Consulting Engineers | Working Together, Better

Fire Station 4-5 Storage Building

300 Earl Stewart Drive, Aurora ON

Issued for Tender

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1.1 Use and Reliance Upon Available Project Information

.1 Available Project information is made available to Bidders to fulfill the *Owner*'s duty to disclose all relevant Project information to Bidders.

.2 Bidders shall interpret and draw their own conclusions about available Project information, including consideration of the time when it was created. Available project information may be time sensitive. The *Owner* and *Consultant* assume no responsibility for such interpretations and conclusions.

.3 Available Project information, or any part thereof, shall not be construed as contract requirements unless also reflected in *Drawings* or *Specifications*, and in case of conflict the *Drawings* or *Specifications* shall govern.

.4 Bidders, acting reasonably, may rely on available Project information in preparing their bids, subject to any qualifications stated in such Available Project information and unless expressly stated otherwise in this Section.

1.2 Available Project Information

.1 Geotechnical investigation report entitled A Soil investigation for Proposed Fire Hall, 625 St. John's Sideroad and 71 Pedersen Drive Town of Aurora, dated December 2015, prepared by Soil Engineers Ltd., reference No. 1509-S135. This report is included in the Bid Documents.

.2 The following Drawings and Specifications for the original building dated August 2018, prepared by SEI Electrical Engineering for ThomasBrown Architects: E101 - Site-Power and Systems. The listed original building drawings and specification are included in the Bid Documents.

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the Contract and Division 01, General Requirements apply to this section.

1.2 Division of Work

.1 Division of the *Work* among *Subcontractors* and *Suppliers* is solely *Contractor*'s responsibility. *Consultant* and *Owner* assume no responsibility to act as an arbiter to establish subcontract limits between Sections or Divisions of the *Work*.

1.3 Documents at the Site

.1 Keep the following documents at *Place of the Work*, stored securely and in good order and available to *Owner* and *Consultant* in hard copy or electronic form. If kept only in electronic form, provide tablet or similar device for viewing documents by *Owner* or *Consultant*:

.1 Current *Contract Documents*, including *Drawings, Specifications* and addenda.

.2 *Change Orders, Change Directives*, and *Supplementary Instructions*.

.3 Reviewed *Shop Drawings*, *Product* data and samples.

.4 Field test reports and records.

.5 Construction progress schedule.

.6 Meeting minutes.

.7 Manufacturer's certifications.

.8 Permits, inspection certificates, and other documents required by authorities having jurisdiction.

.9 Current as-built drawings.

.10 Material Safety Data Sheets (MSDS) for all controlled *Products*.

.11 Proof of WHMIS Training.

.12 Health and Safety Plan.

.13 Latest edition of the Occupational Health and Safety Act and Regulations for Construction Projects.

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EXISTING CONDITIONS AND OBJECTIVES

The purpose of the project is to provide a storage enclosure at 300 Earl Stewart Drive, Aurora. The work includes preparation of the site, supply and install a shipping container foundation, supply and installation of a fabric canopy enclosure, and all associated fixtures and finishes.

The project may be completed in 2024 or with site work and installation of shipping containers completed in 2024 with installation canopy enclosure and finishes in 2025. The Work is to be priced as a single phase project.

Existing shipping containers to be reused

General view of work area

STIPULATED AND UNIT PRICE ITEMS

Items outlined below coincide with the Stipulated Price items listed on the Bid Form and are to include all costs associated with the following:

1.0 General

.1 **Mobilization, Access and Protection (Item 1.1):**

.1 This item shall include, but not be limited to, all related equipment, mobilization, project management, safety supervision, site protection, coordination with Consultant and Building Management, demobilization, securities, site cleanup and repair of damage caused by the work.

.2 The site is active 24/7. The Owner will occupy the premises during entire construction period for execution of normal operations. Cooperate with the Owner in scheduling operations to not affect the operations of the Owner.

.3 Contractor is to coordinate the work/access with the Owner on a daily basis.

.4 Temporary barriers, enclosures and signage will be highly enforced. No public access to the work area is to be allowed and no work is to occur outside enclosed work area.

.5 It is expected that the Contractor will ensure the safety and proper routing of the public. Maintain fire routes and exits. No areas of access to or around the building are to be restricted without the approval of the Owner.

.6 Where a worker may be exposed to a fall hazard, the employer of the worker is responsible for providing and ensuring that all such workers be adequately trained and protected by a fall protection system that meets the requirements of the Occupational Health and Safety Act - Ontario Regulation 213/91 - Section 26.

.7 Provide access to the work area as required to facilitate review by the Consultant as described herein.

.8 Provide temporary support to existing structural and cladding components during performance of work (if required).

.9 Install temporary protection for all building components, vehicles, pedestrians and occupants, as required to ensure safe, clean, and orderly removal and disposal work.

.10 Weather protection and enclosures (if required) are to be included in this item and will not be considered as an additional cost after award of the project. Provide weather protection for building components as required to perform the work if required and as specified.

.11 Coordination of trades will be the responsibility of the Contractor to ensure the work is completed as soon as possible.

.12 Prior to commencement of work, determine the nature and extent of all site services above and below grade. Contractor to establish exact locations before commencing work. Clearly mark such locations to prevent disturbance during work. Take care during excavations and/or removal operations to prevent damage to buried services. Any damages are to be immediately reported to the Owner and Consultant. Any damages caused by not performing locates or by negligence will be at the Contractors expense to rectify. Since this is private property, a private utility locating company must perform the service locates.

.13 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and related components. Obtain direction from Consultant or specific utility provider before moving or otherwise disturbing utilities.

.14 Prior to commencement of the Work, record condition and take photographs of existing building and landscaping components. Provide daily and final cleanup to restore site landscaping (grassed areas, shrubs and hard surfaces) to pre-construction conditions. During the completion of the Work, every attempt to minimize damage to landscaping shall be exercised, including the control of debris.

.1 Making good of site landscaping includes all making required to provide electrical power to the storage building.

.15 For work completed by a subcontractor, a representative of the general contractor must be present on site at all times.

.16 Permit Application: The Contractor shall apply for and pick up the building permit. The Consultant will provide copies of the project drawings and specifications in PDF format

for use by the Contractor. All other permit documentation is to be prepared and submitted by the Contractor. The Owner will pay for the Permit.

.17 Coordinate compaction testing by an independent testing agency. All administration, profit, and overhead to coordinate testing is included in this item. The cost of testing will be paid by the Owner.

.2 **Bonding (Item 1.2):** Obtain bonding as set out in the specifications. This item may be removed from the Tender Form at the option of the Owner.

2.0 Site Grading, Granular Base and Reclaimed Asphalt Surfacing

.1 **Site Grading and Granular Base (Item 2.1)**: Supply and installation of granular base to elevations indicated and as required to receive reclaimed asphalt surfacing. Work to include, but not be limited to the following:

.1 Removal of existing large stone finish across Work area down to existing granular subbase (240 mm +/-) will be by Owner/others.

.2 Grade and proof roll the existing sub-grade granular to uniform profile and compacted to 98% Standard Proctor.

.3 Supply of new crushed limestone conforming to the Granular 'A' designation. Compact to density not less than 100% Standard Proctor maximum dry density. Depth of new material will vary to suit site conditions. Finished surface to be level to suit reclaimed asphalt surfacing.

.2 **Reclaimed Asphalt (Item 2.2):** Supply and install new reclaimed asphaltic as specified. Work to include, but not be limited to the following:

.1 Supply and installation of filter fabric and reclaimed asphalt asphaltic to a minimum compacted thickness of 100 mm. The height of the finished surface should be uniform across storage area to minimum 600 mm beyond footprint of storage containers. Compact to density not less than 98% Standard Proctor maximum dry density.

.3 **Retaining Wall (Item 2.3)**: Supply and installation of new retaining wall as specified. Work to include, but not be limited to the following:

.1 Supply and installation of mass concrete retaining wall as indicated on drawings including drainage board, continuous securement bar, filter fabric, weeping tile in filter cloth sock and granular base and backfilling.

3.0 Shipping Containers

.1 **Shipping Containers (Item 3.1):** Supply and installation of prefinished steel shipping containers in accordance with specifications and drawings. Work to include, but not be limited to the following:

.1 Provide shop drawings for placement and modification of shipping containers including, rolling shutter doors, man doors, barn style doors, all door hardware, pallet stops (continuous steel angle welded to top of containers), container coupling, and pre-engineered truss mounting brackets (supplied by fabric building supplier).

.2 Owner has two (2) existing 20 foot long x eight (8) foot wide shipping containers that are to be incorporated into the work. Three (3) new 40 foot long x eight (8) foot wide shipping containers are to be provided by container supplier. New containers to match width and height of existing containers.

.3 All modifications to existing containers and new containers are to be by the container supplier in accordance with their standard assemblies and approved shop drawings. Refer to drawings for general modification requirements for containers.

.4 Installation of pre-engineered truss mounting brackets.

.5 Supply and install all man doors and rolling shutter doors. Doors to be standard for container supplier and include all operational hardware. Man doors to be keyed alike unless directed otherwise by Owner. Padlock for container rolling shutter doors to be keyed alike unless directed otherwise by Owner.

.6 Supply of new and placement of all shipping containers to location indicated on project drawings.

4.0 Pre-Engineered Fabric Building

.1 **Pre-Engineered Fabric Enclosure (Item 4.1):** Supply and installation of pre-engineered fabric building in accordance with specifications and drawings. Work to include, but not be limited to the following:

.1 Preparation of engineered shop drawings for complete assembly including fire rated fabric, structural steel frame, two (2) gable louver vents in front wall and two (2) gable louvre vents in rear wall, each three foot by thee foot (3'x3'), electric operated rolling shutter, man door, and all accessories as required for complete installation.

.2 Installation of pre-engineered fabric enclosure and all associated accessories.

.3 Supply and installation of concrete blocks as required for HSS and fabric termination.

.4 Supply and installation of 14' wide x 16' high, vertical lift overhead door in front elevation, with electric motor, one set of operation controls on interior and exterior.

.5 Supply and installation of 3'-0" wide man door in front elevation, complete with hardware. Door to be keyed to owner requirements.

.6 Provide fifteen-year (15) manufacturers warranty on fabric and fifteen-year (15) steel frame coating and defects in materials and workmanship,

5.0 Electrical

.1 **Electrical (Item 5.1):** Work to include, but not be limited to the following:

.1 Supply and installation of power supply from existing building to new storage building. Utilize existing empty conduit running from existing electrical room on the east side of the building that runs north to the new storage building.

.2 Supply and installation of power to front rolling shutter / high lift overhead door.

.3 Supply and install all lighting and controls.

.4 Supply and install all power outlets.

.5 Provide ESA electrical certification for complete installation as part of closeout documentation.

UNIT PRICES

Items outlined below coincide with the Unit Price items listed on the Bid Form and are to include all costs associated with the following:

.1 **Replace Contaminated or Inadequate Subbase Material:** Excavate contaminated or inadequate subbase material and disposal of at an approved site. Replace with new crushed limestone conforming to the Granular 'A' designation compacted to 98% Standard Proctor. Repeat as required to achieve specified grades and compaction. Compaction testing is to confirm compaction level has been obtained before commencement of installation of new granular base.

.2 **Labour Costs:** Hourly costs related to the completion of work not originally specified in the scope of work. Contractor to submit a detailed breakdown of hours for any work completed under this item.

QUALIFICATIONS

.1 The above is to be considered a general description of the work to be completed and must not be construed as limiting the scope of work.

.2 All quantities / measurements to be confirmed by Contractor from on-site take-offs.

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 01, General Requirements apply to this section.

1.2 Contractor's Use of Premises

.1 Except as otherwise specified, *Contractor* has unrestricted use of *Place of the Work* from time of *Contract* award until *Ready-for-Takeover*.

.2 Confine *Construction Equipment*, *Temporary Work*, storage of *Products*, waste products and debris, and all other construction operations to limits required by laws, ordinances, permits, and *Contract Documents*, whichever is most restrictive. Do not unreasonably encumber *Place of the Work*.

1.3 Work Sequence

.1 Schedule and construct *Work* in stages to accommodate *Owner's* use of premises during construction.

.2 Schedule and construct *Work* in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of *Work* will provide alternate usage.

1.4 Hours of Work

.1 *Work* may be performed Monday to Friday, 8:00 a.m. to 5:00 p.m., unless otherwise approved by the *Owner*. Work on Saturdays and Sundays or extended work hours may be permitted at the *Owner*'s discretion. Working times must be coordinated with *Consultant* and *Owner*'s Representative prior to construction start.

.2 Allow for hours of work restrictions in construction progress schedule.

1.5 Noisy Work Restrictions

.1 Schedule excessively noisy work to avoid disturbance to building occupants and adjacent properties. Working times must be coordinated with *Consultant* and *Owner*'s Representative prior to construction start.

.2 Use powder actuated devices only with *Consultant*'s written permission.

.3 Allow for hours of work restrictions in construction progress schedule.

1.6 Maintaining Life Safety Systems in Occupied Facilities

.1 Maintain operational life safety systems and public access to exits in occupied areas during all stages of the *Work*.

.2 Determine nature and exact locations of existing fire and smoke sensors prior to the commencement of the *Work*. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.

.3 Be responsible for costs incurred by *Owner* on account of false fire alarms activated as a result of the execution of the *Work* without adequate precautions.

.4 Cooperate with *Owner* in scheduling operations to minimize disruptions and to facilitate *Owner* usage.

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

1.2 Definition

.1 In this Section "Substitution" means a *Product*, a manufacturer, or both, not originally specified in *Contract Documents* by proprietary name but proposed for use by *Contractor* in place of a *Product*, a manufacturer, or both, specified by proprietary name.

1.3 Substitution Procedures

.1 *Contractor* may propose a Substitution wherever a *Product* or manufacturer is specified by proprietary name(s), unless there is accompanying language indicating that Substitutions will not be considered.

.2 *Contractor* may propose a Substitution wherever a *Product* or manufacturer is specified by proprietary name(s) and accompanied by language such as "or equal", "or approved equal", or other similar words. Do not construe such language as an invitation to unilaterally provide a Substitution without *Consultant's* prior acceptance. Do not order or install any Substitution without written approval by the *Consultant*.

.3 Provided a proposed Substitution submission includes all of the information specified in this Section under Submission Requirements For Proposed Substitutions, *Consultant* will promptly review and accept or reject the proposed Substitution.

.4 *Consultant* may accept a Substitution if satisfied that:

.1 the proposed substitute *Product* is the same type as, is capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance and maintenance considerations, of the specified Product,

.2 the proposed substitute manufacturer has capabilities comparable to the specified manufacturer, and

.3 the Substitution provides a benefit to *Owner*.

.5 If *Contractor* fails to order a specified *Product* or order a *Product* by a specified manufacturer in adequate time to meet *Contractor*'s construction schedule, *Consultant* will not consider that a valid reason to accept a Substitution.

.6 If *Consultant* accepts a Substitution and subject to *Owner*'s agreement, the change in the *Work* will be documented in writing by email, letter, or Observation Report.

.7 If a Substitution is accepted, *Contractor* shall not revert to an originally specified *Product* or manufacturer without *Consultant*'s prior written acceptance.

1.4 Submission Requirements for Proposed Substitutions

.1 Include with each proposed Substitution the following information:

.1 Identification of the Substitution, including product name and manufacturer's name, address, telephone numbers, and web site.

.2 Reason(s) for proposing the Substitution.

.3 A statement verifying that the Substitution will not affect the *Contract Price* and *Contract Time* or, if applicable, the amount and extent of a proposed increase or decrease in *Contract Price* and *Contract Time* on account of the Substitution.

.4 A statement verifying that the Substitution will not affect the performance [or warranty] of other parts of the *Work*.

.5 Manufacturer's Product literature for the Substitution, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.

.6 Product samples as applicable.

.7 A summarized comparison of the physical properties and performance characteristics of the specified Product and the Substitution, with any significant variations clearly highlighted.

.8 Details of other projects and applications where the Substitution has been used as applicable.

.9 Identification of any consequential changes in the *Work* to accommodate the Substitution and any consequential effects on the performance of the *Work* as a whole. A later claim for an increase to the *Contract Price* or *Contract Time* for other changes in the *Work* attributable to the Substitution will not be considered.

END OF SECTION – 01 25 00

PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

1.2 Schedule of Labour Rates

.1 Labour rates shall reflect the salaries, wages, and benefits paid to personnel in the direct employ of the *Contractor*, *Subcontractors*, and sub-*Subcontractors*, stated as hourly rates, that will be used when:

.1 Preparing price quotations for *Change Orders*, and

.2 Determining the cost of work attributable to *Change Directives*.

.2 Labour rates stated in the schedule of labour rates shall be consistent with rates that will actually be paid, and payroll burden costs that will actually be incurred, in the normal performance of the *Work*, during regular working hours.

1.3 Valuation of Changes Based on Agreed Unit Prices

.1 The *Consultant* may, at the outset of the Contract or at any other time, request the *Contractor* to submit unit prices anticipated to be required in valuing changes in the *Work*.

.2 The *Contractor* shall submit such unit prices promptly upon request.

.3 The unit prices shall be valid for a specified duration.

.4 The unit prices shall exclude all fees for overhead and profit and shall be subject to the percentage fees specified in this Section under Fees for Overhead and Profit – *Change Orders*.

.5 The *Consultant* will evaluate the *Contractor*'s quoted unit prices and, if accepted by the *Owner* in writing, the agreed unit prices shall be used to value subsequent proposed changes in the *Work* wherever they are applicable.

1.4 Method of Contract Price Adjustment – Change Orders

.1 Unless otherwise agreed, the adjustment of the *Contract Price* on account of a proposed change in the *Work* shall be based on a quotation for a fixed price increase or decrease to the *Contract Price* regardless of the *Contractor*'s actual expenditures and savings.

.2 If unit prices included in the stipulated price contract are applicable to the proposed change, the adjustment of the *Contract Price* shall be based on those unit prices, to the extent they apply. If the actual quantities to which the unit prices apply vary from the estimated quantities by more than 30%, the unit prices shall be subject to negotiation.

.3 Where the actual quantity is greater than the estimated quantity, the negotiated price applies only to the quantity that exceeds 130% of the estimated quantity, and where the actual quantity is less than the estimated quantity, the negotiated unit price shall not exceed a unit price that would cause the payment amount to exceed that derived from the original unit price and estimated quantity.

1.5 Change Order Procedures

.1 Upon issuance by the *Consultant* to the *Contractor* of a proposed change in the *Work*, and unless otherwise requested in the proposed change or unless otherwise agreed, submit to the *Consultant* a fixed price quotation for the proposed change in the *Work* within 5 days after receipt of the proposed change in the *Work*.

.2 If requested in the proposed change, provide a detailed breakdown of the price quotation including the following to the extent applicable, with appropriate supporting documentation:

.1 Estimated labour costs, including hours and applicable hourly rates based on the accepted schedule of labour rates.

.2 Estimated Product costs, including Supplier quotations, estimated quantities and unit prices.

.3 Estimated Construction Equipment costs.

.4 Enumeration of all other estimated costs included in the price quotation.

.5 Estimated credit amounts for labour and Products not required on account of the proposed change.

.6 Fees, not exceeding the applicable percentages for overhead and profit as specified in this Section.

.7 Where applicable, *Subcontractor* quotations, also including a detailed breakdown of all of the above.

.3 Include in the quotation the increase or decrease to the Contract Time, if any, for the proposed change, stated in number of days.

.4 The quotation will be evaluated by the *Consultant* and the *Owner* and, if accepted by the *Owner*, be documented in the form of a signed *Change Order*.

1.6 Fees for Overhead and Profit – Change Orders

.1 Where the *Contractor*'s price quotation for a *Change Order* results in a net increase to the *Contract Price*, the *Contractor*'s entitlement to a fee for overhead and profit in the quotation shall be a maximum of 15%.

.2 Where the Contractor's or a *Subcontractor*'s price quotation for a *Change Order* results in a net decrease in price before adjustment for fees for overhead and profit, such a price quotation shall be for the net decrease without any adjustment for fees for overhead and profit.

1.7 Method of Contract Price Adjustment – Change Directive

.1 Unless the *Owner* and the *Contractor* reach an earlier agreement on the adjustment to the *Contract Price* by means of a *Change Order* that cancels the *Change Directive*, the adjustment in the *Contract Price* for change carried out by way of a *Change Directive* shall be determined as specified in the General Conditions of Contract after the change in the *Work* is completed.

1.8 Change Directive Procedures

.1 If a *Change Directive* is issued for a change in the *Work* for which a proposed change was previously issued, but no *Change Order* has yet been signed, the *Change Directive* shall cancel the proposed change and any *Contractor* quotations related to that change in the *Work*.

.2 When proceeding with a change in the *Work* under a *Change Directive*, keep accurate records of daily time sheets for labour and Construction Equipment, and invoices for Product and Construction Equipment costs. Submit such records to the *Consultant* weekly, until the *Change Order* superseding the *Change Directive* is issued.

1.9 Supplemental Instructions

.1 The *Consultant* may issue Supplemental Instructions to provide clarifications to the *Contract Documents*, provide additional information, or make minor variations in the *Work* not involving adjustment in the *Contract Price* or Contract Time.

.2 If the *Contractor* considers a Supplemental Instruction to require an adjustment in *Contract Price* or Contract Time, the *Contractor* shall promptly notify the *Consultant* and the *Owner* in writing and shall not proceed with any work related to the Supplemental Instruction pending receipt of a *Change Order*, a *Change Directive*, or, in accordance with the dispute resolution provisions of the General Conditions of Contract, a Notice in Writing of a dispute and instructions to proceed.

END OF SECTION – 01 26 00

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PART 1 - GENERAL

1.1 References

.1 Canadian Construction Documents Committee CCDC 2 2020 – Stipulated Price Contract.

1.2 Applications for Progress Payments

.1 Date applications for payment the last day of each month or as otherwise agreed to by the *Owner/Consultant*.

.2 Ensure the amount claimed each month is for value proportionate to amount of *Contract,* of *Work* performed and/or products delivered to *Place of Work* at that date.

.3 Submit a proper invoice with each application for payment.

1.3 Schedule of Values

.1 Submit for *Consultant*'s review at least 15 calendar days before the first application for payment, an initial schedule of values including quantities where appropriate, aggregating the total amount of *Contract Price*, so as to facilitate *Consultant*'s evaluation of *Contractor*'s Applications for Payment. Modify the initial schedule of values if and as requested by *Consultant*. Obtain *Consultant*'s written acceptance of the initial schedule of values prior to the first application for payment.

.2 Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and *Products* delivered to *Place of the Work*.

.3 Provide the schedule of values in an electronic spreadsheet format, including item descriptions, and numerical sequence, as the Bid Form, Schedule of Prices.

.4 The following represents the minimum information required on a submitted schedule of values:

Schedule of Values

		Contract				Quantities			Claims			
Item	**Description**	**Unit**	**Qty**	**Unit Cost**	**Total**	**Previous**	**Current**	**To Date**	**To Date**	**Previous**	**Remainin**	**Current**
Stipulated Prices												
1.0	**Scope of Work Section #**											
1.1	Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
1.2	Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
2.0	**Scope of Work Section #**											
2.1	Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
2.2	Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
Subtotal					**$**				**$**	**$**	**$**	**$**
Optional Prices												
1	Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
2	Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
Subtotal					**$**				**$**	**$**	**$**	**$**
Extras and Credits												
1	CO1 - Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
2	CO2 - Item Description	LS / m	#	$	$	%	%	%	$	$	$	$
Subtotal					**$**				**$**	**$**	**$**	**$**
Original Contract					**$**							
Extras and Credits					**$**							
Subtotal												**$**
HST					**$**				**$**			**$**
Total					**$**				**$**			**$**

1.4 Proper Invoice

.1 The *Contractor*'s proper invoice shall include the following information, in a format acceptable to the *Consultant*:

.1 The *Contractor's* full legal name and address.

