCIATOR WITH SOUNDER
6 CM-AF141SO - 'ASSISTANCE REQUIRED' SINGLE GANG DOME LIGHT WITH SOUNDER
7 CM-SE21A - EMERGENCY ASSISTANCE SIGN

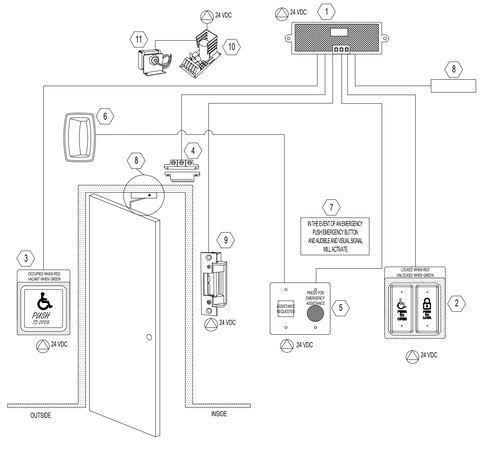
ADDITIONAL PARTS REQUIRED BUT NOT INCLUDED WITH THE CX-WC13FM/CX-WEC10:
8 DOOR OPERATOR - SUPPLIED BY OTHERS

SYSTEM OPERATION

CX-WC13AXFM BARRIER FREE OPERATION:
A. THE DOOR IS NORMALLY CLOSED AND UNLOCKED.
B. PRESSING THE EXTERIOR ' PUSH TO OPEN' AURA PUSH PLATE OPENS THE DOOR.
C. ONCE INSIDE AND THE DOOR IS CLOSED, PRESSING THE ILLUMINATED ' PUSH TO LOCK' AURA PUSH PLATE, CHANGES THE COLOR TO RED AND LOCKS THE DOOR.
D. TO EXIT, PRESS THE INTERIOR PUSH PLATE TO UNLOCK THE DOOR AND RESET THE SYSTEM.
E. THE ' PUSH TO LOCK' AURA™ PUSH PLATE SWITCH ILLUMINATED RING TURNS GREEN AND THE EXTERIOR ' PUSH TO OPEN' AURA™ PUSH PLATE OUTER RING TURNS GREEN.
F. IF THE DOOR IS OPENED MANUALLY TO EXIT THE RESTROOM, THE OVERHEAD MAGNETIC CONTACT SWITCH RESETS THE SYSTEM.

CX-WEC10K2 EMERGENCY CALL OPERATION:
G. THE ' PRESS FOR EMERGENCY ASSISTANCE' MUSHROOM PUSH BUTTON IS ACTIVATED BY THE OCCUPANT.
H. THIS ENERGIZES THE LED ANNUNCIATOR AND SOUNDER WITHIN THE WASHROOM, AND THE DOME LIGHT WITH SOUNDER OUTSIDE THE WASHROOM.
I. BOTH ANNUNCIATORS WILL BE ENERGIZED UNTIL THE LATCHING MUSHROOM PUSH BUTTON SWITCH IS PULLED OUT.

NOTES:
1. ALSO REFER TO CAMDEN WIRING DIAGRAM DRAWING No: CX-WC13AXFM-WEC10-8.
2. PROVIDE QUANTITY OF POWER SUPPLIES AND 120/24V TRANSFORMERS AS SHOWN ON WIRING DIAGRAM.
3. POWER SUPPLIES AND TRANSFORMERS TO BE LOCATED ABOVE CEILING TILES WHERE POSSIBLE.



DOOR/CALL SYSTEM WIRING DIAGRAM

SCALE: N.T.S.

DRAWING LIST

E1	LEGENDS, LIGHT SCHEDULE & PARTIAL SINGLE LINE DIAGRAM
E2	ELECTRICAL SITE PLAN
E3	ELECTRICAL PLAN
E4	LIGHTING PLAN
E5	FIRE ALARM PLAN

DRAWINGS TO BE READ IN CONJUNCTION WITH BOOK SPECIFICATIONS

FIRE ALARM ZONE LIST	
ALARM ZONE	DESCRIPTION
1	1ST FLOOR
2	2ND FLOOR
3	STAIR A
4	STAIR B
5	ELEVATOR
6-10	PROVIDE 5 SPARE FIRE ALARM ZONES

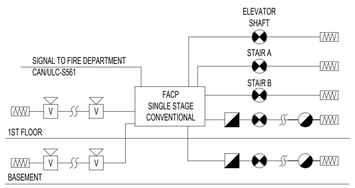
FIRE ALARM NAC	
ALARM ZONE	DESCRIPTION
1	1ST FLOOR HORNS (CLASS 'B')
2	2ND FLOOR HORNS (CLASS 'B')
3-7	PROVIDE 5 SPARE NAC ZONES

FIRE ALARM RELAY LIST	
ALARM ZONE	DESCRIPTION
1	ELEVATOR RETURN LANDING
2	ELEVATOR SECONDARY RETURN LANDING
3	ELEVATOR LOBBIES & HOISTWAY OTHER THAN RETURN LANDINGS
4	AUTOMATIC DOORS
5-9	FAN SHUTDOWN (ERV-1, GF-1, eRTU-3, eRTU-4, eRTU-5)
10-12	PROVIDE 3 EXTRA RELAYS

NOTE:
1. PROVIDE MINIMUM SPARE ALARM ZONES, SUPERVISORY ZONES AND NAC AS SHOWN.
2. ALL HVAC EQUIPMENT SUPPLYING AIR INTO THE BUILDING TO SHUT DOWN UPON FIRE ALARM ACTIVATION, INCLUDING BUT NOT LIMITED TO ERV-1, GF-1, eRTU-3, eRTU-4 & eRTU-5), COORDINATE WITH MECHANICAL DRAWINGS.
3. SMOKE DETECTORS LOCATED IN ELEVATOR LOBBIES TO HAVE RELAY BASE
4. ELEVATOR SUPPLIER TO CONFIRM EXACT NUMBER OF RELAYS REQUIRED.
5. COORDINATE WITH MECHANICAL DRAWINGS FOR EXACT QUANTITY OF FAN SHUTDOWN RELAYS REQUIRED.

1. FIRE ALARM

1.1. INSTALL ALARM SYSTEM COMPONENTS AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE TO OBC 3.2.4.
1.2. PROVIDE SHOP DRAWINGS AND THIRD PARTY CERTIFICATION OF VERIFICATION, EG. SIMPLEXGRINNEL, CHUBB EDWARDS, ETC.
1.3. FIRE ALARM SYSTEMS MUST BE INSTALLED IN CONFORMANCE WITH CAN/ULC-S524, "INSTALLATION OF FIRE ALARM SYSTEMS".
1.4. FIRE ALARM SYSTEM MUST BE IN CONFORMANCE WITH CAN/ULC-S537 "VERIFICATION OF FIRE ALARM SYSTEMS".
1.5. SIGNALS TO FIRE DEPARTMENT ARE TO BE PROVIDED FOR NEW ALARM SYSTEM AS PER OBC 3.2.4.8 AND CAN/ULC-S561, "INSTALLATIONS AND SERVICES FOR FIRE SIGNAL RECEIVING CENTERS AND SYSTEMS."
1.6. COMMISSIONING OF LIFE SAFETY AND FIRE PROTECTION SYSTEMS SHALL BE PERFORMED BY THIRD PARTY (EG. FIRE CUBE INC.) UNDER THIS CONTRACTOR AS PER OBC 3.2.4.6 AND AS PER CAN/ULC S1001, "INTEGRATED SYSTEMS TESTING OF FIRE PROTECTION AND LIFE SAFETY SYSTEMS". CONFIRM ADDITIONAL REQUIREMENTS WITH LOCAL AHJ.
1.7. CIRCUIT BREAKER/DISCONNECT SWITCH SUPPLYING THE FIRE ALARM SYSTEM SHALL BE CLEARLY LABELED, COLOURED RED AND BE LOCKABLE IN THE ON POSITION.
1.8. SUPPLY FANS TO SHUT DOWN UPON FIRE ALARM ACTIVATION.
1.9. FOR ADDITIONAL ELEVATOR AND FIRE ALARM INTERLOCKING DETAILS, COORDINATE WITH THE EXISTING ELEVATOR MANUFACTURER.
1.10. ANY SINGLE FIRE ALARM HORN/STROBE IN ALARM STATE IS TO ACTIVATE ALL FIRE ALARM HORNS/STROBE UNITS SIMULTANEOUSLY.
1.11. FIRE ALARM HORNS TO BE SILENCED MANUALLY AT FIRE ALARM CONTROL PANEL. IN ADDITION AUTOMATIC SILENCING SHALL BE PROGRAMMED AS FOLLOWS; ALARM SIGNAL CANNOT BE SILENCED AUTOMATICALLY BEFORE 20 MINUTES HAS ELAPSED AS PER OBC 3.2.4.7/3.2.4.20(13).



NOTE:
1. DIAGRAMMATIC ONLY, CONFIRM QUANTITIES ON PLANS.

FIRE ALARM RISER DIAGRAM

SCALE: N.T.S.

NEW PANEL B

60 CIRCUIT 225A, 3PH SURFACE MOUNTED

CIRCUIT #		DESCRIPTION	AMPS A	AMPS B	AMPS C	VOLTS	PHASE	C.B.A.T.
1		EXTERIOR DOWNLIGHTS/TIMER	16			120	1	20
3		CORRIDOR, COMMUNITY RM LIGHTING, EMERG LIGHT & EF-2		16		120	1	20
5		VESTIBULE POWER DOOR OPERATOR			6	120	1	15
7		TRANSFORMERS FOR WASHROOM FIXTURES	5			120	1	15
9		DISHWASHER		12		120	1	15
11		UNIVERSAL W/R PULL SWITCH ALARM & POWER DOOR			1	120	1	15
13		ROOFTOP MAINTENANCE RECEPTACLES	16			120	1	15
15		RECEPTACLES		12		120	1	15
17		RECEPTACLES			12	120	1	15
19		COUNTER RECEPTACLE	16			120	1	20
21		DF-1 BOTTLE FILLING STATION		5		120	1	15
23		GF-1			6	120	1	15
25		WASHROOM LIGHTING, EF-1	16			120	1	20
27		RECEPTACLES		12		120	1	15
29		FIRE ALARM CONTROL PANEL			6	120	1	15
31		TRANSFORMERS FOR WASHROOM FIXTURES	5			120	1	15
33		FFH2		17		208	2	20
35					17			
37		BBH1	5			120	1	15
39		FFH1		13		120	1	20
41		FFH1			13	120	1	20
43		FFH1	13			120	1	20
45		FFH1		13		120	1	20
47		FFH1			13	120	1	20
49		FFH1	13			120	1	20
51		RUNNING MAN EXIT SIGNS		3		120	1	15
53		HYDRAULIC LIFT RECEPTACLE (FUTURE)			12	120	1	15
55								
57								
59								
	2		28					
	4	CU-1		28		208	3	35
	6				28			
	8	AC-1, AC-2	1			208	2	15
	10			1				
	12	AC-3, AC-6			1	208	2	15
	14		1					
	16	AC-4, AC-5		1		208	2	15
	18				1			
	20	ERV-1	5			208	2	15
	22			5				
	24	HAND DRYER			10	120	1	15
	26	ERV-2	10			120	1	15
	28	ERV-3		10		120	1	15
	30	EDH-1			13	120	1	20
	32	HAND DRYER	10			120	1	15
	34	EDH-2		4		120	1	15
	36	HAND DRYER			10	120	1	15
	38	EF-3	2			120	1	15
	40	HAND DRYER		10		120	1	15
	42	HAND DRYER			10	120	1	15
	44							
	46							
	48							
	50							
	52							
	54							
	56							
	58							
	60							

THE ELECTRICAL CONTRACTOR IS TO CONFIRM FINAL CIRCUIT LOAD AND ENSURE CIRCUIT PROTECTION, WIRING AND CONDUIT IS SIZED TO SATISFY THE ONTARIO ELECTRICAL SAFETY CODE

TOTAL PHASE A	162		
TOTAL PHASE B		162	
TOTAL PHASE C			159

Do not scale drawings. Report any discrepancies to Hallex Engineering Ltd. before proceeding.

This drawing must be signed and sealed by the Engineer prior to use in construction or submission for building permit.

All construction shall be in accordance with latest edition of the Ontario Building Code and all applicable Ontario regulations.

No part of this drawing including details, calculations or schedules may be reproduced in any form, either in part or whole, without the prior written consent of Hallex Engineering Ltd.

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4999 Victoria Ave., Niagara Falls, ON L2E 4C9 Tel: 905-357-4015 Fax: 905-353-1105

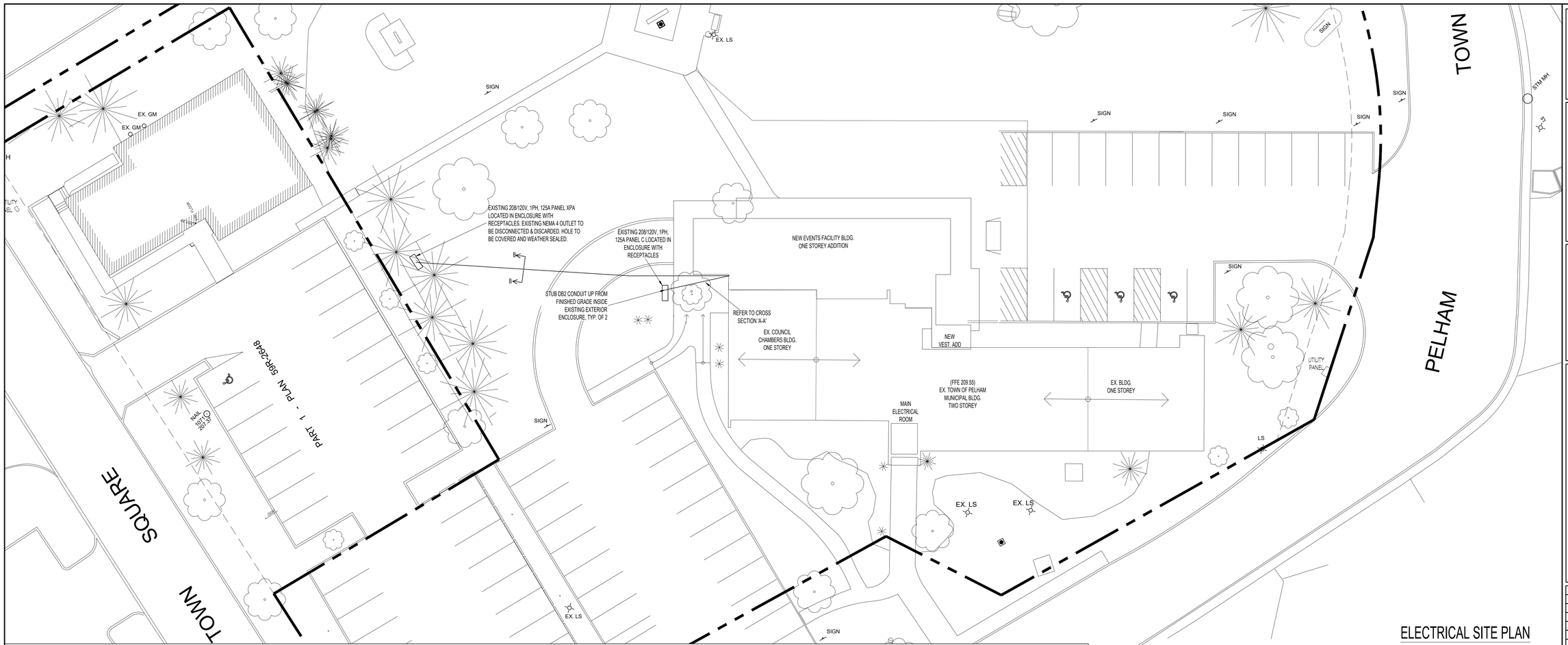
REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT/TENDER	2022/05/31
1	PERMIT/TENDER	2022/06/07