.2 The date of the proper invoice.

.3 The period during which the services or materials were supplied to the project. The period is to be monthly unless agreed to otherwise by the *Owner* and *Contractor*.

.4 The full project name as identified in the CCDC form of contract or Purchase Order for the project. Do not abbreviate or shorten the project name.

.5 An up-to-date schedule of values and description of the *Work*, including quantities where appropriate, of the services or materials that were supplied.

.6 The amount payable for the services or materials that were supplied, and the payment terms.

.7 The name, title, telephone number and mailing address of the person to whom payment is to be sent.

.8 WSIB clearance certificate dated to cover the period during which the services or materials were supplied to the project.

.9 With the second and subsequent applications for payment including the final and release of holdback, submit a sealed Statutory Declaration of Progress Payment Distribution by *Contractor* CCDC 9A 2018. For release of holdback on a subcontract that is 100% complete, the *Subcontractor* shall submit a sealed Statutory Declaration of Progress Payment Distribution by *Subcontractor* CCDC 9B 2018, which shall accompany the *Contractor*'s Statutory Declaration for Progress Payments.

.10 With the application for release of holdback, submit a copy of confirmation of publication of the Certificate of Substantial Performance dated Month Day, Year.

.11 Where a Certificate of Substantial Performance is not issued, submit with the application for release of holdback, a copy of the Statement of Contract Deemed Completed dated Month Day, Year and issued on Month Day, Year.

.12 All invoices for *Work* to be paid for out of an allowance, as identified in the schedule of values.

1.5 Payment for Products Stored Off Site

.1 *Owner* may, due to extraordinary circumstances and at *Owner*'s sole discretion, make payments for *Products* delivered to and stored at a location other than *Place of the Work*, subject to:

.1 a request submitted by *Contractor* in writing, with appropriate justification, and

.2 whatever conditions *Owner* or *Consultant* may establish for such payments, as required to protect *Owner*'s interests.

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

1.2 Construction Start-Up Meeting

.1 Promptly after *Contract* award, *Consultant* will establish the time and location of a construction start-up meeting to review and discuss administrative procedures and responsibilities.

.2 Senior representatives of *Owner*, *Consultant*, and *Contractor*, including *Contractor*'s project manager and site superintendent, and major *Subcontractors*, shall be in attendance.

.3 *Consultant* will chair the meeting and record and distribute the minutes.

1.3 Construction Progress Meetings

.1 Progress meetings shall be had at the discretion of the *Owner* for the duration of the *Work*. *Consultant* shall prepare meeting agendas, chair the meetings, and record and distribute the minutes.

.2 *Consultant* shall record in the meeting minutes significant decisions and identify action items and action dates by attendees or the parties they represent.

.3 *Consultant* shall distribute copies of minutes to meeting attendees and any affected parties who may not be in attendance.

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

1.2 Construction Progress Schedule

.1 At the request of the *Owner* or *Consultant*:

.1 Provide a work breakdown structure identifying key activities and major milestones, including long delivery *Products*, inspection and testing activities, preparation and review of mock-ups, and similar items, at a sufficient level of detail to effectively manage construction progress.

.2 Indicate milestone dates for Ready-for-Takeover and Substantial Performance of the *Work*.

.3 Submit updated progress schedule monthly to *Owner* and *Consultant*, indicating actual and projected start and finish dates with report date line and progress.

END OF SECTION – 01 32 00

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PART 1 - GENERAL

1.1 References

.1 Canadian Construction Documents Committee CCDC 2 (latest edition) Stipulated Price Contract

1.2 Administrative

.1 Submit to *Consultant* submittals listed for review under the relevant section. Submit with reasonable promptness and in orderly sequence so as to not cause delay in *Work*. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time or for Product substitutions or claims for additional costs or other deviations from the *Drawings* and Specifications.

.2 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.

.3 Do not proceed with *Work* affected by a submittal until review is complete.

.4 Present shop drawings, product data, samples and mock-ups in SI Metric units. Where items or information is not produced in SI Metric units converted values are acceptable.

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

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

.7 *Contractor*'s responsibility for errors and omissions in submission is not relieved by *Consultant*'s review of submittals.

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

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

.10 Verify field measurements and that affected adjacent work is coordinated.

.11 Submittals not meeting specified requirements will be returned with comments.

.12 Reproduction of construction *Drawings* to serve as background for Shop Drawings is not permitted.

.13 Do not propose Substitutions or deviations from *Contract Documents* via Shop Drawing, Product data and sample submittals.

1.3 Shop Drawings and Product Data

.1 Indicate Products, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the *Work*.

.2 Where Products attach or connect to other Products, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross-references to *Drawings*, Specifications and other already reviewed *Shop Drawings*.

.3 Cross-reference shop drawing information to applicable portions of *Contract Documents*.

.4 Submit one (1) electronic copy of shop drawings for each requirement requested in specification sections and as the *Consultant* may reasonably request.

.5 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in specification Sections and as *Consultant* may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.

.6 Allow 10 days for *Consultant*'s review of each submission.

.7 Where a submittal includes information not applicable to the *Work*, clearly identify applicable information and strike out non-applicable information.

.8 Supplement standard information to include details applicable to Project.

.9 Submissions shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 *Contractor*.

.2 *Subcontractor*.

.3 Supplier.

.4 Manufacturer.

.4 *Contractor*'s stamp, signed by *Contractor*'s authorized representative certifying approval of submissions, verification of field measurements and compliance with *Contract Documents*.

.5 Details of appropriate portions of *Work* as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.10 Product data submittals shall include material safety data sheets (MSDS) for all controlled Products.

.11 If upon review by the *Consultant*, no errors or omissions are discovered or if only minor corrections are made, the copy shall be returned, and fabrication and installation work may proceed.

.12 If upon *Consultant*'s review significant errors or omissions are discovered, a so noted copy will be returned for correction and resubmission. Do not commence fabrication or installation.

.13 *Consultant*'s notations on submittals are intended to ensure compliance with *Contract Documents* and are not intended to constitute a change in the *Work* requiring change to the *Contract Price* or Contract Time. If *Contractor* considers any *Consultant*'s notation to be a change in the *Work*, promptly notify *Consultant* in writing before proceeding with the *Work*.

.14 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the *Work* proceeds. When resubmitting, notify *Consultant* in writing of any revisions other than those requested by *Consultant*.

END OF SECTION – 01 33 00

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PART 1 - GENERAL

1.1 References

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

.2 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O.

.3 Infrastructure Health and Safety Association (IHSA),

.4 Public Service Health and Safety Association (PSHSA)

.5 Workplace Safety and Prevention Services (WSPS)

.6 Ministry of Labour, Training and Skills Development

.7 The Ontario Road Builders' Association, ORBA

1.2 Submittals

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

.2 Submit *Contractor* internal Health and Safety Guidelines.

.3 Submit site-specific Health and Safety Plan within 7 days after award of Contract and prior to commencement of *Work*. Health and Safety Plan must include but is not limited to:

.1 Name and Contact information of the *Contractor*'s authorized site health and safety person.

.2 Results of safety and health risk or hazard analysis for site tasks and operation. These results may follow the items as outlined in the Section 01 11 00 – Summary of *Work*.

.3 On-site Contingency and Emergency Response Plan addressing standard operating procedures to be implemented during emergency situations. (ie: If swing stage work is required the protocol that will be followed if supporting cable breaks)

.4 Location of the nearest medical facility and the level of injury that each can service.

.5 Phone numbers of the local fire department, police and ambulance outside the 911 service.

.6 Copies of certification all employees on site for applicable safety training inclusive but not limited to:

.1 WHMIS

.2 Fall Arrest

.3 Suspended Access Equipment

.4 Erection of Scaffolding

.5 License for powder actuated devices

.7 Safety Data Sheets (SDS) of products to be used.

.4 Submit copies of incident and accident reports.

.5 *Consultant*'s review of *Contractor*'s Health and Safety plan should not be construed as approval and does not reduce the *Contractor*'s overall responsibility for construction Health and Safety.

.6 Where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of *Work*, and submit additional certifications for any new site personnel to *Consultant*.

1.3 Occupational Health and Safety

.1 Conform to safe work practices in accordance with regulations and authorities having jurisdiction.

.2 Prepare and maintain on site a detailed plan for management of coronaviruses, including prevention, documentation, reporting, sanitation, self distancing, PPE equipment, site scheduling including staggering of work schedules, in accordance with recommended health and safety guidelines.

.3 Promptly report to *Owner* and *Consultant* all accidents or if any claim is made against the *Contractor* or *Subcontractor* on account of accident.

.4 Provide at the site, equipment to supply first aid.

.5 Enforce proper work methods and act immediately on directions regarding safety and work practices given by authorities having jurisdiction or the *Owner*, at no additional cost to the *Owner*.

.6 Failure of *Contractor* to comply with verbal or written instructions or orders from the Ministry of Labour inspector or other authorities as well as *Owner* or *Consultant* regarding safe work practices or provision of specified requirements under the Act shall be considered non-compliance with the Contract.

.7 Maintain on-site a copy of the latest edition of the Occupational Health and Safety Act and Regulations for Construction Projects.

.8 Ensure that all personnel are adequately equipped to comply with safety regulations and that sufficient safety equipment is available.

1.4 Filing of Notice

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

1.5 Responsibility

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

1.6 Unforeseen Hazards

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of *Work*, follow procedures in place for Employee's Right to Refuse *Work* in accordance with Acts and Regulations of Authorities having jurisdiction. Advise *Consultant* verbally and in writing.

1.7 Health and Safety Coordinator

.1 Employ and assign to *Work*, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:

.1 Have minimum two (2) years' site-related working experience specific to activities.

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

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

1.8 Posting of Documents

.1 Provide/post all workplace documents in English, French and the majority workplace language, if other than English or French.

.2 Ensure applicable items, articles, notices and orders are posted in a weatherproof format and in conspicuous locations on site in accordance with Acts and Regulations of Authorities having jurisdiction, and in consultation with *Consultant*.

.3 Post at all entrances to the Workplace / construction site, construction trailers, etc., a copy of Ministry of Labour, Training and Skills Development posters for construction.

1.9 Infectious Diseases

.1 All measures are to be taken to prevent the spread of infectious diseases and should be done in compliance with requirements under the Occupational Health and Safety Act, and associated regulations and public health directives.

1.10 Correction of Non-Compliance

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

.2 *Consultant* may stop *Work* if non-compliance of health and safety regulations is not corrected.

1.11 Work Stoppage

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

1.12 Products

.1 Personal Protection Equipment (PPE)

.1 Provide PPE to all workers entering the workplace, in accordance with current regulations and best practice guidelines applicable to the project.

END OF SECTION – 01 35 00

PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the *Owner*'s representative.

.3 All materials shall be new and in perfect condition, free from defects which may impair strength, durability or appearance.

.4 Scheduling of the *Work* shall be discussed with, and be subject to the approval of the *Owner*.

1.2 Independent Inspection and Testing Agencies

.1 Except as otherwise specified, *Owner* will retain and pay for independent inspection and testing agencies to inspect, test, or perform other quality control reviews of parts of the *Work*.

.2 Retain and pay for inspection and testing that is for *Contractor*'s own quality control or is required by regulatory requirements.

.3 Refer to Section 01 21 00 for cash allowances related to independent inspection and testing services to be retained and paid for by *Contractor*. Cash allowance excludes any inspection and testing that is for *Contractor*'s own quality control or is required by regulatory requirements.

.4 Employment of inspection and testing agencies by *Contractor* or *Owner* does not relieve *Contractor* from responsibility to perform the *Work* in accordance with *Contract Documents*.

.5 Allow and arrange for inspection and testing agencies to have access to the *Work*, including access to off site manufacturing and fabrication plants.

.6 For inspection and testing required by *Contract Documents* or by authorities having jurisdiction, provide *Consultant* and inspection and testing agencies with timely notification in advance of required inspection and testing.

.7 Submit test samples required for testing in accordance with submittals schedule specified in Section 01 32 00 – Construction Progress Documentation.

.8 Provide labour, *Construction Equipment* and temporary facilities to obtain and handle test samples on site.

1.3 Inspection and Testing Agency Reports

.1 For inspection and testing required by *Contract Documents* or by regulatory requirements, and performed by *Contractor* retained inspection and testing agencies, submit to the *Consultant* copies of reports. Submit within 10 days after completion of inspection and testing.

.2 For inspection and testing performed by *Owner* retained inspection and testing agencies, copies of inspection and testing agency reports will be provided to *Contractor*.

1.4 Mock-Ups

.1 Prepare mock-ups of *Work* as specified in the technical *Specifications*. If a mock-up location is not indicated in the *Drawings* or *Specifications*, locate where directed by *Consultant*.

.2 Modify mock-up as required until *Consultant* approval is obtained.

.3 Approved mock-ups establish an acceptable standard for the *Work*.

.4 Protect mock-ups from damage until the *Work* they represent is complete.

.5 Unless otherwise specified in the technical *Specifications*, approved mock-ups forming part of the *Work* may remain as part of the *Work*.

.6 Remove mock-ups only when the *Work* they represent is complete or when otherwise directed by *Consultant*.

END OF SECTION – 01 40 00

PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the *Owner*'s representative.

.3 All materials shall be new and in perfect condition, free from defects which may impair strength, durability or appearance.

.4 Scheduling of the work shall be discussed with, and be subject to the approval of the *Owner*.

.5 Provide temporary utilities as specified and as otherwise necessary to perform the *Work* expeditiously.

.6 Remove temporary utilities after use.

1.2 Temporary Water Supply

.1 Connect to and use *Owner*'s existing water supply for temporary use during construction, subject to existing available volume and pressure. Usage at no cost to *Contractor*.

1.3 Temporary Heating and Ventilation

.1 Arrange and pay for temporary heating and ventilation required during construction.

.2 Vent construction heaters in enclosed spaces to the outside or use flameless type of construction heaters.

.3 Provide temporary heat for the *Work* as required to:

.1 Facilitate progress of *Work*.

.2 Protect the *Work* against dampness and cold.

.3 Prevent moisture condensation on surfaces, freezing, or other damage to finishes or stored *Products*.

.4 Maintain specified minimum ambient temperatures and humidity levels for storage, installation and curing of *Products*.

.5 After building is enclosed, maintain interior temperature and relative humidity as required above.

.4 Provide temporary ventilation for the *Work* as required to:

.1 Prevent accumulations of fumes, exhaust, vapours, gases and other hazardous, noxious, or volatile substances in enclosed spaces, as required to maintain a safe work environment meeting applicable regulatory requirements.

.2 Ensure that hazardous, noxious, or volatile substances do not migrate to *Owner* occupied spaces.

.3 Ventilate temporary sanitary facilities.

.5 Do not use permanent building heating and ventilation systems during construction.

1.4 Temporary Electrical Power and Lighting

.1 Arrange and pay for temporary power and lighting required during construction

.2 Existing power supply for temporary use during construction is to be confirmed on site by *Contractor*.

.3 Arrange and pay for necessary connections and disconnections of temporary power and lighting in accordance with regulatory requirements.

END OF SECTION – 01 51 00

PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the *Owner*'s representative.

.3 Scheduling of the work shall be discussed with, and be subject to the approval of the *Owner*.

.4 Provide temporary barriers and enclosures necessary to protect the public and/or building occupants and to secure *Place of the Work* during performance of the *Work*.

.5 Comply with applicable regulatory requirements.

.6 Maintain temporary barriers and enclosures in good condition for the duration of the *Work*.

.7 Remove temporary barriers and enclosures from *Place of the Work* when no longer required.

1.2 Work Area Hoarding

.1 Erect temporary site enclosures using 1800mm (72") high interlocking steel fence, with openings no greater than 38mm (1-½"). Provide lockable access gates as required to facilitate construction access.

.2 Maintain hoarding in good repair until removed.

1.3 Protection of Building Finishes

.1 Provide necessary temporary barriers and enclosures to protect existing and completed or partially completed finished surfaces from damage during performance of the *Work*.

.2 Confirm with *Consultant* locations and installation schedule three (3) days prior to installation.

1.4 Fire Routes

.1 Maintain fire access routes, including overhead clearances, for use by emergency response vehicles.

.2 Provide all required signage to inform emergency vehicles of temporary route for access if modified as part of work.

1.5 Public Traffic Flow

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

END OF SECTION – 01 56 00

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the *Owner*'s representative.

.3 Scheduling of the work shall be discussed with, and be subject to the approval of the *Owner*.

.4 Provide temporary controls as necessary for performance of the *Work* and in compliance with applicable regulatory requirements.

.5 Maintain temporary controls in good condition for the duration of the *Work*.

.6 Remove temporary controls and *Construction Equipment* used to provide temporary controls from *Place of the Work* when no longer required.

1.2 Plant Protection

.1 Protect trees and other plant material designated to remain as may be required.

.2 Protect trees and shrubs susceptible to damage during construction by encasing with protective wood framework.

.3 For trees designated to remain, protect roots inside dripline from disturbance or damage during excavation and grading. Avoid traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

1.3 Dust and Particulate Control

.1 Implement and maintain dust and particulate control measures in accordance with applicable regulatory requirements.

.2 Execute *Work* by methods that minimize dust from construction operations and spreading of dust on site or to adjacent properties.

.3 Provide temporary enclosures to prevent extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area.

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

.5 Use appropriate covers on trucks hauling fine, dusty, or loose materials.

1.4 Pollution Control

.1 Take measures to prevent contamination of soil, water, and atmosphere through uncontrolled discharge of noxious or toxic substances and other pollutants, potentially causing environmental damage.

.2 Be prepared, by maintaining appropriate materials, equipment, and trained personnel on site, to intercept, clean up, and dispose of spills or releases that may occur. Promptly report spills and releases that may occur to:

.1 authority having jurisdiction,

.2 person causing or having control of pollution source, if known, and

.3 *Owner* and *Consultant*.

.4 Contact manufacturer of pollutant, if known and applicable, to obtain material safety data sheets (MSDS) and ascertain hazards involved and precautions and measures required in cleanup or mitigating actions.

.5 Take immediate action to contain and mitigate harmful effects of the spill or release.

END OF SECTION – 01 57 00

PART 1 - GENERAL

1.1 General Requirements

.1 Provide *Products* that are not damaged or defective, and suitable for purpose intended, subject to specified requirements. If requested by *Consultant*, furnish evidence as to type, source and quality of *Products* provided.

.2 Unless otherwise specified, maintain uniformity of manufacture for like items throughout.

.3 Permanent manufacturer's markings, labels, trademarks, and nameplates on *Products* are not acceptable in prominent locations, except where required by regulatory requirements or for operating instructions, or when located in mechanical or electrical rooms.

1.2 Product Availability and Delivery Times

.1 Promptly upon Contract award and periodically during construction, review and confirm *Product* availability and delivery times. Order *Products* in sufficient time to meet the construction progress schedule and the *Contract Time*.

.2 If a specified *Product* is no longer available, promptly notify *Consultant*. *Consultant* will take action as required.

.3 If delivery delays are foreseeable, for any reason, promptly notify *Consultant*.

.1 If a delivery delay is beyond *Contractor*'s control, *Consultant* will provide direction.

.2 If a delivery delay is caused by something that was or is within *Contractor*'s control, *Contractor* shall propose actions to maintain the construction progress schedule for *Consultant*'s review and acceptance.

1.3 Storage, Handling, and Protection

.1 Store, handle, and protect *Products* during transportation to *Place of the Work* and before, during, and after installation in a manner to prevent damage, adulteration, deterioration and soiling.

.2 Comply with manufacturer's instructions for storage, handling and protection.

.3 Store packaged or bundled *Products* in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in *Work*.

.4 Comply with the requirements of the workplace hazardous materials information system (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, including requirements for labeling and the provision of material safety data sheets (MSDS).

.5 Store *Products* subject to damage from weather in weatherproof enclosures.

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

.7 Remove and replace damaged *Products*.

END OF SECTION – 01 61 00

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

1.2 Products

.1 Unless otherwise specified, when replacing existing or previously installed *Products* in the course of cutting and patching work, use replacement *Products* of the same character and quality as those being replaced.

.2 If an existing or previously installed *Product* must be replaced with a different *Product*, submit request for substitution in accordance with Section 01 25 00 – Substitution Procedures.

1.3 Preparation

.1 Inspect existing conditions in accordance with Section 01 71 00 - Examination and Preparation.

.2 Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of the *Work* from damage.

.3 Provide protection from elements for areas that may be exposed by uncovering work.

1.4 Existing Utilities

.1 When breaking into or connecting to existing services' utilities, execute the *Work* at times directed by local governing authorities, with a minimum of disturbance to the *Work*, pedestrian and vehicular traffic, and ongoing *Owner* operations.

.2 Maintain excavations free of water.

.3 Keep duration of interruptions to a minimum.

.4 Carry out interruptions after regular working hours of occupants, preferably on weekends, unless *Owner*'s prior written approval is obtained.

.5 Protect and maintain existing active services. Record location of services, including depth, on as-built drawings.

.6 Construct or erect barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures as required to protect pedestrian and vehicular traffic.

1.5 Cutting, Fitting and Patching

.1 Execute cutting, fitting and patching required to make *Work* fit properly.

.2 Provide protection of finished surfaces and other elements or components to ensure no damage to unrelated surfaces, elements or components.

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

.4 Provide openings in non-structural elements of *Work* for penetrations of mechanical and electrical work, as required.

.5 Where new *Work* connects with existing and where existing work is altered, cut, patch and make good to match existing work.

.6 Obtain Consultant's approval before cutting, boring or sleeving load-bearing members.

.7 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

.8 Fit work airtight to pipes, sleeves, ducts, and conduits.

.9 At penetration of fire-rated wall, ceiling or floor construction, completely seal voids with firestopping and smoke seal materials, full thickness of the construction element.

.10 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

END OF SECTION – 01 73 29

PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 Comply with applicable regulatory requirements when disposing of waste materials.

.3 Obtain permits from authorities having jurisdiction and pay disposal fees where required for disposal of waste materials and recyclables.

1.2 General Cleaning Requirements

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

.2 Prevent cross-contamination during the cleaning process.

.3 Notify the *Consultant* of the need for cleaning caused by *Owner* or other contractors.

1.3 Progressive Cleaning and Waste Management

.1 Maintain the *Work* in a tidy and safe condition, free from accumulation of waste materials and construction debris.

.2 Provide appropriate, clearly marked, containers for collection of waste materials and recyclables. Locate containers as directed by *Owner* and/or *Consultant*.

.3 Remove waste materials and recyclables from work areas, separate, and deposit in designated containers at end of each *Working Day*. Collect packaging materials for recycling or reuse.

.4 Remove waste materials and recyclables from *Place of the Work* daily.

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

.6 Provide protective floor and wall coverings, including elevators, where access to work areas is through finished building areas.

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

1.4 Final Cleaning

.1 Remove from *Place of the Work* surplus *Products*, waste materials, recyclables, *Temporary Work*, and *Construction Equipment* not required to perform any remaining work.

1.5 Waste Management and Disposal

.1 Dispose of waste materials and recyclables at appropriate municipal landfills and recycling facilities in accordance with applicable regulatory requirements.

.2 Do not burn or bury waste materials at *Place of the Work*.

.3 Do not dispose of volatile and other liquid waste such as mineral spirits, oil, paints and other coating materials, paint thinners, cleaners, and similar materials together with dry waste materials or on the ground, in waterways, or in storm or sanitary sewers. Collect such waste materials in appropriate covered containers, promptly remove from *Place of the Work*, and dispose of at recycling facilities or as otherwise permitted by applicable regulatory requirements.

.4 Cover or wet down dry waste materials to prevent blowing dust and debris.

END OF SECTION – 01 74 00

PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

1.2 Ready-For-Takeover

.1 The prerequisites to attaining *Ready-for-Takeover* of the *Work* are described in the General Conditions of the *Contract*.

1.3 Inspection and Review Before Ready-For-Takeover

.1 The *Consultant* and the *Contractor* shall jointly review the *Work* to:

.1 Identify defective, deficient, or incomplete work.

.2 Prepare a comprehensive and detailed list of items to be completed or corrected.

.3 Provide an anticipated schedule and costs for items to be completed or corrected.

.2 *T*he list of items to be completed or corrected shall be maintained and the review procedures above repeated until no items remain on the list.

.3 When the *Consultant* determines that the *Work* is *Ready-for-Takeover*, the *Consultant* will notify the *Contractor* and the *Owner* in writing to that effect.

1.4 Prerequisites to Final Payment

.1 After *Ready-for-Takeover* of the *Work* and before submitting an application for final payment in accordance with the General Conditions of Contract:

.1 Correct or complete all remaining defective, deficient, and incomplete work.

.2 Remove from the Place of the Work all remaining surplus Products, Construction Equipment, and Temporary Work.

.3 Perform final cleaning and waste removal necessitated by the *Contractor's* work performed after *Ready-for-Takeover*, as specified in Section 01 74 00 – Cleaning and Waste Management.

1.5 Substantial Performance of the Work

.1 The prerequisites to, and the procedures for, attaining substantial performance of the *Work*, or similar such milestone as provided for in the lien legislation applicable to the *Place of the Work*, shall be:

.1 independent of those for attaining *Ready-for-Takeover* of the *Work*, and

.2 in accordance with the lien legislation applicable to the *Place of the Work*.

END OF SECTION – 01 77 00

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PART 1 - GENERAL

1.1 Warranties

.1 Submit all specified *Contractor* and *Manufacturer* warranties for *Consultant*'s review.

1.2 Operation and Maintenance Manual – Products and Finishes Content

.1 Include *Product* data, with catalogue number, options selected, 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 Include an outline of requirements for routine and special inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.

.4 Include additional content as specified in technical *Specifications* sections.

END OF SECTION – 01 78 00

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the Owner's representative.

.3 Scheduling of the work shall be discussed with, and be subject to the approval of the Owner.

.4 Provide a minimum 24 hour notice to the Consultant and the Owner prior to proceeding with any work that may disrupt building access or services.

1.2 References

.1 Comply with requirements of the following documents, latest edition:

.1 Canadian Standards Association CSA S350, Code of Practice for Safety in Demolition of Structures.

.2 Occupational Health and Safety Act and regulations for Construction Projects

.3 National Building Code of Canada, Part 8, "Safety Measures at Construction and Demolition Sites", and Provincial requirements.

.4 Ontario Regulation 406/19, On-Site and Excess Soil Management.

PART 2 - PRODUCTS

.1 Not Used.

PART 3 - EXECUTION

3.1 General Protection

.1 Prevent movement, settlement, or other damage to adjacent structures, utilities, and parts of buildings to remain in place.

.2 Minimize noise, dust, and inconvenience to occupants.

.3 Protect existing building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Provide required signage, barricades, and temporary site egress in accordance with Owners requirements.

.6 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.7 Treat water containing suspended materials as excess soil/waste in accordance with regulations.

.8 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.9 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

.10 Protect trees, plants and foliage on site and adjacent properties where indicated.

.11 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.12 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

3.2 Existing Services

.1 Ensure all services that may be impacted by the work, whether buried, built-in or exposed, are identified by performing locates and/or scanning (i.e. x-ray, ground penetrating radar, etc.) prior to commencement of work and notify Consultant of findings.

.2 Take care during excavations and/or removal operations to prevent damage to buried services. Any damages are to be immediately reported to the Owner and Consultant. Owner to pay for repairs provided damage has not resulted from negligence as determined by the Consultant. Any damages caused by not performing locates or by negligence will be at the Contractors expense to rectify.

3.3 Demolition Salvage and Disposal

.1 Include for the disposal of removed materials to appropriate Landfill and/or recycling facilities, except where specified otherwise, in accordance with authority having jurisdiction.

.2 Include for the temporary removal and reinstatement of excess soil to appropriate Landfill and/or designated temporary storage site, in accordance with authority having jurisdiction.

.3 site, in accordance with authority having jurisdiction.

END OF SECTION – 02 41 19

PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the Owner's representative.

.3 All materials shall be new and free from defects which may impair strength, durability or appearance.

.4 Scheduling of the work shall be discussed with, and be subject to the approval of the Owner.

.5 Paving shall be done only by skilled workers, with suitable machinery, supervised by foreman experienced in type of paving specified.

1.2 References

.1 Comply with requirements of the following documents, latest edition:

.1 MTO LS-264, Theoretical Maximum Relative Density of Bituminous Paving Mixtures.

.2 MTO LS-602, Sieve Analysis of Aggregates.

.3 OPSS 1010, Material Specification for Aggregates – Base, Sub-base, Select Sub-grade, and Backfill Material.

.4 OPSS 501, Construction Specifications for Compacting.

.5 Ontario Regulation 406/19, On-Site and Excess Soil Management

.6 Ontario Building Code.

1.3 Quality Assurance

.1 A pre-construction meeting shall be conducted at the project site to coordinate installation and sequencing of installation. The meeting shall include the Consultant, Contractor, and Owner's Representative.

.2 The Contractor must provide two (2) weeks notice prior to commencement of Work.

.3 Cooperate with the Consultant and testing company by scheduling the placing and the compacting of backfill so tests can be progressively taken. Notice of any required inspection must be given 48 hours in advance.

.4 Inspection and testing of reclaimed asphalt pavement will be carried out by independent testing laboratory as approved by Consultant/Owner. Costs of tests will be paid under testing allowance. Testing invoices to be attached at invoicing without mark-up.

.5 Granular base testing is to be provided by an independent agency for conformance with OPSS 1010, and will include:

.1 Performance of in-place compaction testing with a nuclear density test gauge in randomly selected locations, in accordance with OPSS 501 (Method A).

.6 Any tests that fail to meet the specifications shall be paid for by the Contractor and shall result in the materials to be removed and replaced and/or re-compacted.

.7 Obtain approval of subgrade by Consultant before placing granular subbase and base.

1.4 Submittals

.1 Submit evidence of compliance of proposed backfill material with required standards from supplier at least two (2) weeks prior to use on site.

.2 Submit reclaimed asphalt data sheets to Consultant / Owner for review at least two (2) weeks prior to placement.

.3 Materials to be tested by independent testing laboratory when requested by Consultant or Owner.

1.5 Waste Management and Disposal

.1 Promptly remove all excavated material from site. Do not stockpile excavated materials to interfere with traffic flow at the site.

.2 Material disposal off site to comply with Ontario Regulation 406/19, On-Site and Excess Soil Management.

1.6 Environmental Requirements

.1 Asphalt shall not be laid unless the air temperature at the surface to be paved is at least 7°C and rising, nor until any frost or moisture has evaporated to leave a dry surface. Paving operations shall be suspended whenever the air temperature at the surface to be paved drops below 7°C.

1.7 Measurement for Payment

.1 Measurement for payment shall be on lump sum basis. The tendered cost shall be full compensation for all labour, equipment and material required to complete this work as specified herein.

1.8 Warranty

.1 The paving work covered by this section must be repaired at no cost to the owner for a warranty period of two (2) years. The warranty will cover any defects related to deficient installation procedures, including but not limited to, compaction, and settlement.

.2 Any repair required under the warranty will be carried out in accordance with the specifications at no cost to the Owner.

PART 2 - PRODUCTS

2.1 Materials

.1 Granular Base:

.1 To OPSS 1010.

.2 Granular A.

.3 19mm (3/4") crushed limestone having the same gradation limits as Granular A.

.2 Granular Sub-base:

.1 Existing.

.3 All granular to consist of 100 percent quarried bedrock unless otherwise specified. Reclaimed material will not be acceptable.

.4 Reclaimed Asphaltic Concrete:

.1 to OPSS 1010.

.2 Surface Course:

.1 Reclaimed Asphaltic Concrete.

.2 Compacted thickness: 100mm (4") minimum.

.3 To be compacted to a minimum of 98% of maximum relative density (MRD).

.5 Filter Fabric:

.1 Filter fabric by Terrafix Geosynthetics Inc. as follows:

.1 For encasing subsurface drain systems and over drainage course: Terrafix 270R.

PART 3 - EXECUTION

3.1 Examination

.1 Examine the Drawings, Specifications and the site to determine the extent of the work involved, together with other necessary data affecting the work, as in no circumstances will any claims against the Owner be allowed resulting from failure to ascertain the extent of such work herein described or implied.

.2 Review existing conditions and substrates upon which work of this section is dependent. Report to the Consultant in writing any defects or discrepancies. Commencement of work implies acceptance of existing conditions and assuming full responsibility for the finished condition of the work.

3.2 Preparation and Excavation

.1 Determine the nature and extent of all site services above and below grade prior to commencement of work.

.2 Verify grades of paving area for conformity with elevations and sections before placing granular base material to allow review by Consultant and changes, if necessary.

.3 Excavate and remove existing materials as specified. Do not over excavate, otherwise the overage shall be made up with compacted granular fill, at the Contractors own expense.

.4 Where excavation is required adjacent to curbs, which are to remain in place, it shall be to 1 m (3 ft) from curb to maintain soil bearing for curbs.

3.3 Protection

.1 Provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.

.2 Protect pedestrians from excavations with appropriate signage.

.3 Take all measures necessary to control dust.

.4 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38°C. Do not permit stationary loads on pavement until 24 hours after placement.

3.4 Sub-Grade

.1 Following excavation and removal of surface stone by Owner/others, proof roll the exposed sub-grade using suitable compaction equipment to identify soft or spongy areas, remove material and replace with new, as specified. Arrange for review by Consultant and Testing Company.

.2 Sub-base shall be undisturbed and/or stable material, having a minimum 98% of the maximum dry density, as determined by MTO LS-706, at optimum moisture content. Compact and adjust the moisture content to the top 300mm (12") of the exposed sub-grade where required to achieve these limits. Do not compact frozen material.

.3 If unsatisfactory material is encountered in the sub-grade, this material should be completely removed at a 45 degree slope (1:1) beneath and away from the base elevation. Once unsatisfactory fill material is completely removed, it should be replaced with approved import fill material. Place in maximum 200mm (8") lifts. Compact each layer to 98% of the maximum dry density.

.4 Keep compacted sub-grade free from rain or other water. If sub-grade is softened by water, excavate softened material and replace with granular material at no cost to Owner and re-compact material to ensure that a uniform 98% of the maximum dry density is obtained.

.5 Place filter fabric on sub-grade, as per manufacturer's installation guidelines.

3.5 Granular Base Course

.1 Place granular base material on clean unfrozen surface, free from snow and ice.

.2 Place granular base to compacted thicknesses as indicated. Do not place frozen material.

.3 Place in layers not exceeding 200mm (8") compacted thickness. Compact to density not less than 98% corrected Standard Proctor maximum dry density.

.4 The moisture content of the backfilling material should be adjusted to optimum moisture content.

.5 Before placing of asphalt, ensure base grading has been installed to provide positive slope for drainage.

3.6 Reclaimed Asphalt Paving

.1 Obtain approval of granular base and filter fabric installation from Consultant before placing reclaimed asphalt.

.2 Place, compact and roll reclaimed asphaltic concrete in accordance to OPSS 501.

.3 Place reclaimed asphalt in two (2) uniform compacted layers not exceeding 50mm (2").

.4 Compress the surface thoroughly and uniformly by a power driven steel roller. Rolling shall commence longitudinally at the sides and proceed towards the centre of the pavement, overlapping on successive trips by at least one half of the width of the roller. Keep roller speed slow enough to avoid displacement and do not stop roller on fresh pavement. Moisten roller wheels with water to prevent pick-up of material.

.5 Repair/build-up low areas and recompact as directed by Consultant.

.6 Hand tamp with minimum 16kg hot tampers or vibrating plate, in areas not accessible to rolling equipment.

.7 Allow for compaction testing to be performed as specified.

.8 Following final compaction, surface shall be of uniform texture, without flat spots, or other defects. Defective areas shall be removed/regraded and/or built-up with reclaimed asphalt and recompacted.

3.7 Cleaning

.1 Exercise care in paving operations adjacent to curbs, lighting standards, sidewalks, etc., so as not to damage these items. Make good any damaged items to the satisfaction of the Consultant.

.2 Where perimeter landscaping has been disturbed as a result of the asphalt paving work, make good with existing.

.3 As work proceeds on a daily basis and on completion, remove all surplus materials and debris resulting from the foregoing work.

.4 All spatter or staining on existing elements as the result of the asphalt paving work shall be removed as the Contractors cost. Contractor shall assume responsibility of existing elements and new asphalt where solvents are required to remove spatter and staining which will adversely affect the elements to be cleaned.

.5 Protect adjacent materials, construction and finished surfaces from damage while cleaning.

END OF SECTION – 32 12 16

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PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the Owner's representative.

.3 All materials shall be new and free from defects which may impair strength, durability or appearance.

.4 Scheduling of the work shall be discussed with, and be subject to the approval of the Owner.

1.2 References

.1 Comply with requirements of the following documents, latest edition:

.1 ASTM C140, Sample and Testing concrete Masonry Units

.2 ASTM C1262, Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units

.3 ASTM C1372, Standard Specification for Segmental Retaining Wall Units.

.4 ASTM D422, Gradation of Soils

.5 ASTM D698, Moisture Density Relationship for Soils, Standard Method

.6 ASTM D 1248, Specification for Corrugated Plastic Pipe

.7 Ontario Regulation 406/19, On-Site and Excess Soil Management.

.8 Ontario Building Code.

1.3 Quality Assurance

.1 Review of retaining wall installation will be carried out by the Consultant.

.2 Arrange for compaction testing to be performed by an independent testing firm. Testing will include random in-place compaction tests and additional tests should test results fail to comply.

1.4 Submittals

.1 Shop Drawings:

.1 Upon award of the Contract and prior to commencing installation, submit shop drawings stamped by the design engineer (licensed to practice in the province of Ontario), depicting all components of the new retaining wall system. Shop Drawings to be provided for Consultant approval prior to commencement of work. **Specification drawings are conceptual only.**

.2 Samples:

.1 Submit samples of the modular units for review by the Owner. Samples shall fully represent the colour and texture to be supplied.

1.5 Delivery, Storage and Handling

.1 All materials shall be new and in perfect condition, free from defects which may impair strength, durability or appearance.

.2 All materials shall be stored in such a way that no damage occurs to any part of the material. Damaged or contaminated material shall not incorporated into any part of the modular retaining wall system.

.3 Schedule deliveries in order to keep storage at job site to minimum without causing delays.

1.6 Measurement for Payment

.1 Measurement for payment shall be on a lump sum basis, unless otherwise stated on the tender form. The tendered cost shall be full compensation for all labour, equipment and material required to complete this work as specified herein.

1.7 Warranty

.1 Submit a written warranty for work specified in this section covering a period of two years, including materials and application, at no cost to the Owner. The contractor shall warrant that the installation will be free from defects related to workmanship or material deficiencies.

.2 Any repair required under the warranty will be carried out in accordance with the recommendations of the Consultant.

PART 2 - PRODUCTS

2.1 Materials

.1 Foundation and Base Soil:

.1 OPSS Granular "A", clear free draining gravel or crushed limestone compacted to a minimum of 98% Standard Proctor Maximum Dry Density.

.2 Drainage Soil:

.1 Free draining OPSS Granular "B" Type 1 aggregate.

.3 Modular Concrete Retaining Wall System:

.1 System:

.1 Anchor Block Retaining Wall System by Anchor Concrete Products.

.2 Or approved equivalent

.4 Geotextile Drainage Filter:

.1 TerraDrain 600 by Terrafix Geosynthetics Inc., complete with continuous mechanically fastened securement strip and end drainage outlet.

.2 Or approved equivalent.

PART 3 - EXECUTION

3.1 Examination

.1 Examine the drawings and specifications to determine the extent of the work involved, together with other data affecting the work, as in no circumstances will any claims against the Owner be allowed resulting from failure to ascertain the extent of such work shown, herein described or implied.

3.2 Protection

.1 Protect existing pavements, utility lines, site appurtenances, and water courses which are to remain. If damaged, restore to original condition at no cost to the Owner.

3.3 Excavation

.1 Verify locations of existing site utilities and structures above and below grade prior to commencement of work. Arrange for removal, temporary relocation and reinstallation of any utilities as may be required. Make good and pay for damage to utilities resulting from work under this contract.

.2 Excavate and dispose of existing sub-base to the grades shown on the drawings and dispose of at an approved landfill and in accordance with regulations. Native soils that are not to be removed are to remain undisturbed.

.3 Observe the rules and regulations governing the respective utilities during excavation. Report existing unlocated services encountered and do not continue excavation without direction.

.4 During removal of soils, support adjacent structures with adequate bracing to prevent cracking or displacement as may be required.

3.4 Foundation Soil

.1 Foundation soil shall be defined as any soils located beneath the wall.

.2 The foundation soil shall be proof rolled and examined by the Consultant to ensure that it meets the minimum strength requirements according to the design assumptions. If unacceptable foundation soil is encountered, excavate affected areas and replace with acceptable material under the direction of the Consultant.

.3 The foundation soil shall be compacted to a minimum of 98% of Standard Proctor (ASTM D698) prior to placement of the base material.

3.5 Base Soil

.1 The leveling base soil shall be installed on undisturbed native soils or suitable compacted crushed stone compacted to 98% Standard Proctor Density, along the grades and dimensions shown on

the drawings to provide a level hard surface on which to place the first course of blocks. The thickness of the leveling base shall be 150mm (6") minimum. Well-graded sand can be used to smooth the top 1/2 in. (13 mm) on the base material.

.2 The base soil shall be placed to allow bottom wall units to be buried to proper depths as per wall heights and specifications.

3.6 Drainage System

.1 Install specified drainage system against the back of full area of the back of the retaining wall in accordance with manufacturer's recommendations. Geotextile laps shall be 300mm (12") minimum and shall be shingled down the wall to prevent infiltration of the retained soil.

.2 Place the specified drainage outlet at low end of the retaining wall. Outlet to drain into existing stone surfacing and on top on new filter fabric layer.

3.7 Modular Units

.1 Supply and install the new modular concrete retaining wall system in accordance with the manufacturer's written instructions for the specified system.

.2 The bottom row of the retaining wall shall be placed on a prepared leveled base care shall be taken to ensure that the modular units are aligned properly, leveled from side to side and front to back and are in complete contact with the base material.

.3 The wall modules above the bottom course shall be placed such that the interlocking profiles are fully engaged.

.4 Successive courses/cap course shall be placed to create a running bond pattern with the edge of all units being approximately aligned with the middle of the unit in the course below it.

.5 The wall modules shall be swept clean before placing additional levels to ensure that no dirt, concrete or other foreign materials become lodged between successive lifts of the wall modules.

.6 Care shall be taken to ensure that the wall modules are not broken or damaged during handling and placement.

3.8 Drainage Soil

.1 Drainage soil shall be placed behind the wall facing in maximum lifts of 150mm (6") and compacted to a minimum density of 95% Standard Proctor.

.2 No heavy compaction equipment shall be allowed within 1m (3ft) of the back of the wall.

3.9 Retained Soil

.1 Retained soils shall be placed and compacted behind the infill soil and/or drainage soil if applicable, in maximum lift thickness of 150mm (6). The retained soils shall be undisturbed native material or engineered fill compacted to a minimum density of 95% Standard Proctor.

.2 No heavy compaction equipment shall be allowed within 1m (3ft) of the back of the wall.

3.10 Finishing Wall

.1 Coping units shall be secured to the top of the wall with four (4) 10mm (3/8") beads of the approved flexible concrete adhesive positioned evenly across the depth of the retaining wall units.

3.11 Cleaning

.1 As work proceeds on a daily basis and on completion, remove all surplus materials and debris resulting from the foregoing work.

.2 Protect adjacent materials, construction and finished surfaces from damage while cleaning.