CLIENT:
GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON.
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON.

SHEET TITLE:
LEGENDS, LIGHT SCHEDULE & PARTIAL SINGLE LINE DIARGAM

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BG
DESIGNED BY:	BG
CHECKED BY:	MWo
SCALE:	
DWG.	E1
REV.	1

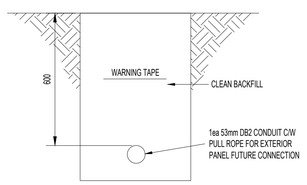


ELECTRICAL SITE PLAN

SCALE: 1:200

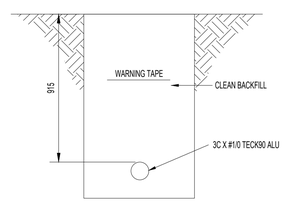
MECHANICAL / ELECTRICAL COORDINATION SCHEDULE

DEVICE DETAILS			ELECTRICAL CHARACTERISTICS							F/A SHUTDOWN (BY DIV. 16.)	REMOTE CONTROL (THIS COLUMN REFERS TO INTERLOCKING ONLY. NOT THE EQUIPMENT ITSELF)									NOTES
TAG	DESCRIPTION	LOCATION	HORSEPOWER	KW	FULL LOAD AMPS	MINIMUM CIRCUIT AMPS	VOLTAGE	PHASE	ISOLATING DEVICE	EQUIPMENT TO SHUTDOWN	THERMOSTAT	R/A THERMOSTAT	BMS	SWITCH	SENSOR	TIMER	INTERLOCKED WITH	CONTROL INTERLOCKED BY	CONTROL SUPPLIED BY	CONTROL INSTALLED BY	LEGEND: E = ELECTRICAL CONTRACTOR M = MECHANICAL CONTRACTOR O = OTHER
AC-1	INDOOR VRF UNIT	WOMENS WASHROOM				0.40	208	1	PANEL B		X						CU-1, FFH-2	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-2.
AC-2	INDOOR VRF UNIT	MENS WASHROOM				0.40	208	1	PANEL B		X						CU-1, FFH-3	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-3.
AC-3	INDOOR VRF UNIT	COMMUNITY ROOM				0.40	208	1	PANEL B		X						CU-1, FFH-4	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-4.
AC-4	INDOOR VRF UNIT	CORRIDOR				0.40	208	1	PANEL B		X						CU-1, FFH-1, FFH-6	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16. PROVIDE DDC INTERLOCK WITH FFH-1 & FFH-6.
AC-5	INDOOR VRF UNIT	STORAGE ROOM				0.40	208	1	PANEL B		X						CU-1, FFH-5	M	M	M	CONTROLLED BY THERMOSTAT, INTERLOCKED WITH CU-1 BY DIV. 15. HIGH VOLTAGE CONNECTIONS BY DIV. 16.PROVIDE DDC INTERLOCK WITH FFH-5.
CU-1	OUTDOOR VRF CONDENSING UNIT	ROOFTOP				27.6	208	3	PANEL B		X						AC-1, AC-2, AC-3, AC-4, AC-5	M	M	M	INTERLOCKED WITH INDOOR UNITS BY DIV. 15. HIGH VOTLAGE CONNECTIONS BY DIV. 16.
EF-1	EXHAUST FAN	JANITOR CLOSET				0.1	120	1	PANEL B					X				E	E	E	INTERLOCKED w/ LIGHT SWITCH BY DIV. 16.
EF-2	EXHAUST FAN	STORAGE ROOM				2.0	120	1	PANEL B					X				E	E	E	INTERLOCKED w/ LIGHT SWITCH BY DIV. 16.
EF-3	EXHAUST FAN	ROOFTOP				2.0	115	1	PANEL B			X						E	M	M	CONTROLLED BY REVERSE ACTING THERMOSTAT
GF-1	DUCT GAS FURNACE	ROOFTOP				6.0	120	1	PANEL B		X						ERV-1	M	M	M	INTERLOCKED TO OPERATE WITH ERV-1
ERV-1	ENERGY RECOVERY VENTILATIOR	ROOFTOP				10.8	208	1	PANEL B							X	GF-1	M	M	M	CONTROLLED BY SCHEDULED TIMER, OVERRIDE BY SWITCH. INTERLOCKED TO OPERATE WITH GF-1.
ERV-2	ENERGY RECOVERY VENTILATIOR	COMMUNITY ROOM				10.0	120	1	PANEL B							X	EDH-1	M	M	M	CONTROLLED BY SCHEDULED TIMER, OVERRIDE BY SWITCH
ERV-3	ENERGY RECOVERY VENTILATIOR	CORRIDOR				10.0	120	1	PANEL B							X	EDH-2	M	M	M	CONTROLLED BY SCHEDULED TIMER, OVERRIDE BY SWITCH
EDH-1	ELECTRIC DUCT HEATER	WASHROOMS		1.5			120	1	PANEL B		X						ERV-2	E	M	M	CONTROLLED BY DUCT HEATER THERMOSTAT & INTERLOCKED TO OPERATE DURING ERV-2 HOURS OF OPERATION.
EDH-2	ELECTRIC DUCT HEATER	WASHROOMS		0.5			120	1	PANEL B		X						ERV-3	E	M	M	CONTROLLED BY DUCT HEATER THERMOSTAT & INTERLOCKED TO OPERATE DURING ERV-3 HOURS OF OPERATION.
HWT-1	ELECTRIC HOT WATER TANK	ELECTRICAL ROOM		3.0			208	1	PANEL A									-	-	-	CONTROLLED BY INTEGRAL AQUASTAT
P-1	DOMESTIC HOT WATER CIRCULATION PUMP	ELECTRICAL ROOM	1/25			0.84	115	1	PANEL A									M	M	M	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
CLAVH	BASINS	WASHROOMS					6	1	PANEL B						X			E	M	E	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
UR	URINALS	WASHROOMS					24	1	PANEL B						X			E	M	E	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
WCH	WATER CLOSETS	WASHROOMS					24	1	PANEL B						X			E	M	E	120V WIRING BY DIV. 16, 24V WIRING BY DIV. 15.
BBH-1	BASEBOARD HEATER	BF WASHROOM		0.5			120	1	PANEL B									E	E	E	SUPPLY AND INSTALL BY DIV. 16.
FFH-1	FORCED FLOW HEATER	CORRIDOR		1.5			120	1	PANEL B								AC-4	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-4.
FFH-2	FORCED FLOW HEATER	MENS WASHROOM		1.5			120	1	PANEL B								AC-1	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-1.
FFH-3	FORCED FLOW HEATER	WOMENS WASHROOM		1.5			120	1	PANEL B								AC-2	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-2.
FFH-4	FORCED FLOW HEATER	COMMUNITY ROOM		1.5			120	1	PANEL B								AC-3	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-3.
FFH-5	FORCED FLOW HEATER	STORAGE ROOM		1.5			120	1	PANEL B								AC-5	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-5.
FFH-6	FORCED FLOW HEATER	CORRIDOR		1.5			120	1	PANEL B								AC-4	M	M	M	SUPPLY AND INSTALL BY DIV. 16. PROVIDE DDC INTERLOCK WITH AC-4.
FFH-7	FORCED FLOW HEATER	VESTIBULE		4.0			120	1	PANEL B									E	E	E	SUPPLY AND INSTALL BY DIV. 16.
DF	BOTTLE FILLING STATION	CORRIDOR			5.0		120	1	PANEL B									M	M	M	120V WIRING BY DIV.16, 24V WIRING BY DIV.15.



TRENCH DETAIL 'A-A'

SCALE: N.T.S.



TRENCH DETAIL 'B-B'

SCALE: N.T.S.

LICENSED PROFESSIONAL ENGINEER
M. R. WORRALL
06/07/2022
220321
PROVINCE OF ONTARIO

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4999 Victoria Ave., Niagara Falls, ON L2E 4C9 Tel: 905-357-4015 Fax: 905-353-1105

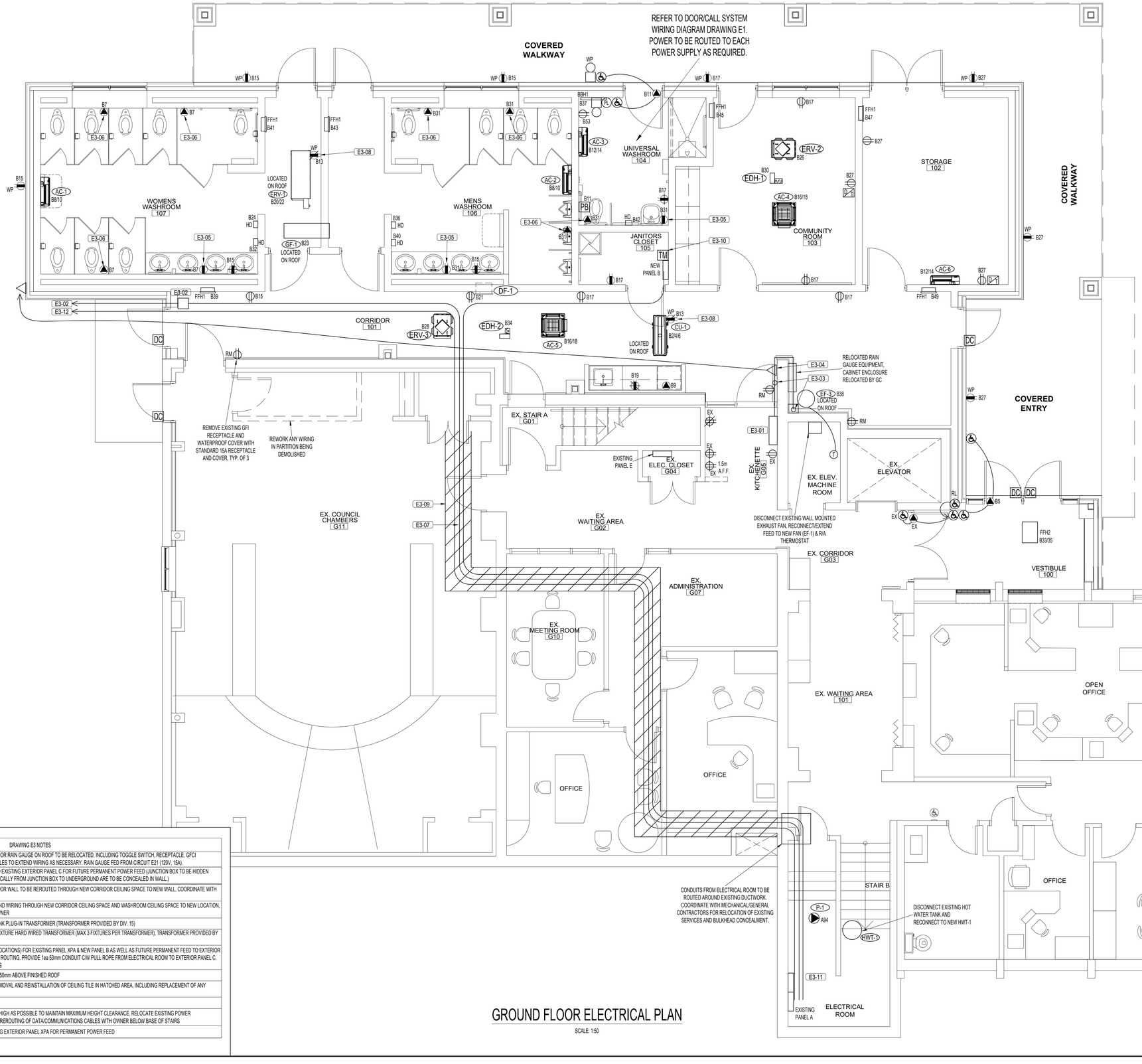
REV.	ISSUED FOR:	YYYY/MM/DD
0	PERMIT/TENDER	2022/05/31
1	PERMIT/TENDER	2022/06/07

CLIENT:
GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON.
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON.

SHEET TITLE:
ELECTRICAL SITE PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BG
DESIGNED BY:	BG
CHECKED BY:	MWo
SCALE:	AS SHOWN
DWG.	E2
REV.	1