END OF SECTION – 32 32 23

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Pretium

Consulting Engineers | Working Together, Better

FIRE STATION STORAGE BUILDING
300 EARL STEWART DRIVE, AURORA, ON

PREPARED FOR:
CENTRAL YORK FIRE SERVICES
c/o CENTRAL YORK FIRE SERVICES
300 EARL STEWART DRIVE
AURORA, ON L4G 7Z5
ATTN.: CLAUDE DUVAL

PREPARED BY:
PRETIUM ENGINEERING INC.
355 HARRY PARKER WALKWAY NORTH, SUITE 6
NEWMARKET, ON, L3Y 7B3
T: 905-717-7055
www.PretiumEngineering.com

NOVEMBER 19, 2024
24-00356

GENERAL NOTES

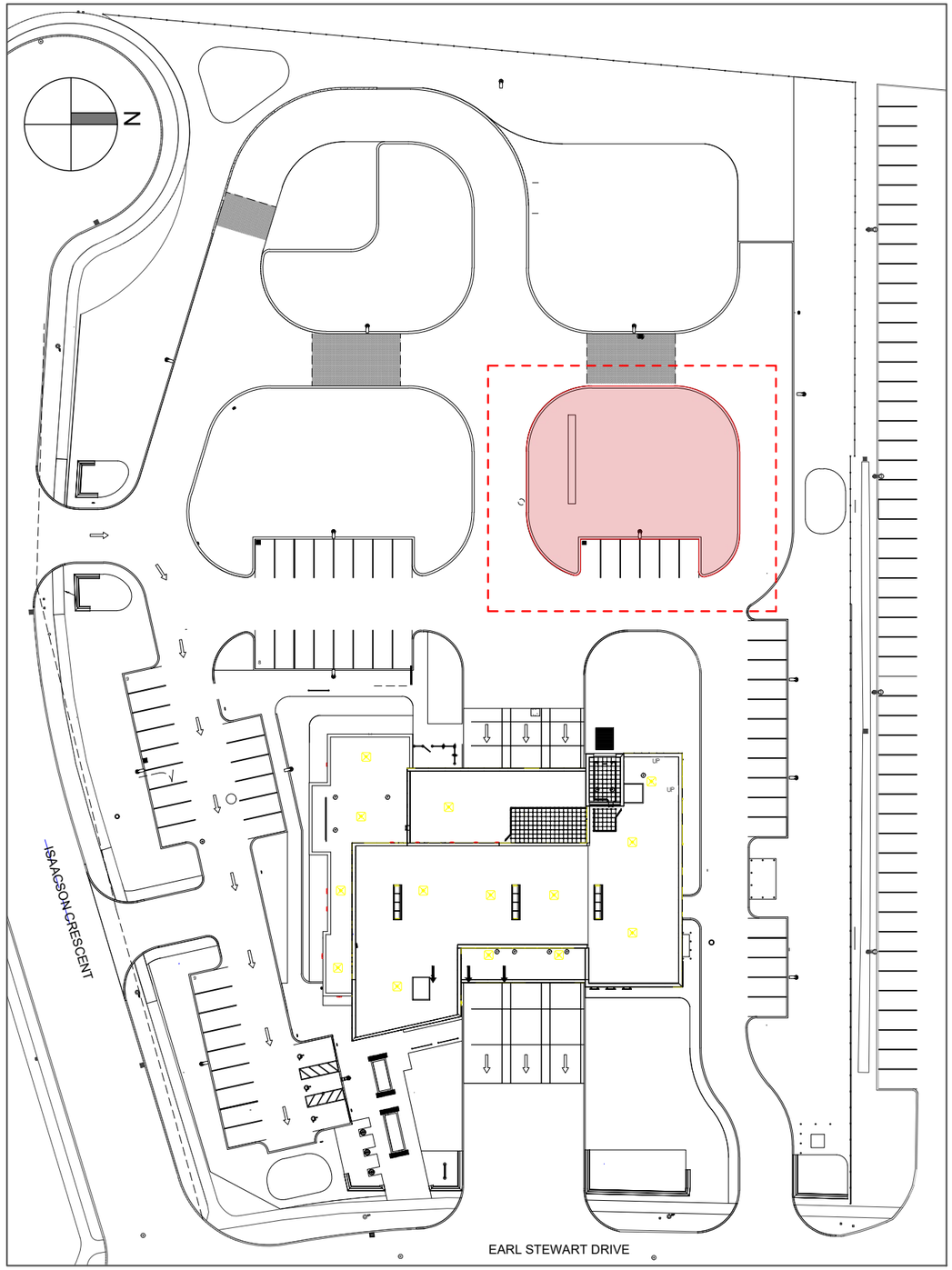
1. ALL DRAWINGS ARE THE PROPERTY OF THE CONSULTANT AND MAY NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION OF THE CONSULTANT.
2. THE CONSULTANT BEARS NO RESPONSIBILITY FOR THE INTERPRETATION OF THE DOCUMENTS BY THE CONTRACTOR. THE CONSULTANT WILL PROVIDE CLARIFICATION OR SUPPLEMENTAL INFORMATION REGARDING THE INTENT OF THE DOCUMENTS UPON WRITTEN APPLICATION.
3. ALL DIMENSIONS ARE NOMINAL AND REPRESENT MILLIMETERS UNLESS NOTED OTHERWISE.
4. CONTRACTOR SHALL SITE VERIFY ALL DIMENSIONS AND ELEVATIONS. THE DRAWINGS ARE NOT TO BE SCALED. REPORT ANY DISCREPANCIES TO THE CONSULTANT BEFORE PROCEEDING WITH THE WORK.
5. ALL MATERIALS IN DETAILS ARE TO BE NEW EXCEPT AS NOTED OTHERWISE.
6. COORDINATE ALL SITE ACCESS AND CLEARANCES WITH THE OWNER.
7. ALL WORK SHALL BE CARRIED OUT IN CONFORMANCE WITH THE CODE AND BYLAWS HAVING JURISDICTION. COORDINATE ALL INSPECTIONS WITH THE MUNICIPALITY.
8. COORDINATE ALL UTILITY STAKEOUTS AND CLEARANCES WITH THE APPROPRIATE UTILITY.
9. COORDINATE WITH AND INFORM CONSULTANTS OF WORK IN PROGRESS AND PROVIDE FREE ACCESS FOR REVIEW BY THE CONSULTANT.
10. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES AFFECTED BY THIS CONSTRUCTION.
11. SUBMIT DATA SHEETS FOR ALL PROPOSED MATERIALS/PRODUCTS TO THE CONSULTANT PRIOR TO INCORPORATING INTO THE WORK.
12. NO HOLES SHALL BE MADE THROUGH STRUCTURAL MEMBERS WITHOUT PRIOR WRITTEN APPROVAL FROM THE CONSULTANT.
13. THE CONTRACTOR SHALL VERIFY THE WORK AREA WITH THE CONSULTANT PRIOR TO BEGINNING WORK.

NO.	REVISIONS	DATE
2	ISSUED FOR TENDER	11/19/2024
1	ISSUED FOR REVIEW	09/13/2024

Sheet List Table

Sheet Number	Sheet Title
A001	COVER PAGE
A101	SITE PLAN
A102	FLOOR PLAN
A103	REFLECTED CEILING PLAN
A104	EXISTING LAND SURVEY
A105	NEW GRADING PLAN
A201	NORTH & SOUTH ELEVATION
A202	EAST & WEST ELEVATION
A301	LATITUDINAL SECTION
E1	LEGEND, DRAWING LIST & SCHEDULE
E2	FLOOR PLAN - ELECTRICAL LAYOUT
E3	PANEL SCHEDULE
E4	ELECTRICAL SPECIFICATION (1 OF 2)
E5	ELECTRICAL SPECIFICATION (2 OF 2)

DWG NO: A001



1 A101 SITE PLAN

NOT TO SCALE

2 A101 KEY PLAN

NOT TO SCALE

GENERAL NOTES

THIS SITE PLAN WAS BASED ON THE EXISTING SITE PLAN PROVIDED BY THE CLIENT.

LEGEND

WORK AREA

NO.	REVISIONS	DATE
2	ISSUED FOR TENDER	11/19/2024
1	ISSUED FOR REVIEW	09/13/2024

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Pretium

Pretium Engineering Inc.

CLIENT:

CENTRAL YORK FIRE SERVICES

CARE OF CENTRAL YORK FIRE SERVICES

PROJECT:

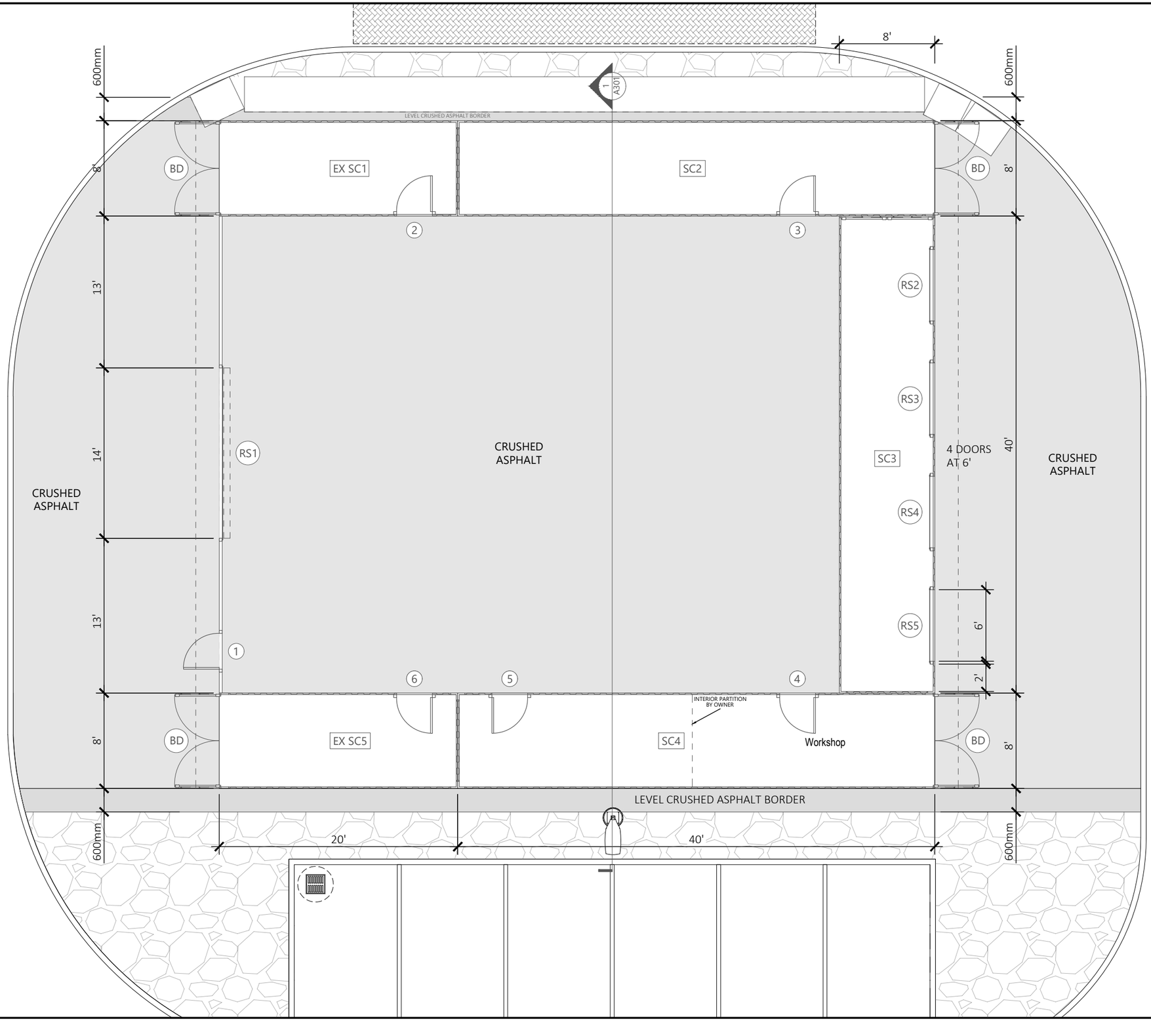
FIRE STATION STORAGE BUILDING

300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:

SITE PLAN

DRAWN BY:	JK	**SCALE:**	AS INDICATED
CHECKED BY:	MT	**DATE:**	11/19/2024
PROJECT NO:	24-00356	**DWG NO:**	A101



LEGEND

- RS# ROLLING SHUTTER DOOR
- BD BARN DOOR
- # MAN DOOR
- SC# SHIPPING CONTAINER
- EX SC# SHIPPING CONTAINER

NO.	REVISIONS	DATE
2	ISSUED FOR TENDER	11/19/2024
1	ISSUED FOR REVIEW	09/13/2024

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Pretium Engineering Inc.

CLIENT:

CENTRAL YORK FIRE SERVICES

CARE OF CENTRAL YORK FIRE SERVICES

PROJECT:

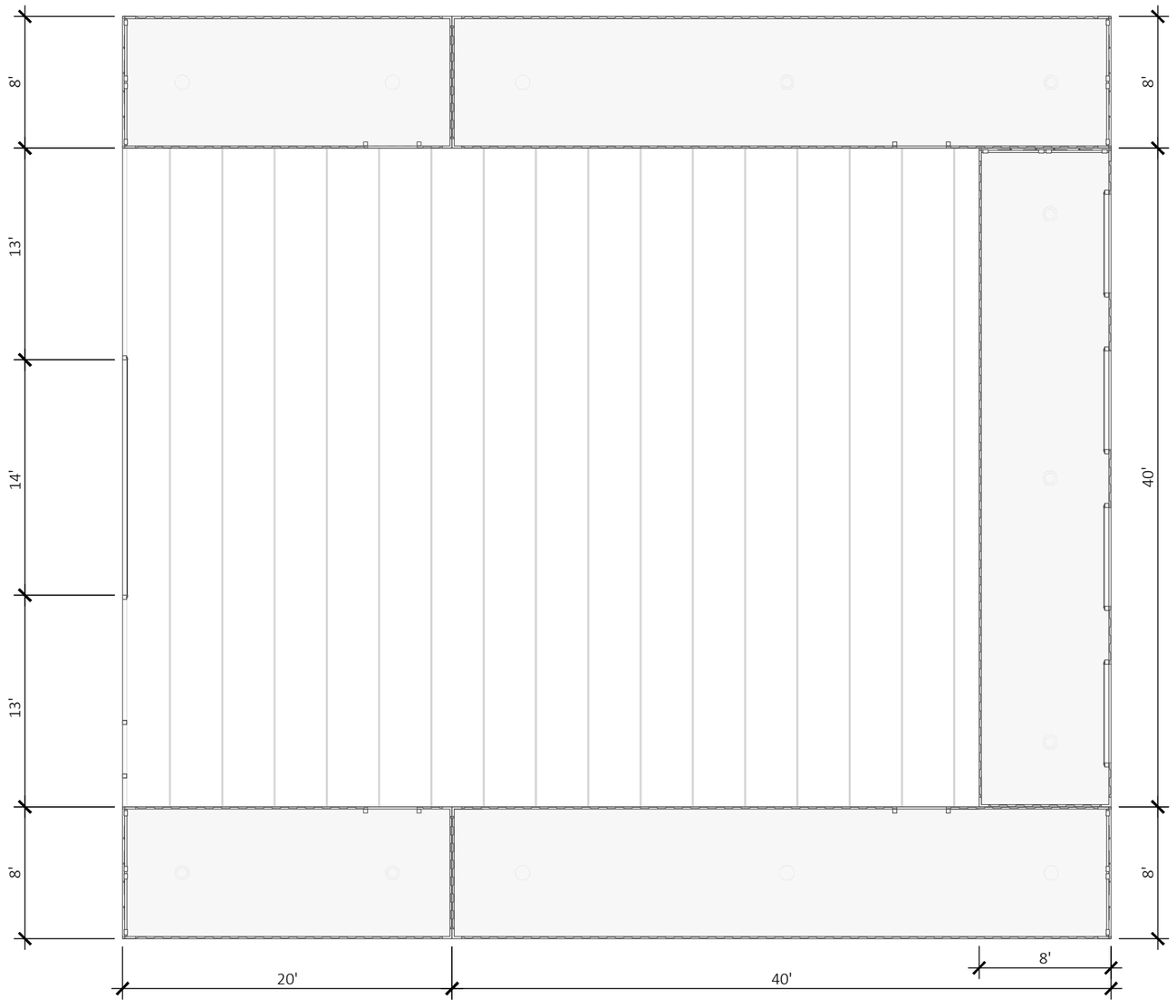
FIRE STATION STORAGE BUILDING

300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:

FLOOR PLAN

DRAWN BY:	JK	**SCALE:**	1:100
CHECKED BY:	MT	**DATE:**	11/19/2024
PROJECT NO:	24-00356	**DWG NO:**	A102



GENERAL NOTES

PLACEMENT OF LIGHT FIXTURES TO BE CONFIRMED.

NO.	REVISIONS	DATE
2	ISSUED FOR TENDER	11/19/2024
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Pretium Engineering Inc.

CLIENT:

CENTRAL YORK FIRE SERVICES

CARE OF CENTRAL YORK FIRE SERVICES

PROJECT:

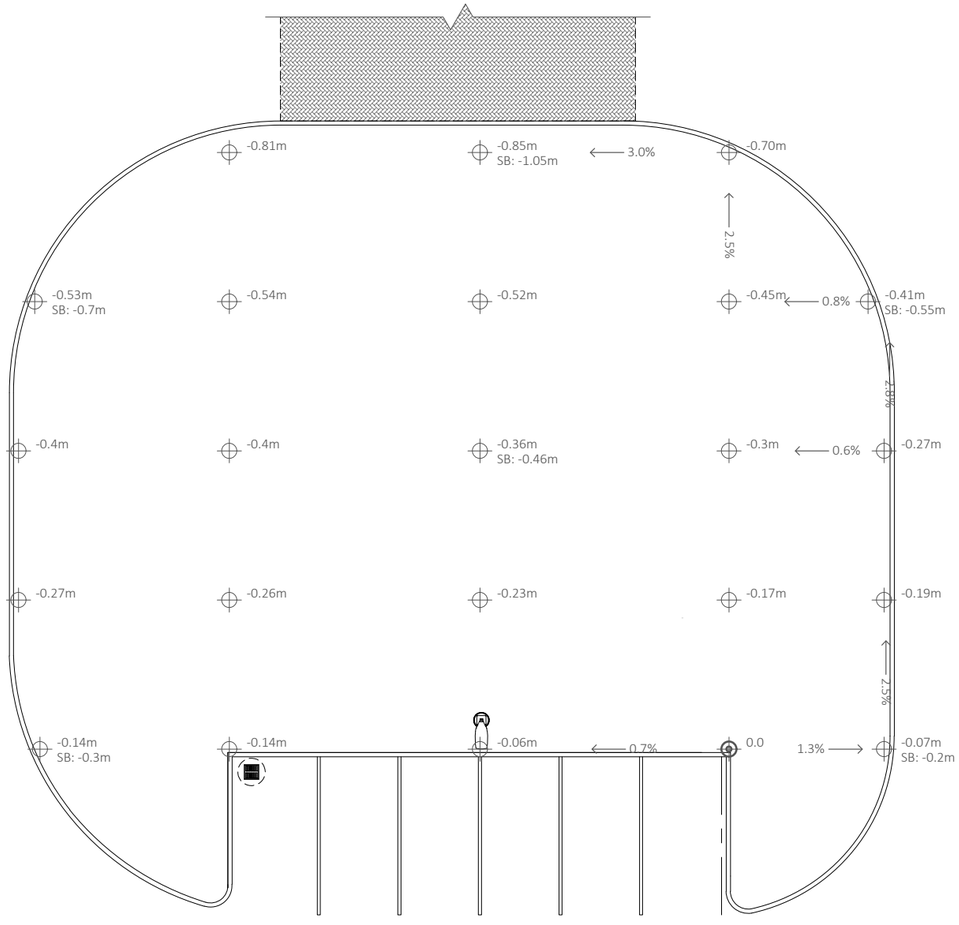
FIRE STATION STORAGE BUILDING

300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:

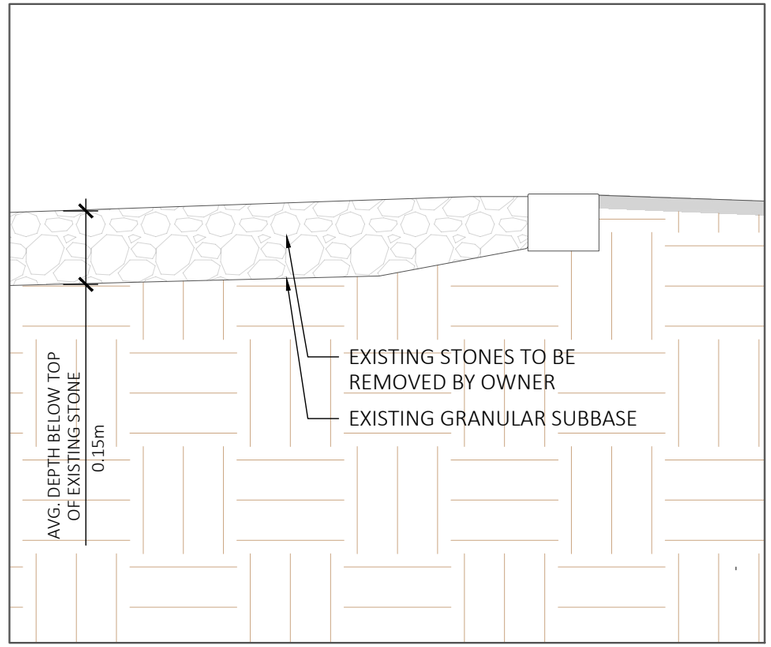
REFLECTED CEILING PLAN

DRAWN BY:	JK	**SCALE:**	1:100
CHECKED BY:	MT	**DATE:**	11/19/2024
PROJECT NO:	24-00356	**DWG NO:**	A103



1 A104 EXISTING GRADING PLAN

AS INDICATED



2 A104 DEPTH OF EXISTING GRANULAR SUBBASE

AS INDICATED

GENERAL NOTES

- TOP OF EXISTING GRANULAR BASE
- TOP OF CRUSHED ASPHALT
- ORIGIN

SB = TOP OF EXISTING GRANULAR SUBBASE

NO.	REVISIONS	DATE
2	ISSUED FOR TENDER	11/19/2024
1	ISSUED FOR REVIEW	09/13/2024

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CLIENT:

CENTRAL YORK FIRE SERVICES

CARE OF CENTRAL YORK FIRE SERVICES

PROJECT:

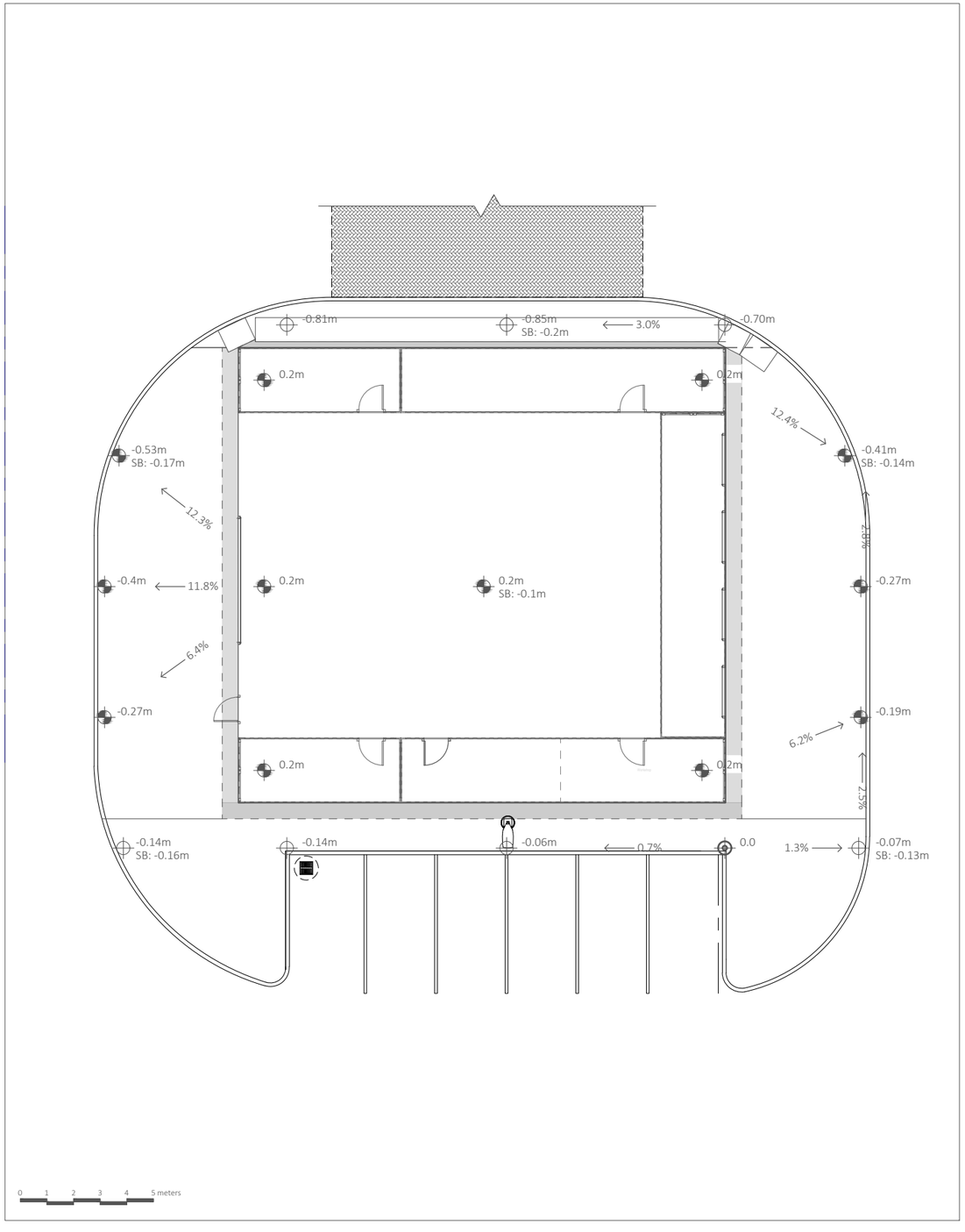
FIRE STATION STORAGE BUILDING

300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:

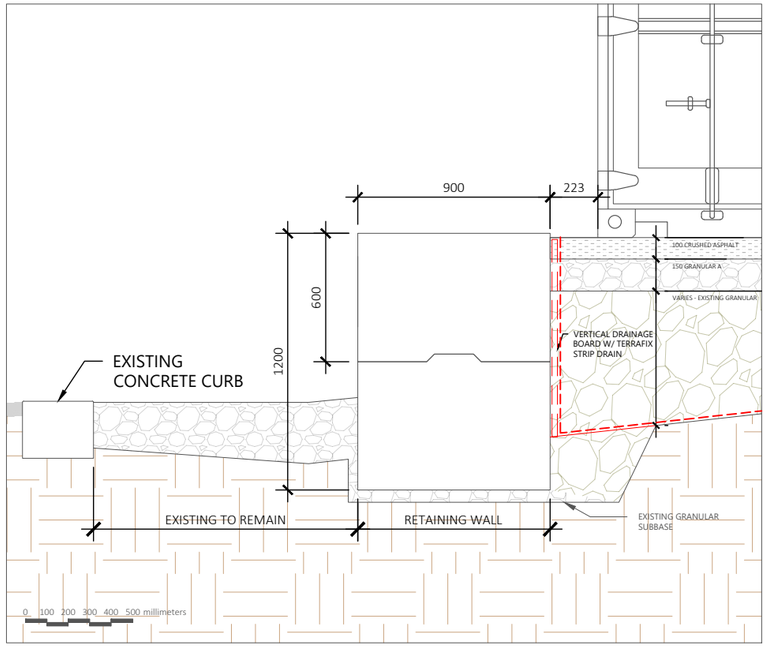
EXISTING LAND SURVEY

DRAWN BY:	JK	**SCALE:**	NOT TO SCALE
CHECKED BY:	MT	**DATE:**	11/19/2024
PROJECT NO:	24-00356	**DWG NO:**	A104



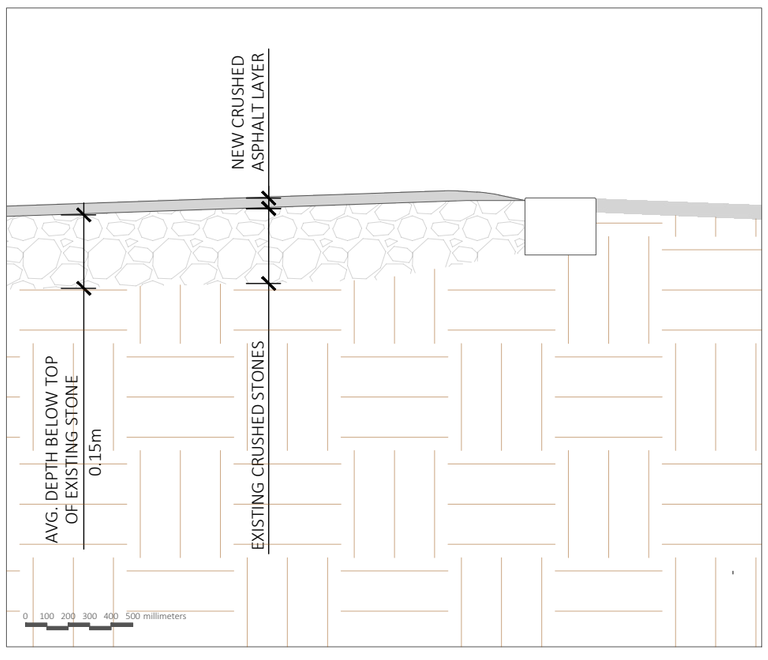
1 A105 NEW GRADING PLAN

AS INDICATED



2 A105 RETAINING WALL

AS INDICATED



3 A105 CRUSHED ASPHALT

AS INDICATED

GENERAL NOTES

- TOP OF EXISTING GRANULAR BASE
- TOP OF CRUSHED ASPHALT
- ORIGIN

SB = TOP OF EXISTING GRANULAR SUBBASE

NO.	REVISIONS	DATE
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CONSTRUCTION NORTH

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Pretium Engineering Inc.