GROUND FLOOR ELECTRICAL PLAN

SCALE: 1:50

DRAWING E3 NOTES	
E3-01	EXISTING POWER AND MONITORING EQUIPMENT FOR RAIN GAUGE ON ROOF TO BE RELOCATED, INCLUDING TOGGLE SWITCH, RECEPTACLE, GFCI PROTECTION AND ENCLOSURE. MATCH TECK CABLES TO EXTEND WIRING AS NECESSARY. RAIN GAUGE FED FROM CIRCUIT E21 (120V, 15A).
E3-02	1ea 53mm DB2 CONDUITS FROM JUNCTION BOX TO EXISTING EXTERIOR PANEL C FOR FUTURE PERMANENT POWER FEED (JUNCTION BOX TO BE HIDDEN ABOVE DROP CEILING. CONDUITS RUNNING VERTICALLY FROM JUNCTION BOX TO UNDERGROUND ARE TO BE CONCEALED IN WALL.)
E3-03	EXISTING CONDUIT AND CONDUCTORS ON EXTERIOR WALL TO BE REROUTED THROUGH NEW CORRIDOR CEILING SPACE TO NEW WALL, COORDINATE WITH GENERAL CONTRACTOR
E3-04	RELOCATE EXISTING ANTENNA TOWER AND EXTEND WIRING THROUGH NEW CORRIDOR CEILING SPACE AND WASHROOM CEILING SPACE TO NEW LOCATION, COORDINATE FINAL ANTENNA LOCATION WITH OWNER
E3-05	RECEPTACLE MOUNTED UNDER COUNTER FOR SINK PLUG-IN TRANSFORMER (TRANSFORMER PROVIDED BY DIV. 15)
E3-06	PROVIDE 4"X4" JUNCTION BOX FOR WASHROOM FIXTURE HARD WIRED TRANSFORMER (MAX 3 FIXTURES PER TRANSFORMER), TRANSFORMER PROVIDED BY DIV. 15)
E3-07	PROPOSED ROUTING (BASED ON DROP CEILING LOCATIONS) FOR EXISTING PANEL XPA & NEW PANEL B AS WELL AS FUTURE PERMANENT FEED TO EXTERIOR PANEL C, CONFIRM ON SITE FOR MOST EFFICIENT ROUTING. PROVIDE 1ea 53mm CONDUIT C/W PULL ROPE FROM ELECTRICAL ROOM TO EXTERIOR PANEL C. PROVIDE AND INSTALL ALL REQUIRED PULL BOXES
E3-08	MAINTENANCE RECEPTACLE LOCATED MINIMUM 750mm ABOVE FINISHED ROOF
E3-09	GENERAL CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REINSTALLATION OF CEILING TILE IN HATCHED AREA, INCLUDING REPLACEMENT OF ANY BROKEN TILES
E3-10	TIMER FOR EXTERIOR LIGHTING
E3-11	FASTEN CONDUIT TO UNDERSIDE OF CEILING, AS HIGH AS POSSIBLE TO MAINTAIN MAXIMUM HEIGHT CLEARANCE. RELOCATE EXISTING POWER CONDUCTORS AS NECESSARY AND COORDINATE REROUTING OF DATA/COMMUNICATIONS CABLES WITH OWNER BELOW BASE OF STAIRS
E3-12	TECK90 CONDUCTORS FROM PANEL A TO EXISTING EXTERIOR PANEL XPA FOR PERMANENT POWER FEED

LICENSED PROFESSIONAL ENGINEER
M. R. WORRALL
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GRGURIC ARCHITECTS INC.
28 KING STREET EAST, UNIT B
STONEY CREEK, ON.
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON.

SHEET TITLE:
GROUND FLOOR
ELECTRICAL PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
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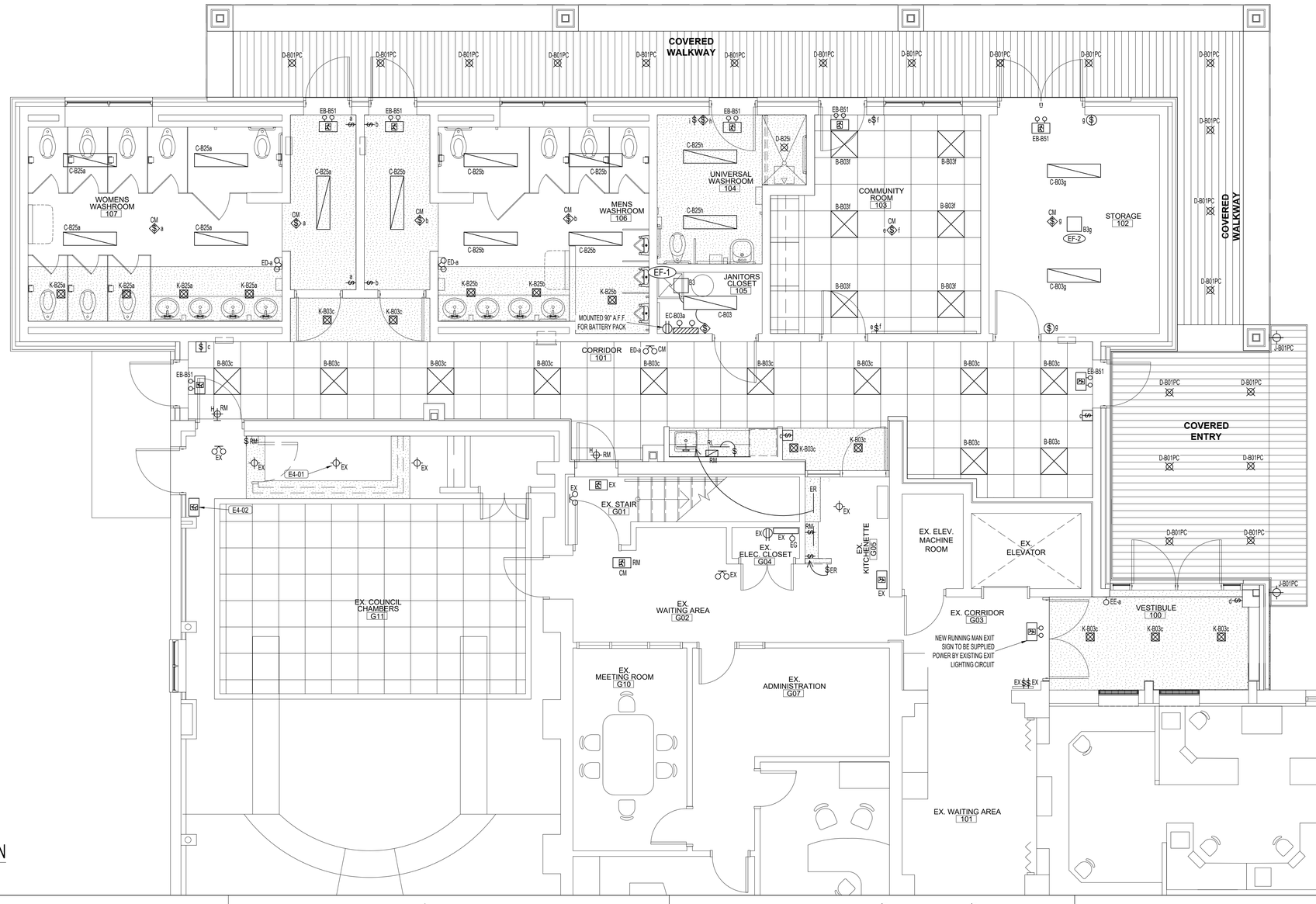
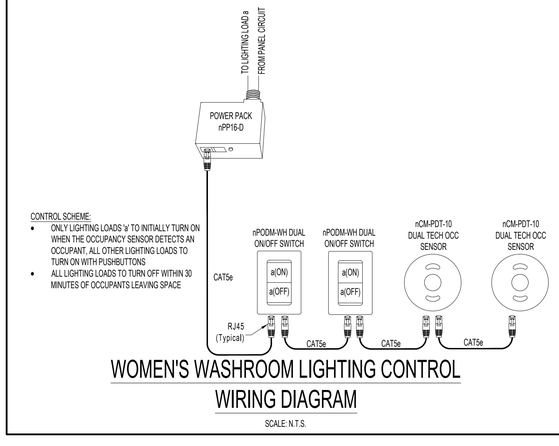
DESIGNED BY:	BG
CHECKED BY:	MWo
SCALE:	AS SHOWN
DWG.	E3
REV.	1