CLIENT:

CENTRAL YORK FIRE SERVICES

CARE OF CENTRAL YORK FIRE SERVICES

PROJECT:

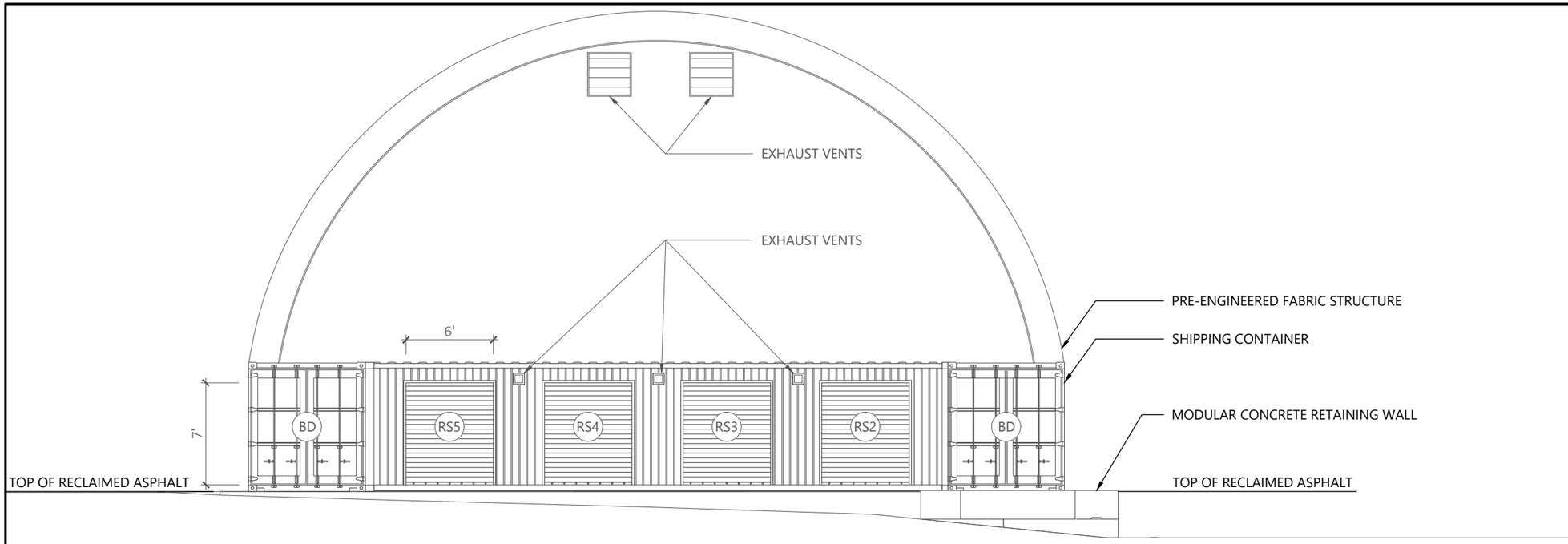
FIRE STATION STORAGE BUILDING

300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:

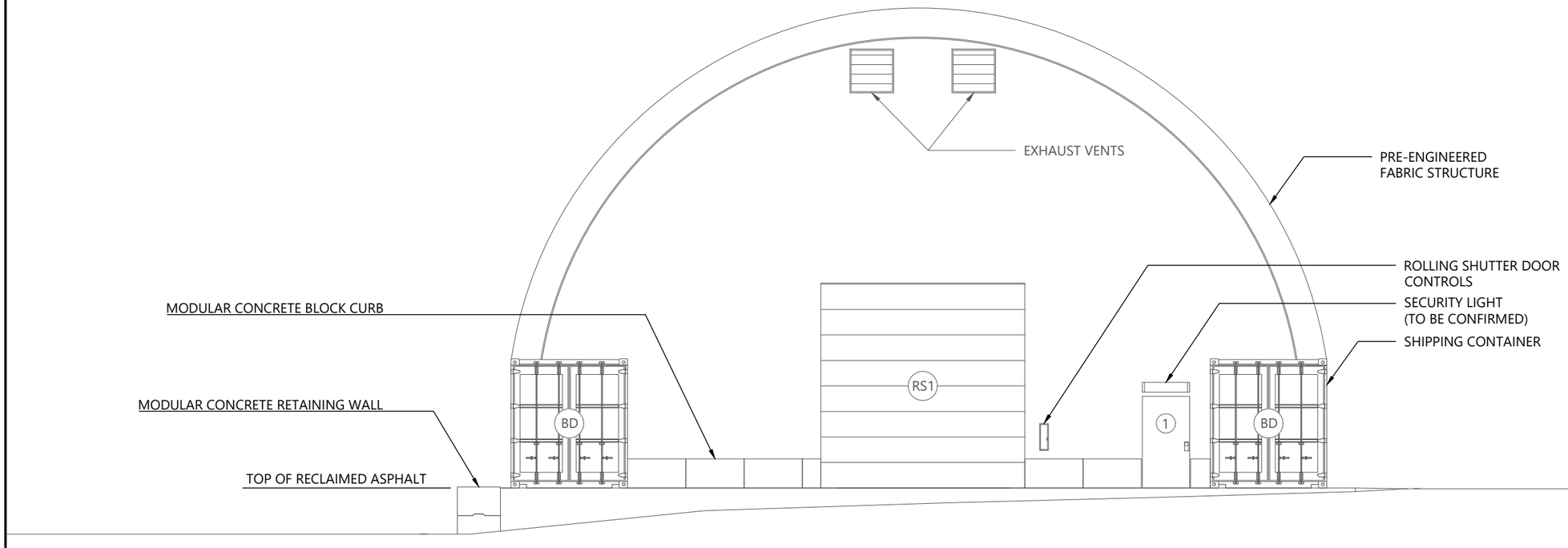
NEW GRADING PLAN

DRAWN BY:	JK	**SCALE:**	AS INDICATED
CHECKED BY:	MT	**DATE:**	11/19/2024
PROJECT NO:	24-00356	**DWG NO:**	A105



1 A201 NORTH ELEVATION

1:100



2 A201 SOUTH ELEVATION

1:100

NO.	REVISIONS	DATE
2	ISSUED FOR TENDER	11/19/2024
1	ISSUED FOR REVIEW	09/13/2024

STAMP:

Pretium

Pretium Engineering Inc.

CLIENT:

CENTRAL YORK FIRE SERVICES

CARE OF CENTRAL YORK FIRE SERVICES

PROJECT:

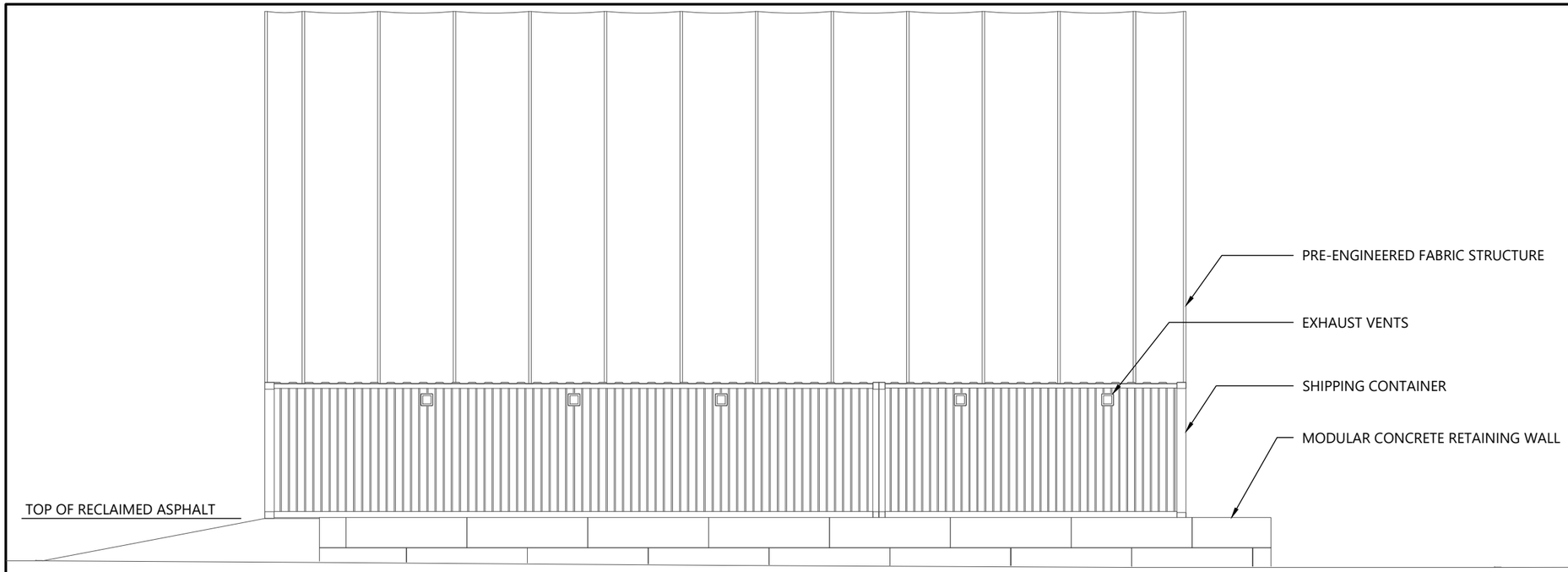
FIRE STATION STORAGE BUILDING

300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:

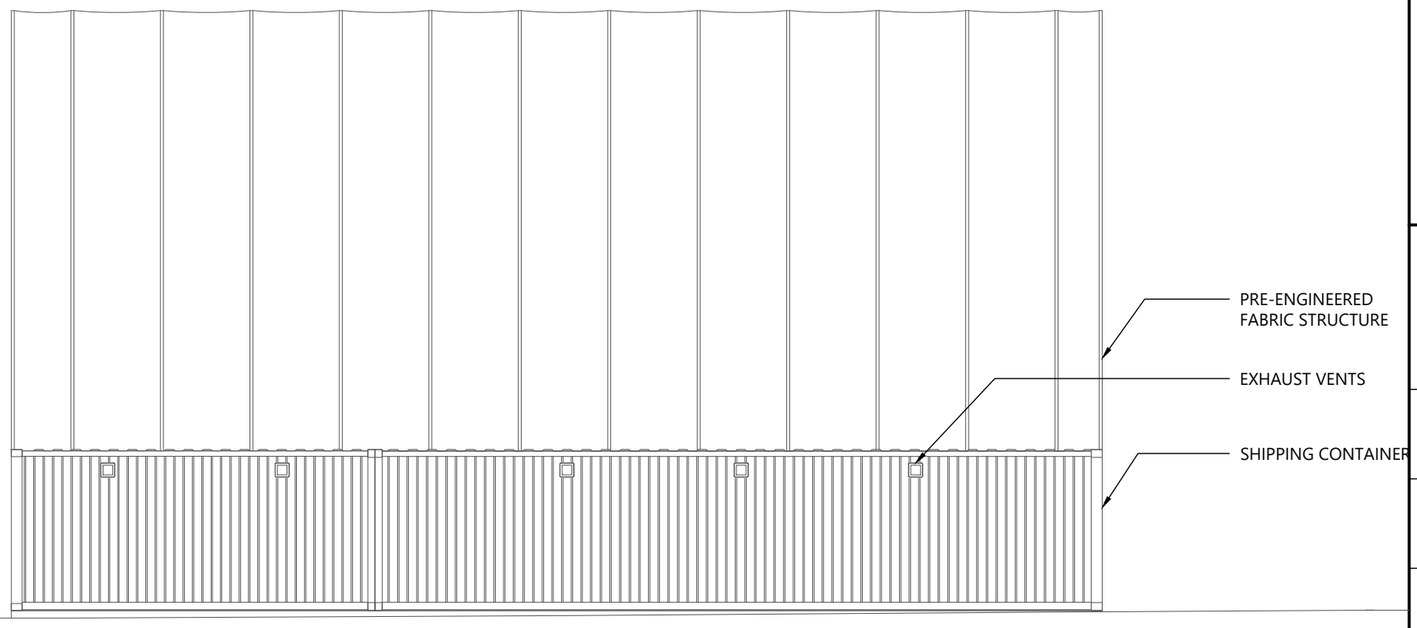
NORTH & SOUTH ELEVATION

DRAWN BY:	JK	**SCALE:**	1:100
CHECKED BY:	MT	**DATE:**	11/19/2024
PROJECT NO:	24-00356	**DWG NO:**	A201



1 A202 WEST ELEVATION

1:100



2 A202 EAST ELEVATION

1:100

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DRAWING:

EAST & WEST ELEVATION

DRAWN BY:	JK	**SCALE:**	1:100
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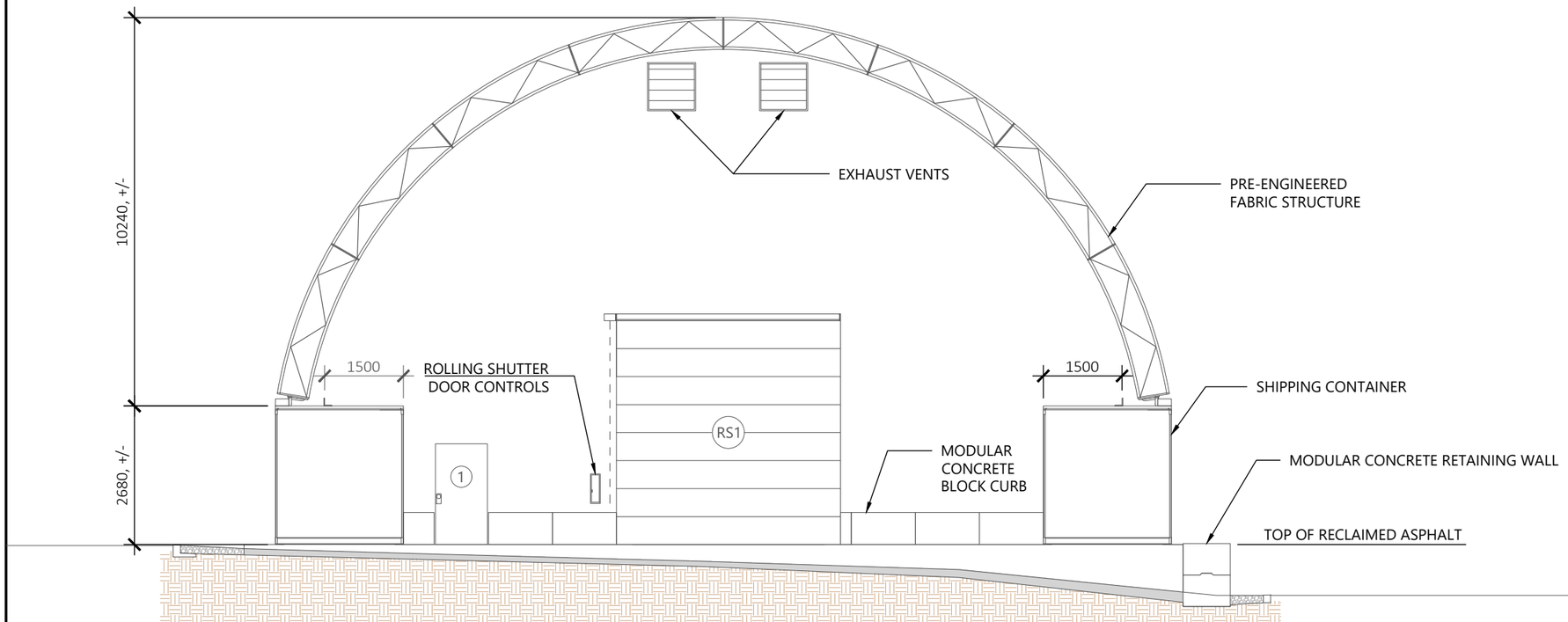

1 / A301 LATITUDINAL SECTION

1:100

GENERAL NOTES

6FT ROLLING SHUTTER DOORS AFTER SPACING ISSUES WERE NOTED WITH THE 8FT ROLLING SHUTTER DOORS.

SURFACE ELEVATIONS WERE BASED OFF OF SURVEY PERFORMED ON-SITE. FULL INFORMATION CAN BE FOUND ON A104 - GRADING PLAN.

ACTUAL LIGHTING SYSTEM AND PLACEMENT TO BE CONFIRMED.

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LATITUDINAL SECTION

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LEGEND

- A 1A–6 — CEILING MOUNTED LUMINAIRE TYPE 'A', CONNECTED TO PANEL '1A', CIRCUIT #6
- WALL MOUNTED LUMINAIRE
- LIGHTING STANDARD WITH SINGLE OR DOUBLE HEADS
- EMERGENCY BATTERY UNIT C/W DOUBLE HEADS. LUMACELL #RGS24S–720–AT OR APPROVED EQUAL
- EMERGENCY REMOTE SINGLE OR DOUBLE HEADS. LUMACELL #M–QM–LD14 OR APPROVED EQUAL
- SELF–POWERED EXIT SIGN FIXTURE WALL OR CEILING MOUNTED – ARROW INDICATES DIRECTION, SHADED AREA DENOTES FACE.
- $ — SINGLE POLE LIGHT SWITCH
- $3 — THREE WAY LIGHT SWITCH
- $OS — OCCUPANCY SENSOR MANUAL OVERRIDE LIGHT SWITCH
- $D — DIMMER SWITCH
- $EF — EXHAUST FAN SWITCH
- OS — CEILING OCCUPANCY SENSOR
- 15A, 125V DUPLEX RECEPTACLE
- T IG — 15A, 125V QUADPLEX RECEPTACLE (CSA 5–15R); 'T' INDICATES 15A/20A T–SLOT RECEPTACLE (CSA 5–20RA), ON THE CIRCUIT WITH SEPARATE NEUTRAL & GROUND WIRE
- 15A, 125V DUPLEX GROUND FAULT INTERRUPTER RECEPTACLE.
- 15A, 125V HOSPITAL GRADE DUPLEX RECEPTACLE (CSA 5–15R).
- 2 — 20A, 125V DUPLEX GROUND FAULT INTERTUPTER RECEPTACLE
- 2 — 20A, 125V DUPLEX RECEPTACLE
- 2 — 20A, 125/250V RECEPTACLE
- 3 — 30A, 125/250V RECEPTACLE
- WALL RECESSED OR WALL MOUNTED ELECTRICAL PANEL BOARD.
- DISCONNECT SWITCH
- TRANSFORMER AS NOTED
- ELECTRIC HEATER
- 1B–1 — DIRECT POWER CONNECTION TO EQUIPMENT AS NOTED, CONNECTED TO PANEL '1B', CIRCUIT #1

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER CATALOGUE/ORDER CODE	VOLTAGE	DRIVER	SUPPLIED
L1	WALL MOUNTED LUMINAIRE (WITH PHOTOCELL)		120V	120V LED DRIVER WITH DIMMING CAPABILITY	OWNER SUPPLY
L2	8' LED SURFACE MOUNTED LUMINAIRE (GENERAL)		120V	120V LED DRIVER WITH DIMMING CAPABILITY	OWNER SUPPLY

ABBREVIATIONS

GFI	GROUND FAULT INTERRUPTER
WP	WEATHER PROOF. C/W WP INSTALLATION
R	RANGE/OVEN
MW	MICROWAVE
F	FRIDGE
D	DRYER
W	WASHER
C	CEILING MOUNTED
H	FOR "HOUSE"
HD	HAND DRYER
IR	INFARED SENSOR
EWH1	ELECTRIC WALL HEATER TYPE 1
ECH1	ELECTRIC CEILING HEATER TYPE 1
1	NOTE (GENERAL OR SPECIFIC)
1 / EXXX	DETAIL #1 ON DRAWING EXXX

DRAWING LIST

DRAWING NO.	TITLE	SCALE
E1	LEGEND, DRAWING LIST, & SCHEDULES	N.T.S.
E2	FLOOR PLAN – ELECTRICAL LAYOUT	1:100
E3	PANEL SCHEDULE	N.T.S.
E4	ELECTRICAL SPECIFICATIONS (1 OF 2)	N.T.S.
E5	ELECTRICAL SPECIFICATIONS (2 OF 2)	N.T.S.

EXIT SIGN, BATTERY UNIT, + REMOTE HEAD SCHEDULE

TYPE	DESCRIPTION	VOLTAGE /PHASE	CATALOGUE NO.
	WALL MOUNTED EXIT SIGN. ARROW INDICATES DIRECTION, SHADED AREA DENOTES FACE. SELF POWERED.	120V/1PH	BELUCE CANADA #GD–RM–SP–L–SW–1–120SP–AT (ADD DIRECTION) OR APPROVED EQUAL
	CEILING MOUNTED EXIT SIGN. ARROW INDICATES DIRECTION, SHADED AREA DENOTES FACE. SELF POWERED.	120V/1PH	BELUCE CANADA #GD–RM–SP–L–SC–1–120SP–AT (ADD DIRECTION) OR APPROVED EQUAL
	CEILING MOUNTED EXIT SIGN. ARROW INDICATES DIRECTION, SHADED AREA DENOTES FACE. SELF POWERED.	120V/1PH	BELUCE CANADA #GD–RM–SP–L–SC–2–120SP–AT (ADD DIRECTION) OR APPROVED EQUAL
	EMERGENCY REMOTE SINGLE OR DOUBLE HEAD.	24V	BELUCE CANADA SINGLE: #SR–1–24V–5WLEDMR16 DOUBLE: #SR–2–24V–5WLEDMR16 OR APPROVED EQUAL
	EMERGENCY BATTERY UNIT WITH AUTOTEST	120V AC SUPPLY 24V OUTPUT	BELUCE CANADA #NV–24–720–0–120/347V–AT OR APPROVED EQUAL

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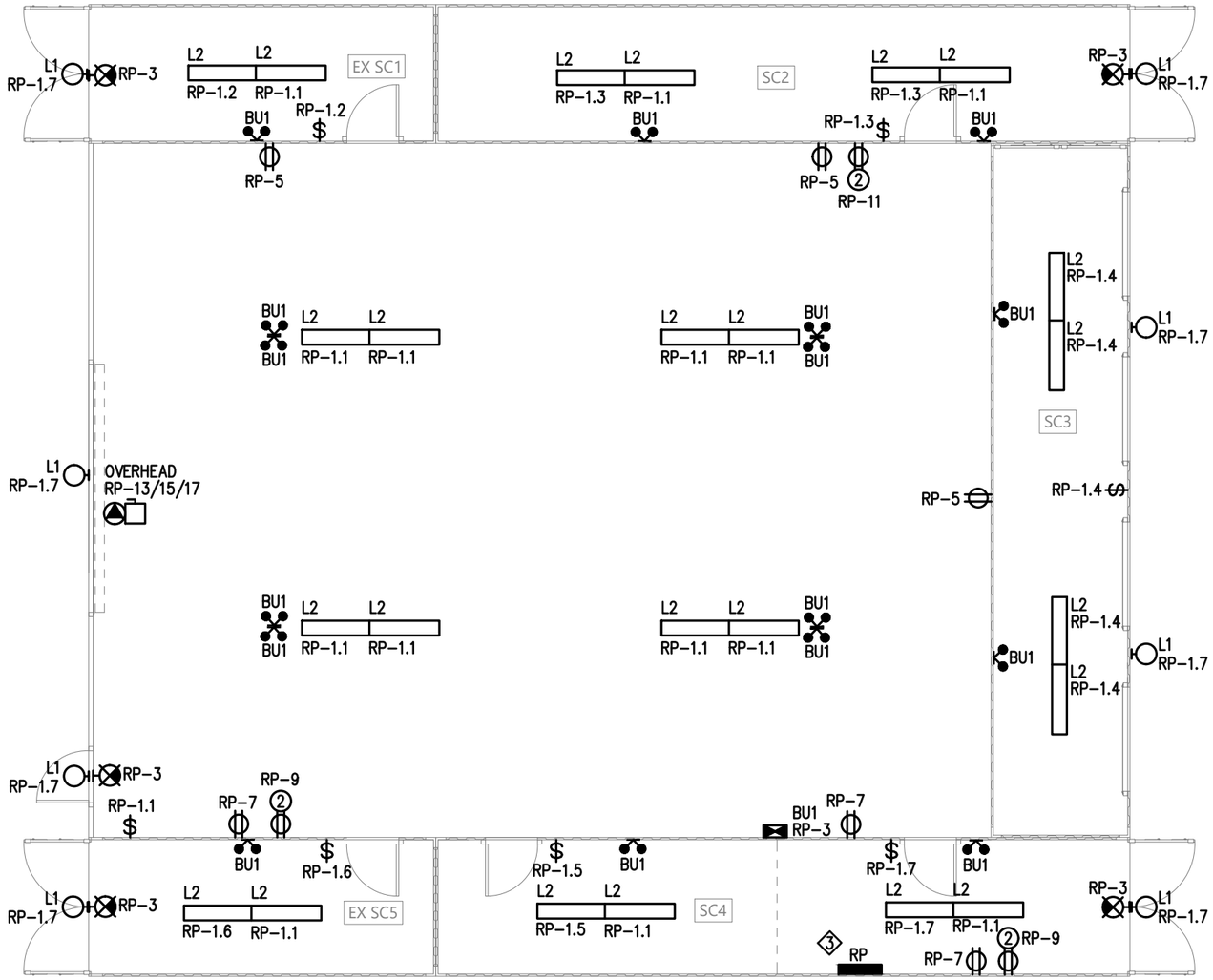
PROJECT:
FIRE STATION STORAGE BUILDING
300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:
LEGEND, DRAWING LIST, & SCHEDULES

DRAWN BY:	SCALE:
CHECKED BY:	DATE:
PROJECT NO:	DWG NO: E1



1 E2 FLOOR PLAN - ELECTRICAL LAYOUT

1:100

GENERAL NOTES:

1. RESERVED
2. ELECTRICAL CONTRACTOR SHALL CONFIRM EXACT LOCATIONS OF POWER OUTLETS WITH ARCHITECTURAL PRIOR TO ROUGH IN FOR ALL DEVICES SHOWN THROUGHOUT ENTIRE PROJECT. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS FROM ALL DISCIPLINES.
3. CONTRACTOR SHALL PROVIDE THE FOLLOWING:
   1) NEW 100A, 208V, 3PH., 30CCT ELECTRICAL PANEL. PROVIDE FEEDER & MAIN BREAKER IN MAIN ELECTRICAL ROOM.
4. ALL WIRING SHALL BE AS PER OESC REQUIREMENTS AND CAPABLE OF CARRYING THE AMPACITY MENTIONED ON DRAWINGS AND SHOWN ON PANEL SCHEDULES.
5. MOUNTING HEIGHTS OF ALL EXIT SIGNS, EMERGENCY REMOTE HEADS, BATTERY PACKS, & LIGHTING TO BE IN ACCORDANCE WITH LATEST EDITIONS OF ONTARIO BUILDING CODE AND THE ONTARIO ELECTRICAL CODE. DROP DOWN WITH STEM TO ACHIEVE LOWER MOUNTING HEIGHTS.
6. COORDINATE WITH ARCHITECTURAL AND INTERIOR DRAWINGS FOR EXACT LOCATIONS PRIOR TO ANY ROUGH-INS. ANY CONFUSION OR DISCREPANCIES SHOULD BE REPORTED TO THE CONSULTANT TEAM RIGHT AWAY.

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FIRE STATION STORAGE BUILDING
300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:
FLOOR PLAN
- ELECTRICAL LAYOUT

DRAWN BY:	SCALE:
CHECKED BY:	DATE:
PROJECT NO:	DWG NO: E2

PANEL RP

PANELBOARD SCHEDULE

TYPE –

DESCRIPTION	BRKR SIZE	WATTS PER PHASE A	WATTS PER PHASE B	WATTS PER PHASE C	CIR NO	BUS ABC	CIR NO	WATTS PER PHASE A	WATTS PER PHASE B	WATTS PER PHASE C	BRKR SIZE	DESCRIPTION
LIGHTING	20A	---			1		2	---			20A	GENERAL RECEPTACLES
EMERGENCY BATTERY PACK/EXIT SIGN	20A		---		3		4		---		20A	GENERAL RECEPTACLES
GENERAL RECEPTACLES	15A			---	5		6			---	20A	GENERAL RECEPTACLES
GENERAL RECEPTACLES	15A	---			7		8	---			20A	GENERAL RECEPTACLES
GENERAL RECEPTACLES	20A		---		9		10		---		15A	GENERAL RECEPTACLES
GENERAL RECEPTACLES	20A			---	11		12			---	15A	GENERAL RECEPTACLES
OVER HEAD DOOR	15A / 3P	---			13		14	---			15A	GENERAL RECEPTACLES
			---		15		16		---		15A	GENERAL RECEPTACLES
				---	17		18			---	15A	SPARE
SPACE ONLY	---	---			19		20	---			20A	SPARE
SPACE ONLY	---		---		21		22		---		---	SPACE ONLY
SPACE ONLY	---			---	23		24			---	---	SPACE ONLY
SPACE ONLY	---	---			25		26	---			---	SPACE ONLY
SPACE ONLY	---		---		27		28		---		---	SPACE ONLY
SPACE ONLY	---			---	29		30			---	---	SPACE ONLY
		---	---	---	TOTALS			---	---	---		
					---	---	---					

– W	CONNECTED LOAD
– A	TOTAL AMPS
WORKSHOP	LOCATION

FLUSH	[ ]	[ ]	LUGS
SURFACE	[X]	[X]	BREAKER

120/208V/3PH.	VOLTAGE/PHASE
100A	MAIN
100A/3P	MAIN BREAKER
30/1	CCTS/TUBS

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FIRE STATION STORAGE BUILDING
300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:
PANEL SCHEDULE

DRAWN BY:	SCALE:
CHECKED BY:	DATE:
PROJECT NO:	DWG NO: E3

ELECTRICAL SPECIFICATIONS (1 OF 2)

1. GENERAL CONDITIONS

   A. THE ELECTRICAL CONTRACTOR SHALL FURNISH ALL LABOUR, MATERIAL, TOOLS, EQUIPMENT, ETC. REQUIRED TO COMPLETE ALL WORK SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED. THE WORK SHALL BE IN ACCORDANCE WITH RULES AND REGULATIONS OF ALL AUTHORITIES HAVING LEGAL JURISDICTION OVER THE WORK. THIS CONTRACTOR SHALL PROVIDE ANY SMALL ITEMS OF WORK NOT SPECIFICALLY CALLED FOR BUT REQUIRED TO COMPLETE THE INTENDED INSTALLATION.

   B. THE CONSULTANT RESERVES THE RIGHT TO APPROVE THE QUALITY OF MATERIAL AND WORKMANSHIP, ALSO TO CALL FOR ANY TESTS WHICH ARE DEEMED NECESSARY DURING THE PROGRESS OF THE WORK AND A COMPLETE TEST OF EACH SYSTEM AT THE COMPLETION OF THE WORK. THE COST OF SUCH TESTS ARE NOT TO BE CONSIDERED AS EXTRAS.

2. SCOPE OF WORK

   THE WORK SHALL CONSIST OF, BUT SHALL NOT BE LIMITED TO THE FOLLOWING:

   A. ALL NECESSARY CONDUIT WIRING AND CONNECTIONS FOR A COMPLETE INSTALLATION.
   B. LIGHTING AND POWER DISTRIBUTION SYSTEM AS SHOWN ON DRAWINGS.

3. CODES, PERMITS AND INSPECTION

   A. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL OBTAIN ALL PERMITS, INSPECTIONS, ETC. AS REQUIRED BY ALL AUTHORITIES HAVING JURISDICTION OVER THIS WORK AND SHALL PAY FOR SAME. THESE COSTS SHALL BE INCLUDED IN THE TENDER PRICE.
   B. ALL PERMITS SHALL BE DELIVERED TO THE OWNER REPRESENTATIVE AS SOON AS THEY BECOME AVAILABLE.
   C. ALL VERIFICATION REPORTS SHALL BE SUBMITTED TO CONSULTANT AND OWNER.

4. DRAWINGS

   THIS CONTRACTOR SHALL PREPARE, AT HIS OWN EXPENSE, ANY LARGE SCALE WORKING DRAWINGS WHICH MAY BE REQUIRED BY THE EXAMINING AUTHORITIES.

5. AS-BUILT DRAWINGS

   THIS CONTRACTOR SHALL KEEP A SEPARATE SET OF WHITE PRINTS ON THE SITE AND NOTE ALL CHANGES AND DEVIATIONS FROM THE ORIGINAL DESIGN. TWO SETS OF THESE PLANS ALONG WITH UPDATED AUTOCAD DRAWINGS SHOWING ALL AS-BUILT CONDITIONS SHALL BE FORWARDED TO THE CONSULTANT AT THE COMPLETION OF THIS CONTRACT BEFORE APPLYING FOR FINAL PAYMENT.

6. SHOP DRAWINGS

   SUBMIT SIX (6) ELECTRONIC OR SIX (6) HARD COPIES OF MANUFACTURER'S SHOP DRAWINGS FOR ALL DEVICES, SYSTEMS AND SUCH FOR REVIEW BY THE CONSULTANT. CLEARLY MARK ALL APPLICABLE OPTIONS ON THESE SHOP DRAWINGS.

7. EXAMINATION OF SITE

   A. THIS CONTRACTOR SHALL VISIT THE SITE OF THE PROJECT AND FAMILIARIZE THEMSELVES WITH THE SPECIFIC SITE CONDITIONS.

   B. ANY DEVIATION AND / OR CONFLICTS ON SITE SHALL BE REPORTED TO THE CONSULTANT PRIOR TO SUBMITTING TENDER.

8. CONSTRUCTION SCHEDULE

   THIS CONTRACTOR SHALL SCHEDULE AND PERFORM HIS WORK TO MEET THE COMPLETION SCHEDULE AS SET OUT BY THE GENERAL CONTRACTOR AND THE OWNER'S REPRESENTATIVE.

9. REVISIONS AND EXTRAS

   NO ADDITIONAL MONEY OVER THE CONTRACT PRICE SHALL BE PAID UNLESS AN APPROVED CHANGE ORDER IS ISSUED BY THE CONSULTANT. CLAIMS FOR EXTRAS SHALL BE SUBMITTED WITH A COMPLETE BREAKDOWN OF MATERIAL, LABOUR, HOURLY RATES, ETC.
   THERE SHALL BE NO EXTRA CLAIM FOR RELOCATION OF ANY EQUIPMENT/DEVICE WITHIN 10 FEET FROM ORIGINAL LOCATION.

10. CLEAN UP

    THIS CONTRACTOR SHALL BE RESPONSIBLE TO PERIODICALLY REMOVE ALL DEBRIS AND TO KEEP THIS AREA CLEAN AT ALL TIMES. CLEAN ALL LUMINAIRES, PANELBOARDS UPON COMPLETION OF WORK.

11. CUTTING AND PATCHING

    ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING, OPENINGS, ETC. AND SHALL INFORM THE GENERAL CONTRACTOR OF SLEEVES OR OPENINGS REQUIRED DURING TENDERING SO THAT COSTS ARE INCLUDED.

12. DELIVERY DATES

    THIS CONTRACTOR SHALL PLACE AN ORDER FOR ALL MATERIAL AND EQUIPMENT IMMEDIATELY AFTER SIGNING OF THE CONTRACT. HE SHALL SUBMIT A LIST OF DELIVERY DATES FOR EACH TYPE OF EQUIPMENT WITHIN 30 DAYS OF THE AWARDING OF THE CONTRACT. THE LIST SHALL INCLUDE MANUFACTURER'S NAMES.

13. EQUIPMENT AND MATERIAL

    GROUNDING SHALL BE AS REQUIRED BY ELECTRICAL CODE AND THE APPROVAL OF ALL EQUIPMENT AND MATERIAL UNLESS SPECIFICALLY NOTED OTHERWISE, SHALL BE NEW AND WITHOUT BLEMISH OR DEFECT. ALL MATERIAL AND EQUIPMENT SHALL BE OF THE TYPE SUBJECT TO FACTORY MUTUAL, U.L.C. OR C.S.A. INSPECTION AND APPROVAL" AND SHALL BEAR "U.L.C." OR "C.S.A." LABELS.

14. CLOSE-OUT

    DEMONSTRATE THE FUNCTION AND OPERATION OF EACH SYSTEM IN MAINTENANCE STAFF, OWNER AND CONSULTANT PRESENCE. CO-ORDINATE COMMISSIONING AND TRAINING SCHEDULE WITH ALL PARTIES.
    PROVIDE THE FOLLOWING DOCUMENTS AT PROJECT COMPLETION:
    - AS BUILT DRAWING AS DESCRIBED ABOVE
    - ELECTRICAL INSPECTION REPORT
    - FIRE ALARM VERIFICATION REPORT AND CERTIFICATE
    - WARRANTY LETTER

15. IDENTIFICATION

    PROVIDE LAMACOID IDENTIFICATION NAMEPLATES WHERE APPLICABLE. THESE SHALL BE BLACK WITH WHITE ENGRAVED LETTERS AND SHALL BE INSTALLED WITH SCREWS ON ALL EQUIPMENT, DISCONNECT SWITCHES, PANELS, ETC. INDICATING THE LOAD SERVED. EACH LIGHTING PANEL SHALL HAVE A TYPEWRITTEN DIRECTORY SHOWING LIGHTS OR EQUIPMENT CONNECTED TO EACH CIRCUIT. DIRECTORIES SHALL BE MOUNTED ON THE INSIDE OF THE PANEL DOOR WITH A TRANSPARENT PLASTIC COVER.

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FIRE STATION STORAGE BUILDING
300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:
ELECTRICAL
SPECIFICATIONS (1 OF 2)

DRAWN BY:	SCALE:
CHECKED BY:	DATE:
PROJECT NO:	DWG NO: E4

ELECTRICAL SPECIFICATIONS (2 OF 2)

16. COORDINATION

THIS CONTRACTOR SHALL BE RESPONSIBLE TO CO-ORDINATE THE INSTALLATION OF EQUIPMENT, CONDUIT WORK, LIGHTING FIXTURES, ETC. WITH OTHER TRADES PRIOR TO THE ACTUAL INSTALLATION.

17. ACCESSIBILITY

ALL WORK SHALL BE INSTALLED SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIRS.

18. RESPONSIBILITY

THIS TRADE SHALL BE RESPONSIBLE FOR THIS WORK UNTIL THE COMPLETION AND FINAL ACCEPTANCE, FOR REPLACING ANY ITEM THAT MAY BE DEFECTIVE, DAMAGED, LOST OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY TO THE COMPLETION OF THE PROJECT.

19. WARRANTY

THIS CONTRACTOR SHALL WARRANT ALL WORK AND EQUIPMENT INSTALLED UNDER THIS CONTRACT, AGAINST ALL DEFECTS OR WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE (1) YEAR AFTER ACCEPTANCE OF THE INSTALLATION BY THE OWNER.

20. CONDUIT AND FITTINGS

A. CONDUIT SIZES SHALL BE AS INDICATED ON THE DRAWINGS AND SHALL NOT BE REDUCED IN SIZE WITHOUT AUTHORIZATION. CONDUIT IN FINISHED AREA SHALL BE CONCEALED. ALL CONDUIT SHALL BE INSTALLED PARALLEL TO BUILDING LINES. MAKE FINAL CONNECTIONS TO VIBRATING EQUIPMENT WITH FLEXIBLE CONDUIT.
B. CONDUITS SHALL BE INSTALLED AT A MINIMUM OF 6" (152MM) FROM UNINSULATED HEATING PIPES.
C. CLEAN INTERIOR OF ALL CONDUITS TO REMOVE WATER AND DEBRIS BEFORE PULLING WIRES.
D. BX CABLES SHALL BE USED ONLY FOR FINAL SHORT CONNECTIONS BETWEEN OUTLET AND OUTLET BOX IN CEILING SPACE TO CEILING MOUNTED LIGHTING FIXTURES OR TO FEED OUTLETS, RECEPTACLES IN THE DRYWALL PARTITIONS. BX CABLES ARE NOT ALLOWED TO RUN IN THE OPEN CEILING AREAS.

21. PULL AND JUNCTION BOXES

A. BOXES SHALL BE CODE GAUGE AND SIZES TO MEET THE ELECTRICAL CODE REQUIREMENTS. SHEET STEEL BOXES FOR CONCEALED WORK AND CAST BOXES FOR EXPOSED WORK.
B. PROVIDE BARRIERS IN BOXES WHERE DIFFERENT VOLTAGES ARE USED.
C. BOXES SHALL BE SUPPORTED INDEPENDENTLY OF CONDUIT.

22. INSTALLATION OF OUTLETS

A. THE PLANS SHOW APPROXIMATE LOCATION OF OUTLETS, EXACT LOCATION SHALL BE CO-ORDINATED ON THE SITE WITH OTHER TRADES, ARCHITECTURAL PLANS, ETC. OUTLETS INACCURATELY LOCATED SHALL BE RE-ADJUSTED OR RELOCATED AT THE CONTRACTOR'S EXPENSE. REFER TO ARCHITECT DRAWINGS FOR HEIGHT OF VARIOUS DEVICES.

23. WIRE AND CABLE

A. UNLESS OTHERWISE NOTED, ALL WIRES SHALL BE COPPER R90, RW90, RA90 OR RWU90 RATING AS REQUIRED ON SITE AND AS DICTATED BY CODE. ALUMINUM WIRE SHALL NOT BE USED.
B. THE MINIMUM PERMISSIBLE SIZE FOR BRANCH CIRCUIT WIRING SHALL BE #12 (20m). EXCEPT FOR EMERGENCY LIGHTING SYSTEM SHALL BE MIN. #10.
C. FOR BRANCH WIRING EXCEEDING 100 FEET (30.5M) TO FURTHEST OUTLET FROM A PANEL SHALL BE #10 AT 120 VOLTS.
D. WIRES AND CABLES SHALL BE RATED AT 600 VOLTS EXCEPT FOR LOW VOLTAGE CONTROL WIRING WHICH SHALL BE RATED AT 300V.
E. ALL WIRES SHALL BE NEW AND DELIVERED TO THE SITE OF THE PROJECT IN THEIR ORIGINAL PACKING. WIRES #10 AND BIGGER SHALL BE STRANDED. THIS DENOTES GAUGE #8, #6, #4, ETC. WIRES SHALL BE FACTORY IDENTIFIED, SHOWING SIZE, VOLTAGE RATING AND INSULATION TYPE.
F. PROVIDE SEPARATE INSULATED GROUND CONDUCTOR FOR EACH FEEDER AND BRANCH CIRCUIT.
G. FINAL CONNECTIONS TO LUMINAIRES SHALL ORIGINATE FROM AN OUTLET BOX. CONNECTIONS OF FIXTURE BODY TO FIXTURE BODY SHALL NOT BE ACCEPTABLE.
H. CODE APPROVED WIRE SHALL BE USED FOR FINAL LUMINAIRE OR APPLIANCE CONNECTIONS.

24. CONNECTORS FOR WIRES

PROVIDE AN APPROVED TYPE WIRE CONNECTOR.

25. POWER DISTRIBUTION SYSTEM

THE POWER DISTRIBUTION SYSTEM SHALL BE AS SHOWN ON THE PLANS AND AS HEREINAFTER SPECIFIED.

26. WIRING DEVICES

A. DUPLEX RECEPTACLES SHALL BE GROUNDING TYPE MINIMUM RATED FOR 15A. 125V, SPECIFICATION GRADE. THESE SHALL HAVE BREAK-OFF LINE TO ALLOW FOR SPLIT WIRING OR 2 CIRCUITS AND SHALL BE EQUAL TO P&S 26252 SERIES OR HUBBELL CAT #5252 OR APPROVED EQUAL, WHITE COLOR C/W STAINLESS STEEL COVER PLATE.
B. COVER-PLATES SHALL MATCH COLOUR OF DEVICE. VERIFY COLOURS OF ALL DEVICES WITH ARCHITECT PRIOR TO ORDERING.