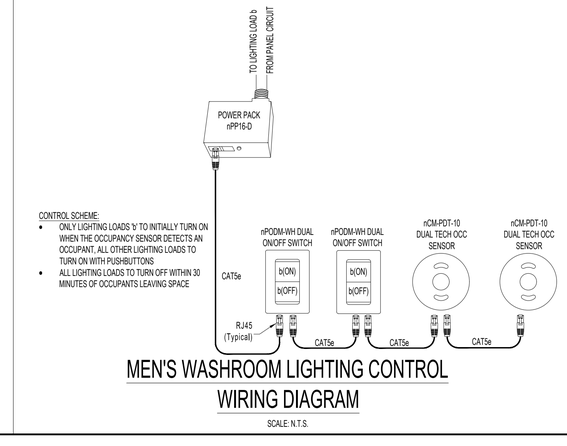
GROUND FLOOR LIGHTING PLAN

SCALE: 1:50



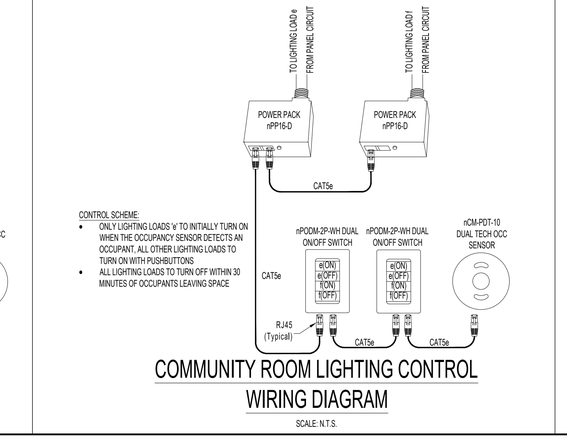
WOMEN'S WASHROOM LIGHTING CONTROL WIRING DIAGRAM

SCALE: N.T.S.



MEN'S WASHROOM LIGHTING CONTROL WIRING DIAGRAM

SCALE: N.T.S.



COMMUNITY ROOM LIGHTING CONTROL WIRING DIAGRAM

SCALE: N.T.S.

DRAWING E4 NOTES	
E4-01	EXISTING LIGHT TO BE CONTROLLED BY SAME SWITCH AS OTHER EXISTING DOWNLIGHTS SHOWN IN COUNCIL CHAMBERS
E4-02	EXISTING EXIT SIGN TO BE REPLACED WITH NEW TYPE EA RUNNING MAN EXIT SIGN WITH NO ARROWS

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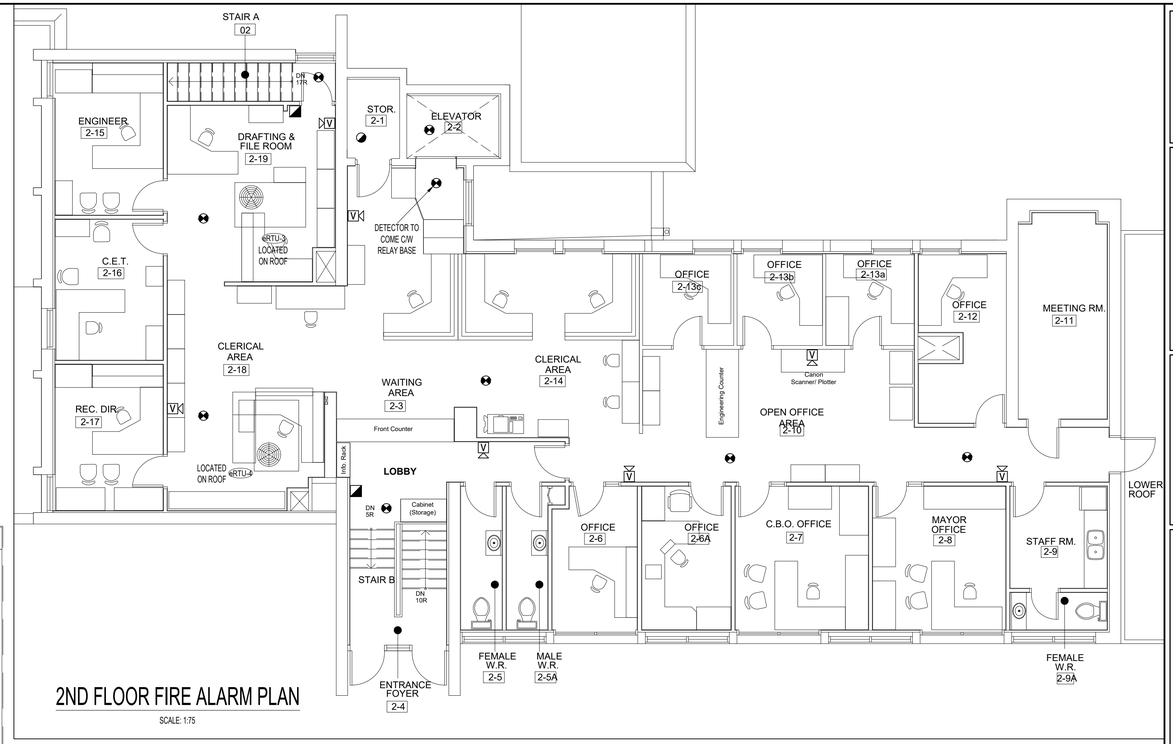
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON.

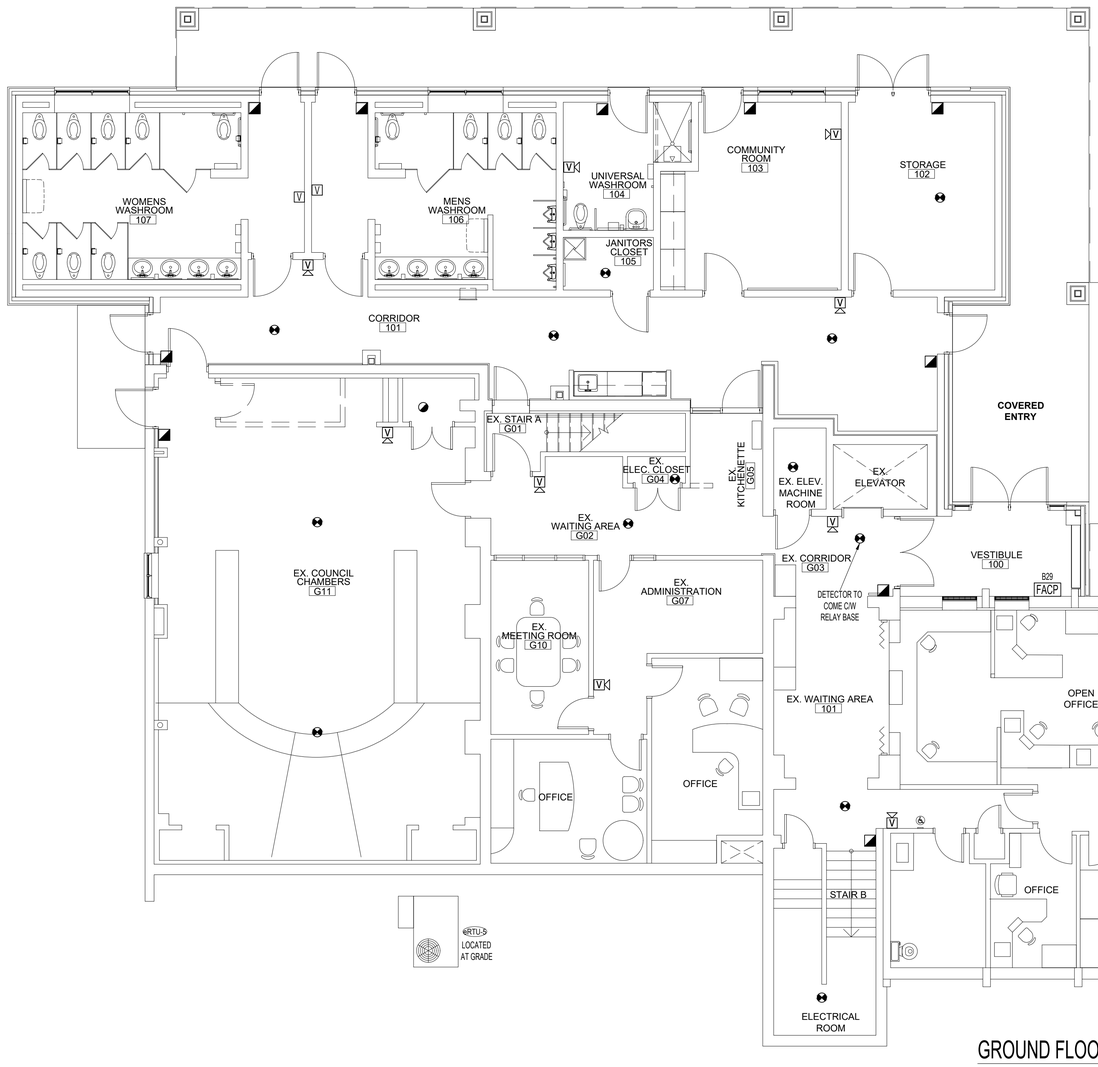
SHEET TITLE:
GROUND FLOOR LIGHTING PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BG
DESIGNED BY:	BG
CHECKED BY:	MWo
SCALE:	AS SHOWN
DWG.	E4
REV.	1



2ND FLOOR FIRE ALARM PLAN

SCALE: 1:75



GROUND FLOOR FIRE ALARM PLAN

SCALE: 1:75

LICENSED PROFESSIONAL ENGINEER
M. R. WORRALL
06/07/2022
220321
PROVINCE OF ONTARIO

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28 KING STREET EAST, UNIT B
STONEY CREEK, ON.
L8G 1J8

PROJECT:
TOWN OF PELHAM
EVENT FACILITY ADDITION
20 PELHAM TOWN SQUARE
FONTHILL, ON.

SHEET TITLE:
FIRE ALARM PLAN

JOB NUMBER:	220321
DATE:	MAY, 2022
DRAWN BY:	BG
DESIGNED BY:	BG
CHECKED BY:	MWo
SCALE:	AS SHOWN
DWG.	E5
REV.	1

2022-PW-16-1 FAC 07-22 - Pelham Municipal Building Addition and Renovations

Opening Date: June 10, 2022 10:00 AM

Closing Date: July 8, 2022 2:00 PM

Bid Number: 2022-PW-16-1 FAC 07-22

Schedule of Prices

The Bidder hereby Bids and offers to enter into the Contract referred to and to supply and do all or any part of the Work which is set out or called for in this Bid, at the unit prices, and/or lump sums, hereinafter stated. HST is additional. In lawful money of Canada.

The first table is a Summary Table which provides your Sub-Total for each pricing table and also indicates whether or not the table is mandatory or not. Asterisk's within the table denotes a "**MANDATORY**" line item.

If the line item and/or table is "**NON-MANDATORY**" and you are not bidding on it, leave the table and/or line item blank. Do not enter a $0.00 dollar value unless you are prepared to provide the line item at zero dollars to the Owner.

If a table is "**NON-MANDATORY**" and you are bidding on it, you must bid on all line items with an asterisk.

If there are multiple tables, you must click the "**EDIT PRICING**" button inside the Summary Table to display the applicable Pricing Table that you wish to bid on.

2022-PW-16-1 Contract Pricing

We, the undersigned General Contractors, having visited the Site and examined all conditions affecting the work, propose to furnish all materials, labour and equipment required to construct project according to all Contract Documents including an addenda for the stipulated price of (in Canadian funds) (excluding HST):

Line Item	Quantity	Unit of Measure	Description	Contract Price (COMPLETE) (Excluding HST) *	Total
1	1	LOT	General Trades		
2	1	LOT	Mechanical		
3	1	LOT	Electrical		
				Subtotal:	

2022-PW-16-1 Breakout Pricing (Provisional)

The following are our Break-Out Prices (Provisional) for the work listed hereunder. Such work and amounts are included in our Contract Price. These prices do not include HST.

Line Item	Quantity	Unit of Measure	Description	Breakout (Excluding HST) *
1	1	LOT	Provide break out price for supply and install of work related to the extension and construction of the clock tower. This should include all structural and electrical and all work associated with this idem.	
2	1	LOT	Provide break out price to include for the supply and install of a third Clock to the clock tower and all work associated with this item.	

Specifications

Acknowledgement - General

Description	Yes - No *	
ACKNOWLEDGEMENT & UNDERSTANDING: We, the undersigned General Contractors, having visited the Site and examined all conditions affecting the work, propose to furnish all materials, labour and equipment required to construct project according to all Contract Documents including addenda numbered for the stipulated price of (in Canadian funds):	○ Yes ○ No	*

Acknowledgement - Bonds

Description	Yes - No *	
ACKNOWLEDGEMENT & UNDERSTANDING: BONDS: 1. A Bid Bond in the amount of 10% of the Tender Sum quoted. 2. An Agreement to Bond from an approved bonding Company for a 50% Performance Bond and for a 50% Labour and Material Bond, should this Tender be accepted.	○ Yes ○ No	*

Acknowledgement - Construction Schedule

Description	Yes - No *
ACKNOWLEDGEMENT & UNDERSTANDING: Should this tender be accepted on or prior to July 5, 2022 the contract will be substantially performed no later than September 6, 2022 and the contract will be completed no later than February 10, 2023.	○ Yes ○ No

Acknowledgement - Cash Allowance

Description	Yes - No *	
ACKNOWLEDGEMENT & UNDERSTANDING: The Stipulated Sum includes the Cash Allowance specified in Section 01020. 7. Bonds	○ Yes ○ No	*

Acknowledgement - Conflict Declarations

Description	Yes - No *	
ACKNOWLEDGEMENT & UNDERSTANDING: We, the undersigned declare that this tender is made without any connection, knowledge, comparison of figures or arrangements with any other company, firm or person making a tender for the same work and is fair and without collusion or fraud.	○ Yes ○ No	*

Acknowledgement - Questions, Discrepancies and Omissions

Description	Yes - No *	
7. Questions, Discrepancies and Omissions If a tenderer discovers discrepancies in, or omissions from, the specifications and/or site plans or other tender documents provided, or if he is in doubt as to their meaning, he should advise the Contract Administrator immediately. Only written addenda issued by the Town during the tender period shall become part of these conditions and instructions. Addenda cannot be issued later than five (5) working days before the closing date without extending the closing date and time. All Addenda will be made available through the Town's procurement software. ACKNOWLEGEMENT & UNDERSTANDING: All questions must be in writing via email with the Tender document number and name in the subject line to the designated representative of the Town for this Tender, Mara Bray, Purchasing Coordinator, purchasing@pelham.ca. All questions must be received at least six (6) business days prior to the Request closing date. All questions received later than six (6) business days before the closing will not be answered.	○ Yes ○ No	*

Subcontractors

The Bidder shall state all Subcontractor(s) and type of Work proposed to be used for this project. Bidders shall not indicate "TBD" (To Be Determined) or "TBA" (To Be Announced) or similar wording and shall not indicate multiple choices of Subcontractor names for any Subcontractor category in their list of Subcontractors.