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NO.	REVISIONS	DATE
1	ISSUED FOR FINAL REVIEW	2024-08-20

STAMP:

Pretium Engineering Inc.

CLIENT:
CENTRAL YORK FIRE SERVICES
CARE OF CENTRAL YORK FIRE SERVICES

PROJECT:
FIRE STATION STORAGE BUILDING
300 EARL STEWART DRIVE, AURORA, ON L4G 7Z5

DRAWING:
ELECTRICAL
SPECIFICATIONS (2 OF 2)

DRAWN BY:	SCALE:
CHECKED BY:	DATE:
PROJECT NO:	DWG NO: E5

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A REPORT TO TOWN OF AURORA

A SOIL INVESTIGATION FOR PROPOSED FIRE HALL

625 ST. JOHN'S SIDEROAD AND 71 PEDERSEN DRIVE TOWN OF AURORA

REFERENCE NO. 1509-S135

DECEMBER 2015

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ENCLOSURES

1.0 INTRODUCTION

In accordance with Purchase Order No. 681 dated October 8, 2015 from the Town of Aurora, a soil investigation was carried out on the properties located at 625 St. John's Sideroad and 71 Pedersen Drive, in the Town of Aurora.

The purpose of the investigation was to reveal the subsurface conditions and determine the engineering properties of the disclosed soils for the design and construction of a proposed Fire Hall.

The geotechnical findings and resulting recommendations are presented in this Report. Please note that the results of chemical testing of selected soil samples are presented under a separate cover.

2.0 SITE AND PROJECT DESCRIPTION

The Town of Aurora is situated on Schomberg Lake (glacial) plain where drift has been partly eroded and filled with glaciolacustrine deposit clay, silt and minor sand and gravel.

The sites of investigation are two separate properties, at approximately 300 m apart: 625 St. John's Sideroad – Lots 6 and 7 (Property 1) and 71 Pedersen Drive – Lot 15 (Property 2). Property 1 is irregular in shape, having a total area of approximately 1.1 hectares (3.7 acres), and is situated at the northwest corner of Isaacson Crescent and Earl Stewart Drive. It is relatively flat at street level. Property 2 is roughly rectangular in shape, having a total area of approximately 0.5 hectares (1.8 acres), and is situated on the south side of Pedersen Drive, approximately 100 m west of Earl Stewart Drive. The existing site gradient of Property 2 drops slightly to the north. Both properties are currently vacant.

It is understood that the two properties are being considered for the development of a fire hall. Detailed design of the fire hall, however, was not available at the time this report was prepared.

3.0 FIELD WORK

The field work, consisting of 6 boreholes to a depth of 8.1 m, was performed on September 28 and October 26, 2015, at the locations shown on the Borehole Location Plan, Drawing No. 1.

The boreholes were advanced at intervals to the sampling depths by a track-mounted, continuous-flight power-auger machine equipped for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed "List of Abbreviations and Terms", were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or 'N' values) of the subsoil. The relative density of the granular strata and the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing.

The field work was supervised and the findings were recorded by a Geotechnical Technician.

The elevation at each of the borehole locations was surveyed using the Global Navigation Satellite System (GNSS), with hand-held surveying equipment (Trimble GeoXH 6000), having an accuracy of 10± cm.

4.0 SUBSURFACE CONDITIONS

Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs, comprising Figures 1 to 6, inclusive. The revealed stratigraphy is plotted on the Subsurface Profile, Drawing No. 2. The engineering properties of the disclosed soils are discussed herein.

Both sites of investigation appear to have been pregraded, having the topsoil removed. Based on the borehole findings, beneath the surficial granular fill or earth fill, in places, both properties are generally underlain by a stratum of silty clay extending to the maximum investigated depth.

4.1 Granular Fill (Boreholes 3 and 5)

A layer of granular fill, approximately 25 mm in thickness, was observed on the ground surface of Boreholes 3 and 5.

4.2 Earth Fill (Boreholes 2, 3 and 4)

An earth fill was encountered near the surface of Boreholes 2, 3 and 4. It extends to depths of 0.8 m and 1.5 m below grade. Sample examination revealed that the fill consists of predominantly silt clay, with a trace to some sand.

The natural water content of the samples ranges from 9% to 18%, with a median of 10%, showing that the fill is in a moist condition.

The consistency of the earth fill, as inferred from the 'N' values ranging from 16 to 46 blows per 30 cm penetration, is very stiff to hard, showing that the earth fill

could have been compacted with some quality control. It is likely that the earth fill was placed is an engineered fill manner.

For design of shallow foundations on the existing fill, an engineered fill certification must be provided for review. Otherwise, the foundations will have to be placed below the existing fill and onto the natural soils.

One must be aware that the samples retrieved from boreholes 10 cm in diameter may not be truly representative of the geotechnical and environmental quality of the fill. This should be further assessed by laboratory testing and/or test pits.

4.3 **Silty Clay** (All Boreholes)

A silty clay deposit was encountered in all boreholes, extending to the maximum investigation depth of 8.1 m below grade.

Weathered soil was observed within the upper 0.3 m of the silty clay deposit in Boreholes 1, 5 and 6. The consistency of the native silty clay, as inferred by the obtained 'N' values, ranging from 3 to 26 blows per 30 cm penetration, with a median of 7 blows, is soft to very stiff, generally firm.

Soft clay was contacted in Boreholes 2, 4, and 6, below depths of 4.5 m or 6 m from grade. In situ vane shear tests were conducted within the soft clay strata in these boreholes, at depths of 5.3 m or 6.9 m. The test results are summarized in the following table:

BH No.	Depth (m)	Undrained Shear Strength (kPa)	Remoulded Shear Strength (kPa)	Sensitivity Value
2	6.9	50	20	2.5
4	5.3	80	20	4
6	6.9	35	15	2.3

The Atterberg Limits of three representative samples and the natural water content of the silty clay were determined. The results are plotted on the Borehole Logs and summarized below:

Liquid Limits	35%, 37% and 44%
Plastic Limits	18%, 19% and 20%
Natural Water Content	14% to 34% (median 25%)

The above values show that the clay is a cohesive material with low plasticity. The water content generally lies slightly below its plastic limits and its liquid limits, confirming the consistency determined from the 'N' values.

Grain size analyses were performed on 3 representative samples; the results are plotted on Figures 7, 8 and 9.

Based on the field and laboratory findings, the deduced soil engineering properties pertaining to the project are listed below:

- Highly frost susceptible and high soil-adfreezing potential.
- Virtually impervious, with an estimated coefficient of permeability less than 10^{-7} cm/sec, a percolation rate of more than 80 min/cm, and runoff coefficients of:

Slope	
0% - 2%	0.15
2% - 6%	0.20
6% +	0.28

- A cohesive-frictional soil, its shear strength is derived from consistency and augmented by the internal friction of the silt. Its shear strength is moisture dependent and, due to the dilatancy of the silt, the overall shear strength of the silty clay is susceptible to impact disturbance, i.e., the disturbance will induce a build-up of pore pressure within the soil mantle, resulting in soil dilation and a reduction of shear strength.
- The soft to firm clay will consolidate under area surcharge loads.
- In steep excavations to depths of 2.0 to 3.0 m, the sides may fail and the bottom may heave due to overstressing.
- In steep cuts, the weathered clay will slough readily and a cut face in the sound clay may collapse as the wet silt slowly sloughs.
- A very poor pavement-supportive material, with an estimated California Bearing Ratio value of less than 3%.
- Moderately high corrosivity to buried metal, with an estimated electrical resistivity of 3000 ohm·cm.

4.4 Compaction Characteristics of the Revealed Soils

The obtainable degree of compaction is primarily dependent on the soil moisture and, to a lesser extent, on the type of compactor used and the effort applied. As a general guide, the typical water content values of the revealed soils for Standard Proctor compaction are presented in Table 1.

Table 1 - Estimated Water Content for Compaction

Soil Type	Determined Natural Water Content (%)	Water Content (%) for Standard Proctor Compaction	
		100% (optimum)	Range for 95% or +
Silty Clay	14 to 34 (median 25)	21	17 to 26

Based on the above findings, the majority of the on site material is on the wet side of the optimum water content. In order to achieve 95% or + Standard Proctor compaction, the material must be aerated by spreading it thinly on the ground for drying during the dry and warm weather, prior to compaction.

The silty clay should be compacted using a heavy-weight kneading-type roller. The lifts for compaction should be limited to 20 cm, or to a suitable thickness as assessed by test strips performed by the equipment which will be used at the time of construction.

It is difficult to monitor the lifts of backfill placed in deep trenches; therefore, it is preferable that the compaction of backfill at depths over 1.0 m below the pavement be carried out on the wet side of the optimum. This would allow wider latitude of lift thickness.

If the compaction of the soils is carried out with the water content within the range for 95% Standard Proctor dry density but on the wet side of the optimum, the surface of the compacted soil mantle will roll under the dynamic compactive load. This is unsuitable for road construction since each component of the pavement structure is to be placed under dynamic conditions which will induce the rolling action of the subgrade surface and cause structural failure of the new pavement. The foundations or bedding of the sewer and slab-on-grade will be placed on a subgrade which will

not be subjected to impact loads. Therefore, the structurally compacted soil mantle, with the water content on the wet side or dry side of the optimum, will provide an adequate subgrade for the construction.

5.0 GROUNDWATER CONDITIONS

The boreholes were checked for the presence of groundwater and/or the occurrence of cave-in upon completion of the field work. The findings are summarized in the borehole logs and in Table 2.

Table 2 - Groundwater Levels

Property	BH No.	Ground El. (m)	Measured Groundwater/ Cave in* Level Upon Completion	
			Depth (m)	El. (m)
625 St. John's Sideroad	1	253.5	6.7	246.8
	2	253.2	6.7	246.5
	3	253.5	3.7	249.8
	4	253.6	Dry	-
71 Pedersen Drive	5	255.2	6.1*	249.1*
	6	256.1	6.4	249.7

Based on the findings, the groundwater or cave-in levels range from El. 246.5 to El. 249.8 m and generally represent the groundwater regime at the time of the investigation. The groundwater level will be subject to seasonal fluctuations.

The groundwater yield from the silty clay is expected to be slow in rate and limited in quantity. During open excavation, the groundwater can be drained and removed by conventional pumping from sumps.

6.0 DISCUSSION AND RECOMMENDATIONS

The investigation has disclosed that beneath a layer of granular fill and/or earth fill, in places, the site is generally underlain by a stratum of soft to very stiff silty clay deposit. Weathered soil is generally confined within the upper 0.3 m layer from the existing ground surface.

Groundwater and cave-in levels are recorded between El. 246.5 m and 249.8 m. These represent the groundwater regime at the time of investigation. The groundwater level, however, is subject to seasonal fluctuations. During open excavation, groundwater seepage from the silty clay will be slow and it can be drained and removed by conventional pumping from sumps.

We understand that the two properties are being considered for the development of a fire hall. Detailed design of the development, however, was not available at the time this report was prepared.

The geotechnical findings which warrant special consideration are presented below:

1. The weathered soil is not suitable to support any structure sensitive to movement. It must be subexcavated and sorted free of topsoil inclusions or deleterious materials, if encountered, and properly compacted before it can be reused as structural backfill and/or for construction of engineered fill on site. If it is impractical to sort deleterious materials from the weathered soil, then it must be wasted and disposed of off-site.
2. The existing earth fill appeared to have been compacted with quality control. For design of shallow foundations on the existing fill, an engineered fill certificate must be provided for review. Otherwise, the foundations will have to be placed below the existing fill and onto the natural soil stratum.

3. The sound natural soils are suitable for normal spread and strip footing construction for the proposed fire hall. The footings must be designed in accordance with the recommended bearing pressures in Section 6.1 and the footing subgrade must be inspected to ensure that its condition is compatible with the design of the foundations.
4. Any excessive filling of the site may lead to long-term settlement (consolidation) in the ground. If more than 1.0 m of fill will be placed for site grading, the site should be preloaded before construction of the structures and utilities. Further investigation and testing of the subsoil will be necessary to estimate the amount of settlement and the time duration of the settlement to complete.
5. The revealed silty clay is highly frost susceptible, with high soil-adfreezing potential. Where the silty clay is used to backfill against foundation walls, special measures must be incorporated into the building construction to prevent serious damage due to soil adfreezing.
6. A Class 'B' bedding, consisting of compacted 20-mm Crusher-Run Limestone, or equivalent, is recommended for the construction of the underground services.

The recommendations appropriate for the project described in Section 2.0 are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should this become apparent during construction, a geotechnical engineer must be consulted to determine whether the following recommendations require revision.

6.1 Foundations

Conventional footings for the proposed structure must be placed onto the sound natural soils. The recommended soil bearing pressures for use in the design of

normal strip and spread footings, founded onto the sound natural soils, together with the corresponding founding levels, are presented in Table 3.

Table 3 - Founding Levels

BH No.	Maximum Allowable Soil Pressure (SLS)/ Factored Ultimate Soil Bearing Pressure (ULS) and Corresponding Founding Level	
	100 kPa (SLS) 150 kPa (ULS)	
	Depth (m)	El. (m)
1	1.0 or +	252.5 or -
2	1.0 or +	252.2 or -
3	1.5 or +	252.0 or -
4	1.5 or +*	252.1 or -
5	1.0 or +	254.2 or -
6	1.0 or +	255.1or -

* Footing size must be restricted to 1.2 m or less; otherwise, the bearing pressure must be reduced to 75 kPa (SLS).

If extended footings and/or cut and fill are required for the site grading, it is generally more economical to place engineered fill for normal footing, sewer and pavement construction. However, excessive filling of the site may lead to long-term settlement in the ground. If more than 1.0 m of fill will be placed for site grading, the site should be preloading before construction. Further investigation and testing of the subsoil will be necessary to estimate the amount of settlement and the time duration of the settlement to complete.

After preloading, the SLS of 100 kPa and ULS of 150 kPa can be used for the design of the normal spread and strip foundations founded on engineered fill. The scheme for engineered fill is discussed in Section 6.2.

One must be aware that the recommended Maximum Allowable Soil Pressures (SLS) and corresponding founding depths are given as a guide for foundation design and must be confirmed by subgrade inspection performed by a geotechnical engineer at the building locations.

The recommended soil pressures (SLS) incorporate a safety factor of 3. The total and differential settlements of the footings are estimated to be 30 mm and 20 mm, respectively.

Footings exposed to weathering, or in unheated areas, should have at least 1.2 m of earth cover for protection against frost action.

The building foundation must meet the requirements specified in the latest Ontario Building Code. As a guide, the structure should be designed to resist an earthquake force using Site Classification 'E' (soft soil).

The in situ soils have moderately high to high soil-adfreezing potential. In order to alleviate the risk of frost damage, the foundation walls must be constructed of concrete and either the trench backfill will need to consist of non-frost-susceptible granular material, or it will need to be shielded with a polyethylene slip-membrane between the concrete wall and the backfill.

6.2 Engineered Fill

Where earth fill is required to raise the site, or where extended footings are necessary, it is generally more economical to place engineered fill for normal footing, sewer and pavement construction.

Due to the presence of soft clay in some areas, excessive filling at the site may lead to long-term settlement (consolidation) in the ground. If more than 1.0 m of fill will be placed for site grading, the site should be preloaded before construction. Further investigation and testing of the subsoil will be necessary to estimate the amount of settlement and the time duration for the settlement to be complete.

The engineering requirements for a certifiable fill for road construction, municipal services, and footings designed with a Maximum Allowable Soil Pressure (SLS) of 100 kPa and a Factored Ultimate Soil Bearing Pressure (ULS) of 150 kPa are presented below:

1. All of the organics, topsoil and weathered soils must be removed, and the subgrade must be inspected and proof-rolled prior to any fill placement
2. The in situ organic-free soils can be used, and they must be uniformly compacted in lifts 20 cm thick to 98% or + of their maximum Standard Proctor dry density up to the proposed grade. The soil moisture must be properly controlled on the wet side of the optimum. Proper aeration of on-site soils will be required prior to compaction.
3. If the building foundations are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% of the maximum Standard Proctor compaction.
4. If imported fill is to be used, the hauler is responsible for its environmental quality and must provide a document to certify that the material is free of hazardous contaminants.
5. If the engineered fill is to be left over the winter months, adequate earth cover, or equivalent, must be provided for protection against frost action.
6. The engineered fill must extend over the entire graded area; the engineered fill envelope and the finished elevations must be clearly and accurately defined in the field, and they must be precisely documented by qualified surveyors.

7. The engineered fill must not be placed during the period from late November to early April, when freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is free of frozen soils, ice and snow.
8. Where the ground is wet due to subsurface water seepage, an appropriate subdrain scheme must be implemented prior to the fill placement, particularly if it is to be carried out on sloping ground.
9. Where the fill is to be placed on a bank steeper than 1 vertical(V): 3 horizontal(H), the face of the bank must be flattened to 3+ so that it is suitable for safe operation of the compactor and the required compaction can be obtained.
10. The fill operation must be inspected on a full-time basis by a technician under the direction of a geotechnical engineer.
11. The footings and underground services subgrade must be inspected by the geotechnical consulting firm that inspected the engineered fill placement. This is to ensure that the foundations are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.
12. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who inspected the fill placement in order to document the locations of excavation and/or to inspect reinstatement of the excavated areas to engineered fill status. If construction on the engineered fill does not commence within a period of 2 years from the date of certification, the condition of the engineered fill must be assessed for re-certification.
13. Despite stringent control in the placement of engineered fill, variations in soil type and density may occur in the engineered fill. Therefore, the strip footings and the upper section of the foundation walls constructed on the engineered fill will require continuous reinforcement with steel bars, depending on the

uniformity of the soils in the engineered fill and the thickness of the engineered fill underlying the foundations. Should the footings and/or walls require reinforcement, the required number and size of reinforcing bars must be assessed by considering the uniformity as well as the thickness of the engineered fill beneath the foundations. In sewer construction, the engineered fill is considered to have the same structural proficiency as a natural inorganic soil.

6.3 Slab-On-Grade

The subgrade for slab-on-grade construction must consist of sound natural soils or properly compacted inorganic earth fill. The subgrade should be proof-rolled. Where soft subgrade is detected, it should be subexcavated, aerated and properly compacted. The floor slab should be constructed on a granular base, 20 cm thick, consisting of 20-mm Crusher-Run Limestone, or equivalent, compacted to its maximum Standard Proctor dry density.

Any new material for raising the grade should consist of organic-free soil compacted to at least 98% of its maximum Standard Proctor dry density.

A Modulus of Subgrade Reaction of 25 MPa/m can be used for the design of the floor slab founded on compacted granular base.

6.4 Underground Services

The subgrade for the underground services should consist of natural soils or engineered fill. In areas where the subgrade consists of silty clay fill and/or weathered soil, these soils should be subexcavated and replaced with properly

compacted inorganic soil and/or bedding material compacted to at least 95% or + of their Standard Proctor compaction.

Where the sewers are to be constructed using the open-cut method, the construction must be carried out in accordance with Ontario Regulation 213/91. In areas where a vertical cut is necessary, the use of a trench box is considered to be appropriate. In the design of the trench box and/or shoring structure, the recommended lateral earth pressure coefficients presented in Table 5, Section 6.8, can be used.

A Class 'B' bedding is recommended for construction of the underground services. The bedding material should consist of compacted 20-mm Crusher-Run Limestone, or equivalent, as approved by a geotechnical engineer.

In order to prevent pipe floatation when the sewer trench is deluged with water, a soil cover with a thickness equal to the diameter of the pipe should be in place at all times after completion of the pipe installation.

Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.

The subgrade of the underground services will generally consist of silty clay with an electrical resistivity of 3000 ohm·cm. It is considered to have moderately high corrosivity to ductile iron pipes and metal fittings; therefore, the underground services should be protected against soil corrosion. For estimation of anode weight requirements, the estimated electrical resistivity of the disclosed soil can be used. This, however, should be confirmed by testing the soil along the water main alignment at the time of sewer construction.

6.5 Backfilling in Trenches and Excavated Areas

The backfill in service trenches should be compacted to at least 95% of its maximum Standard Proctor dry density and increased to 98% or + below the floor slab. In the zone within 1.0 m below the pavement subgrade, the material should be compacted with the water content 2% to 3% drier than the optimum, and the compaction should be increased to 98% of the respective maximum Standard Proctor dry density to provide the required stiffness for pavement construction.

The in situ inorganic soils are generally suitable for use as trench backfill; however, where the soil is too wet for a 95% or + Standard Proctor compaction, it can be aerated by spreading it thinly on the ground for drying prior to structural compaction or it can be mixed with drier soils. In cases where the material is too dry to compact, it may require the addition of water or mixing with a wet material.

In normal construction practice, the problem areas of settlement largely occur adjacent to foundation walls, columns, manholes, catch basins and services crossings. In areas which are inaccessible to a heavy compactor, sand backfill should be used. Unless compaction of the backfill is carefully performed, settlement will occur. Often, the interface of the native soils and sand backfill will have to be flooded for a period of several days.

Narrow trenches for services crossings should be cut at 1V:2H, so that the backfill in the trenches can be effectively compacted. Otherwise, soil arching in the trenches will prevent the achievement of proper compaction. In this case, imported sand fill which can be appropriately compacted by using a smaller vibratory compactor must be used. The areas at the interface of the native soil and the sand backfill should preferably be flooded for at least 1 day.

One must be aware of possible consequences during trench backfilling and exercise caution as described below:

- When construction is carried out in freezing winter weather, allowance should be made for these following conditions. Despite stringent backfill monitoring, frozen soil layers may inadvertently be mixed with the structural trench backfill. Should the in situ soil have a water content on the dry side of the optimum, it would be impossible to wet the soil due to the freezing condition, rendering difficulties in obtaining uniform and proper compaction. Furthermore, the freezing condition will prevent flooding of the backfill when it is required, such as when the trench box is removed. The above will invariably cause backfill settlement that may become evident within 1 to several years, depending on the depth of the trench which has been backfilled.
- In areas where the underground services construction is carried out during winter months, prolonged exposure of the trench walls will result in frost heave within the soil mantle of the walls. This may result in some settlement as the frost recedes, and repair costs will be incurred prior to final surfacing of the new pavement.
- To backfill a deep trench, one must be aware that future settlement is to be expected, unless the side of the cut is flattened to at least 1V:1.5+H, and the lifts of the fill and its moisture content are stringently controlled; i.e., lifts should be no more than 20 cm (or less if the backfilling conditions dictate) and uniformly compacted to achieve at least 95% of the maximum Standard Proctor dry density, with the moisture content on the wet side of the optimum.
- It is often difficult to achieve uniform compaction of the backfill in the lower vertical section of a trench which is an open cut or is stabilized by a trench box, particularly in the sector close to the trench walls or the sides of the box. These sectors must be backfilled with sand. In a trench stabilized by a trench box, the void left after the removal of the box will be filled by the backfill. It

is necessary to backfill this sector with sand, and the compacted backfill must be flooded for 1 day, prior to the placement of the backfill above this sector, i.e., in the upper sloped trench section. This measure is necessary in order to prevent consolidation of inadvertent voids and loose backfill which will compromise the compaction of the backfill in the upper section. In areas where groundwater movement is expected in the sand fill mantle, seepage collars should be provided.

6.6 Sidewalks, Interlocking Stone Pavement and Landscaping

Sidewalks in areas which are sensitive to frost-induced ground movement, such as entrances, must be constructed on a free-draining, non-frost-susceptible granular material such as Granular 'B'. The material must extend to 0.3 to 1.2 m below the slab or pavement surface, depending on the degree of tolerance to movement, and be provided with positive drainage such as weeper subdrains connected to manholes or catch basins.