2022-PW-16-1 Subcontractors

The following is the list of Subcontractors proposed to be used on this contract. Any substitution shall be subject to the approval of the Owner and contingent upon evidence of withdrawal or bankruptcy, satisfactory to the Architect:

TYPE	FULL COMPANY NAME	ADDRESS OF SUB-CONTRACTOR	
Masonry			*
Millwork			
Caulking and Sealing			
Metal Doors and Frames			
Drywall			
Ceramic & Porcelain Tile			
Resilient Flooring			
Sheet Flooring			
Painting			
Roofing			
Toilet Partitions			
Mechanical			
Electrical			

Documents

Ensure your Bid submission document(s) conforms to the following:

1. Documents should be in PDF format. Documents should NOT be provided in any other format.

2. Documents should NOT have a security password, as the Owner may not be able to open the file. It is the Bidder's sole responsibility to ensure that their uploaded document(s) are not either defective, corrupted or blank and that the documents can be opened and viewed by the Owner.

3. The Owner may reject any Bid where any document(s) cannot be opened and viewed by the Owner.

4. If a Bidder requires to upload more than one (1) document, the Bidder should combine the documents into one Zipped file, as per instructions stated below.

If uploading a zipped file containing more than one (1) document, please ensure each document is named, in relation to the submission format item responding to, for example, if responding to the Previous Experience category save the document as “Previous Experience”.

- Bid Bond (pdf Copy to support submission) * (mandatory)
- WSIB Document * (mandatory)

To compress (or zip) a file or folder, **follow these steps**

1. Locate the file or folder that want to compress.
*2. Right-click the file or folder, point to **Send to**, and then click **Compressed (zipped) folder**.*

*A new compressed folder is created in the same location. To rename it, right-click the folder, click **Rename**, and then type the new name.*

To upload a document follow these steps

1. Click on the browse button to locate the file on your computer or network
2. Click the upload button
3. After the file has been successfully uploaded, a link to the document will appear on the screen, along with the time/date that it was uploaded.
4. If you have completed your document upload and are ready to finalize your submission then click the "Continue with Submission" button at the bottom of the screen. Or you may save and come back later.
5. If you need to remove the document, click the remove button next to the document name.

Addenda, Terms and Conditions

The Bidder has carefully examined the Bid Call documents and has a clear and comprehensive knowledge of the Goods and/or Services required under the Bid Call Documents. By submitting the Bid, the Bidder agrees and consents to the terms, conditions and provisions of the Bid Call Document, and offers to provide the Goods and/or Services in accordance therewith and the person signing below is authorized to bind the Bidder

The Bidder hereby acknowledges and agrees:

1. To provide all goods, services and construction, as more specifically set out and in accordance with the Owner's Bid Call Document, including but not limited to the scope of work, specifications, drawings, Addenda (if issued by the Owner), the terms and conditions, etc. stated therein, which are expressly acknowledged and made part of this Contract.

2. This Bid is made without any connections, knowledge, comparison of figures or arrangements with any other company, firm or person making a Bid for the same Work and is in all respects fair and without collusion or fraud.

3. I/WE do hereby Bid and offer to enter into a Contract to do all the Work as specified in the Bid Call Document(s) which shall include all costs but not limited to; freight, duty, currency, etc. in accordance with the prices and terms as submitted by the Bidder herein.

4. If I/WE withdraw this Bid before the formal Contract is executed by the Awarded Bidder for the said Work or Ninety (90) Calendar Days, whichever event first occurs, the amount of the Bid Deposit accompanying this Bid (if applicable to this bid) shall be forfeited to the Owner.

5. If the Bid is accepted, I/WE agree to furnish all required documentation, as required by the Bid Call Document(s) within Ten (10) Calendar Days after notification of Award.

6. I/We acknowledge and agree that any issued Addendum/Addenda forms part of the Bid Call Document.

7. I/We, certify that we are in full compliance with Section 6 of Ontario Regulation 429/07, Accessibility Standards for Customer Service, made under the Accessibility for Ontarian's with Disabilities Act, 2005. If requested, we are able to provide written proof that all employees have been trained as required under the act. I/We shall be aware and sensitive to accessibility and disability issues.

8. I/WE (including any related or affiliated entities and any principal thereof) have no unresolved litigation with the Owner.

9. I/WE have read and agree to the WSIB DECLARATION and if awarded, shall submit to the Town at the time of entering into the Contract, and every sixty (60) days thereafter a satisfactory Certificate of Clearance from the Ontario WSIB. Ontario WSIB Clearance Certificates and updates will continue to be retained by the Town. Such clearance certificates shall indicate that the Contractor and any prior approved Sub-Contractor(s) have complied with the requirements of the Ontario WSIB and is (are) in good standing on the books of the Ontario WSIB. The Board may, at any time during the performance or upon completion of the Contract, require a further declaration that all such assessments or compensations have been paid.

10. I/WE have read and agree to the following Agreement to Abide by the Established Process.

The Town is advising each of the Towns Council Members, staff, volunteers and agents that the integrity of the bidding process requires observance of the following ground rules:

1. All communications, including requests for information, between Bidders and the Town must be between only the representatives of the Town and each Bidder, named below, who have been authorized and designated for that particular purpose.

2. Apart from the communications between and among the designated representatives, there must be no communication between the Town and any representative of the Bidder, and no giving of information with respect to the Bid Call Document and the Contract.

3. Any attempt on the part of any Bidder, or any of its employees, agents, contractors, subcontractors or representatives to contact any persons other than the designated representatives with respect to the Bid Call Document, or any action or violation of the above requirements, will be grounds for disqualification, and the Town may, in its discretion, in addition to any other rights or remedies available at law, reject any potential or actual Bid submitted by that Bidder.

4. Proponents must accept and agree to observe the contents of this "Agreement to Abide by Established Process", inform their staff thereof, and ensure their compliance therewith.

11. I/WE acknowledge and agree that should it be determined that any statements provided in our / my Bid are false or in error, the Town may reject my Bid as non-compliant.

12. I/WE acknowledge and agree to be bound by the General Terms and Conditions

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I/WE agree to be bound by the terms and conditions contained in the Bid Document and any applicable Addenda, and the person named below has the authority to submit this bid on behalf of the Bidder.

Conflict of Interest

Each Bidder shall declare in its Bid any situation that may be a conflict of interest or a potential or perceived conflict of interest of the Proponent, including but not limited to its obligations to the Board, the Contract, the Contract Price or any Customer.

Section 5(1) of the Municipal Conflicts of Interest Act states; where a member, either on his or her own behalf or while acting for, by, with or through another, has any pecuniary interest, direct or indirect, in any matter and is present at a meeting of the council or local board at which the matter is the subject of consideration, the member.

(a) shall, prior to any consideration of the matter at the meeting, disclose the interest and the general nature thereof;

(b) shall not take part in the discussion of, or vote on any question in respect of the matter; and

(c) shall not attempt in any way whether before, during or after the meeting to influence the voting on any such question.

The Town has a fiduciary responsibility to ensure that such behaviour is not permitted and reserves the right to remove from eligibility, the name of any Bidder for failure to comply with the above conditions. The Bidder declares that this Bid is not made in connection with any other Bidder submitting an offer for the same commodity/service and is, in all respects, fair and without collusion or fraud. Based on the above, do you believe your firm may be in possible conflict of interest? Please check appropriate answer

○ **Yes** ○ **No**

The Bidder acknowledges and agrees that the addendum/addenda below form part of the Bid Document. The Bidder acknowledges receipt of the addenda and the price(s) quoted incorporate such addenda.

Please check the box in the column "**I have reviewed this addendum"** below to acknowledge each of the addenda.

File Name	I have reviewed the below addendum and attachments (if applicable)	Pages
There have not been any addenda issued for this bid.		