The grading around sidewalks and pavement must be such that it directs runoff away from the structures.

Since water can percolate easily into the granular base through the joints of the interlocking pavers, saturation of the granular base can be anticipated most of the time, leading to water pumping in the subgrade soils and differential movements on the pavers. It is necessary to install a fabric filter between the subgrade and the granular bases to stabilize the wet subgrade soils.

In areas where frost heaving is prohibited, such as the walkway in front of building entrances, it is recommended to design a frost slab with foundation supports.

Alternatively, the walkway can be properly insulated with 50-mm Styrofoam, or equivalent.

6.7 Pavement Design

The recommended pavement design is presented in Table 4.

Table 4 - Pavement Design

Course	Thickness (mm)	OPS Specifications
Asphalt Surface	40	HL-3
Asphalt Binder	60	HL-8
Granular Base	150	20-mm Crusher-Run Limestone or equivalent
Granular Sub-Base Light-Duty Heavy-Duty	 300 450	50-mm Crusher-Run Limestone or equivalent

In preparation of the subgrade, the topsoil and organic soils must be removed. The subgrade should be inspected and proof-rolled. Any soft spots should be subexcavated, sorted free of any concentrated topsoil and deleterious materials, if encountered, and properly re-compacted with uniform inorganic earth fill.

All the granular bases should be compacted to their maximum Standard Proctor dry density.

In the zone within 1.0 m below the pavement subgrade, the backfill should be compacted to at least 98% of its maximum Standard Proctor dry density, with the water content 2% to 3% drier than the optimum. In the lower zone, a 95% or + Standard Proctor compaction is considered adequate.

The pavement subgrade will suffer a strength regression if water is allowed to infiltrate prior to paving. The following measures should therefore be incorporated into the construction and road design:

- If the pavement construction does not immediately follow the trench backfilling, the subgrade should be properly crowned and smooth-rolled to allow interim precipitation to be properly drained.
- Building pad adjacent to the pavement should be properly graded to prevent the ponding of large amounts of water during the interim construction period.
- If the pavement is to be constructed during the wet seasons and extremely soft subgrade occurs, the granular sub-base may require thickening. This can be further assessed during construction.
- Fabric filter-encased curb subdrains are required to meet the township's requirements.

6.8 Soil Parameters

The recommended soil parameters for the project design are given in Table 5.

Table 5 - Soil Parameters

Unit Weight and Bulk Factor	**Unit Weight (kN/m3)**	**Estimated Bulk Factor**	
	Bulk	**Loose**	**Compacted**
Silty Clay	19.0	1.30	0.98
Lateral Earth Pressure Coefficients			
	Active K_a	**At Rest K_o**	**Passive K_p**
Silty Clay	0.45	0.62	2.22

Table 5 - Soil Parameters (cont'd)

Coefficients of Friction	
Between Concrete and Granular Base	0.50
Between Concrete and Sound Natural Soils	0.30

6.9 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91. For excavation purposes, the types of soils are classified in Table 6.

Table 6 - Classification of Soils for Excavation

Material	**Type**
Silty Clay Fill and firm Silty Clay	3
Weathered soil and soft Silty Clay	4

The groundwater yield from the silty clay is expected to be slow in rate and limited in quantity. During open excavation, the groundwater can be drained and removed by conventional pumping from sumps.

Prospective contractors must be asked to assess the in situ subsurface conditions for soil cuts by digging test pits to at least 0.5 m below the sewer subgrade. These test pits should be allowed to remain open for a period of at least 4 hours to assess the trenching conditions.

7.0 LIMITATIONS OF REPORT

It should be noted that this report deals only with the geotechnical aspects of the proposed project.

This report was prepared by Soil Engineers Ltd. for the account of the Town of Aurora, and for review by their designated consultants and government agencies. The material in it reflects the judgment of Kin Fung Li, B.Eng., Bennett Sun, P.Eng., and Bernard Lee, P.Eng., in light of the information available to it at the time of preparation. Any uses which a Third Party makes of this report, or any reliance on decisions to be made based on it, are the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

SOIL ENGINEERS LTD.

Kin Fung Li, B.Eng.

Bennett Sun, P.Eng.

Bernard Lee, P.Eng.
KFL/BS/BL:dd

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter, 90° point cone driven by a 140-pound hammer falling 30 inches.

Plotted as '—•—'

Standard Penetration Resistance or 'N' Value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil.

Plotted as '○'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/ft)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
over 50	very dense

Cohesive Soils:

Undrained Shear Strength (ksf)	'N' (blows/ft)	Consistency
less than 0.25	0 to 2	very soft
0.25 to 0.50	2 to 4	soft
0.50 to 1.0	4 to 8	firm
1.0 to 2.0	8 to 16	stiff
2.0 to 4.0	16 to 32	very stiff
over 4.0	over 32	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

□ Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength

METRIC CONVERSION FACTORS

1 ft = 0.3048 metres
1lb = 0.454 kg
1 inch = 25.4 mm
1ksf = 47.88 kPa

JOB NO: 1509-S135

LOG OF BOREHOLE NO: 1

FIGURE NO: 1

JOB DESCRIPTION: Proposed Fire Hall

JOB LOCATION: 625 St. John's Sideroad, Town of Aurora

METHOD OF BORING: Flight Auger

DATE: September 28, 2015

Depth Elev. (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
0.0 / 253.5	Ground Surface			
	Firm to stiff weathered SILTY CLAY	1	DO	7
		2	DO	10
		3	DO	7
	brown grey	4	DO	7
		5	DO	8
		6	DO	6
		7	DO	6
		8	DO	6
8.1 / 245.4	END OF BOREHOLE			

Depth Scale (m): 0 1 2 3 4 5 6 7 8 9 10

● Dynamic Cone (blows/30cm) 20 40 60 80

× Shear Strength (kN/m2) 50 100 150 200

○ Penetration Resistance (blows/30cm) 10 20 30 40 50 60 70 80 90

Atterberg Limits PL — LL

● Moisture Content (%) 10 20 30 40

17 23 23 26 25 26 23 26

WATER LEVEL

▽ W.L. @ El. 246.8 m upon completion

Soil Engineers Ltd.

JOB NO: 1509-S135

LOG OF BOREHOLE NO: 2

FIGURE NO: 2

JOB DESCRIPTION: Proposed Fire Hall

JOB LOCATION: 625 St. John's Sideroad, Town of Aurora

METHOD OF BORING: Flight Auger

DATE: September 28, 2015

Depth Elev. (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
0.0 / 253.2	Ground Surface			
	Brown, very stiff EARTH, Fill	1	DO	19
0.8 / 252.4	(possibly engineered fill)			
	Firm to stiff SILTY CLAY	2	DO	14
		3	DO	8
		4	DO	10
		5	DO	8
	brown / grey	6	DO	6
		7	DO	4
		8	DO	7
8.1 / 245.1	END OF BOREHOLE			

Depth Scale (m): 0 1 2 3 4 5 6 7 8 9 10

● Dynamic Cone (blows/30cm) 20 40 60 80

× Shear Strength (kN/m2) 50 100 150 200

○ Penetration Resistance (blows/30cm) 10 20 30 40 50 60 70 80 90

Atterberg Limits PL — LL

● Moisture Content (%) 10 20 30 40

Moisture Content values: 10, 21, 22, 23, 25, 23, 28, 27

× 2 5

WATER LEVEL

W.L. @ El. 246.5 m upon completion

Soil Engineers Ltd.

JOB NO: 1509-S135

LOG OF BOREHOLE NO: 3

FIGURE NO: 3

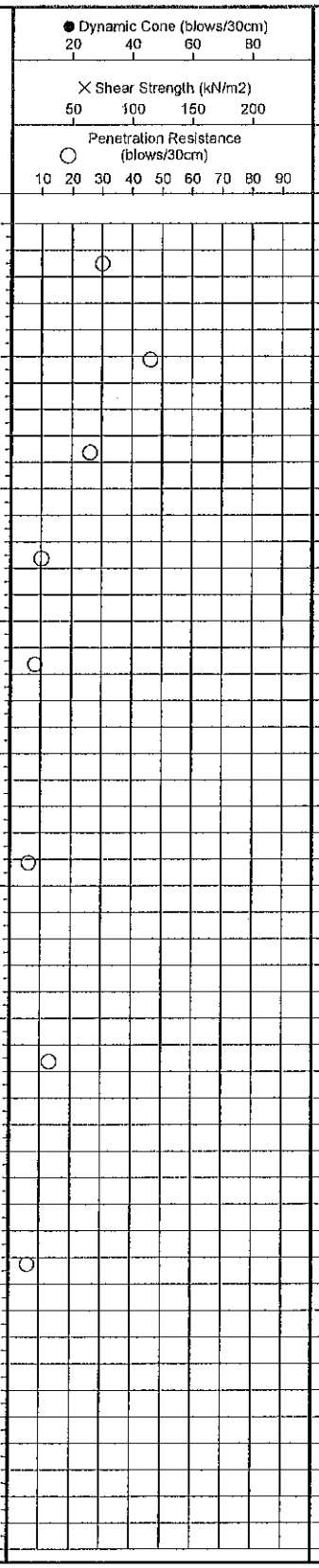
JOB DESCRIPTION: Proposed Fire Hall

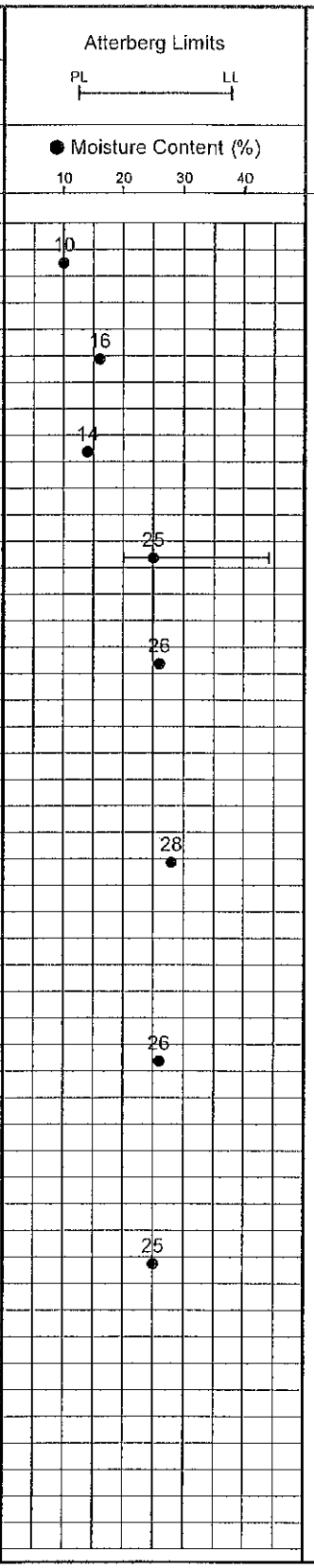
JOB LOCATION: 625 St. John's Sideroad, Town of Aurora

METHOD OF BORING: Flight Auger

DATE: September 28, 2015

Depth Elev. (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
0.0	Ground Surface			
253.5	**25 mm GRANULAR, Fill**			
	Brown	1	DO	30
	EARTH, Fill			
	(possible engineered fill)	2	DO	46
1.5				
252.0	Firm to very stiff	3	DO	26
	SILTY CLAY			
		4	DO	10
		5	DO	8
		6	DO	6
	brown / grey	7	DO	13
		8	DO	6
8.1				
245.4	END OF BOREHOLE			





WATER LEVEL

W.L. @ El. 249.8 m upon completion

Soil Engineers Ltd.

JOB NO: 1509-S135

LOG OF BOREHOLE NO: 4

FIGURE NO: 4

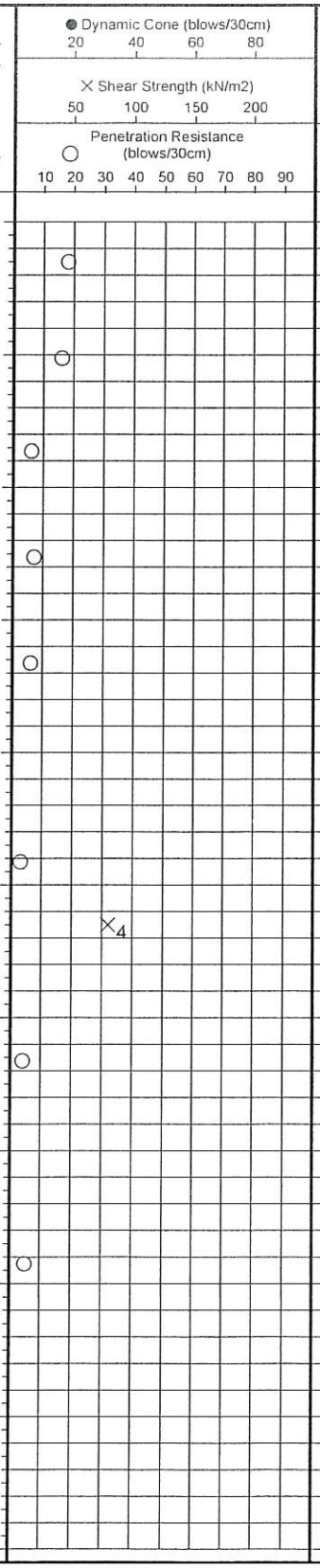
JOB DESCRIPTION: Proposed Fire Hall

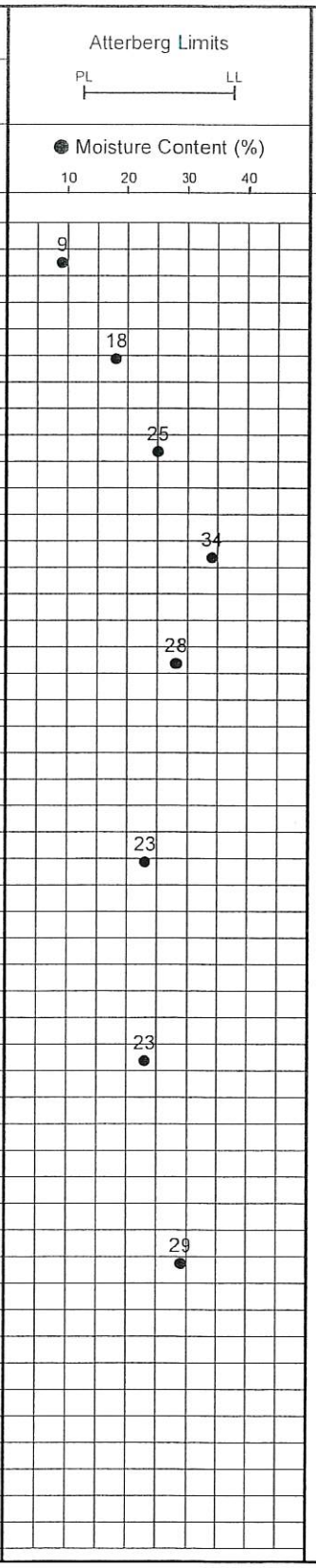
JOB LOCATION: 625 St. John's Sideroad, Town of Aurora

METHOD OF BORING: Flight Auger

DATE: September 28, 2015

Depth / Elev. (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
0.0	Ground Surface			
253.6	Brown **EARTH, Fill** (possible engineered fill)	1	DO	18
		2	DO	16
1.5				
252.1	Soft to firm **SILTY CLAY**	3	DO	6
		4	DO	7
	brown / grey	5	DO	6
		6	DO	3
		7	DO	4
		8	DO	5
8.1				
245.5	END OF BOREHOLE			





WATER LEVEL

Dry upon completion

Soil Engineers Ltd.

JOB NO: 1509-S135

LOG OF BOREHOLE NO: 5

FIGURE NO: 5

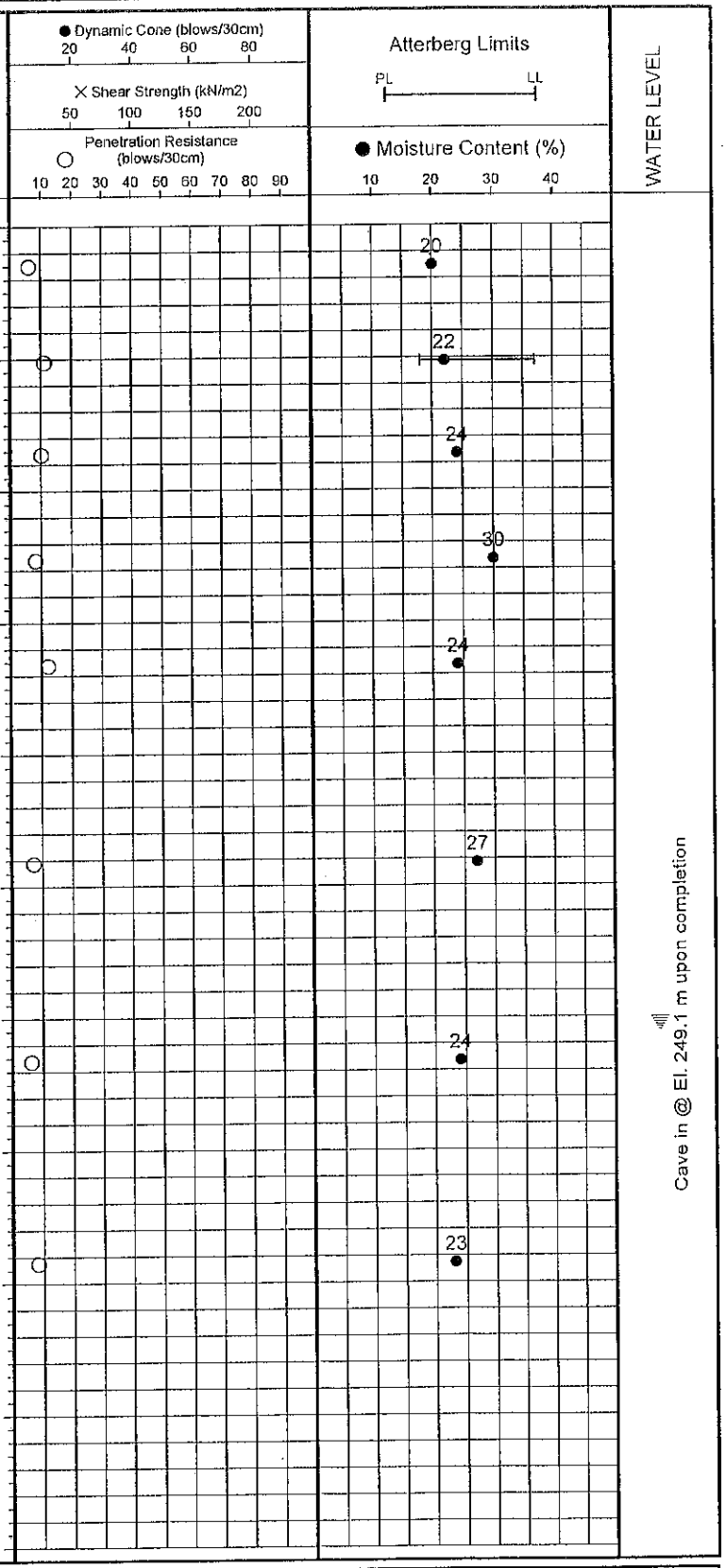
JOB DESCRIPTION: Proposed Fire Hall

JOB LOCATION: 71 Pedersen Drive, Town of Aurora

METHOD OF BORING: Flight Auger

DATE: October 26, 2015

Depth Elev. (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
0.0 / 255.2	Ground Surface			
	25 mm GRANULAR, Fill			
	weathered	1	DO	6
	Firm to stiff			
	SILTY CLAY	2	DO	11
	brown grey	3	DO	10
		4	DO	8
		5	DO	12
		6	DO	7
		7	DO	6
		8	DO	8
8.1 / 247.1	END OF BOREHOLE			



Soil Engineers Ltd.

JOB NO: 1509-S135

LOG OF BOREHOLE NO: 6

FIGURE NO: 6

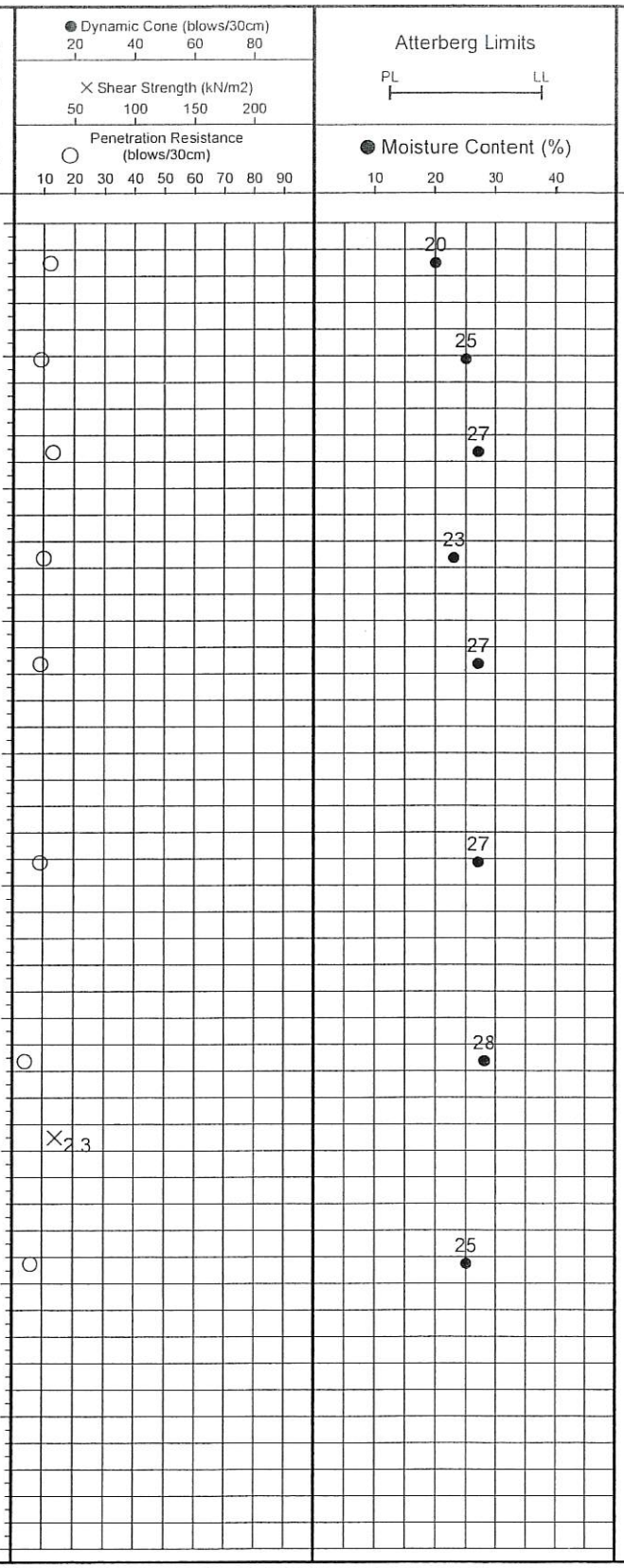
JOB DESCRIPTION: Proposed Fire Hall

JOB LOCATION: 71 Pedersen Drive, Town of Aurora

METHOD OF BORING: Flight Auger

DATE: October 26, 2015

Depth Elev. (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
0.0	Ground Surface			
256.1	Soft to stiff weathered SILTY CLAY	1	DO	12
		2	DO	9
		3	DO	13
		4	DO	10
		5	DO	9
	brown grey	6	DO	9
		7	DO	4
		8	DO	6
8.1				
248.0	END OF BOREHOLE			



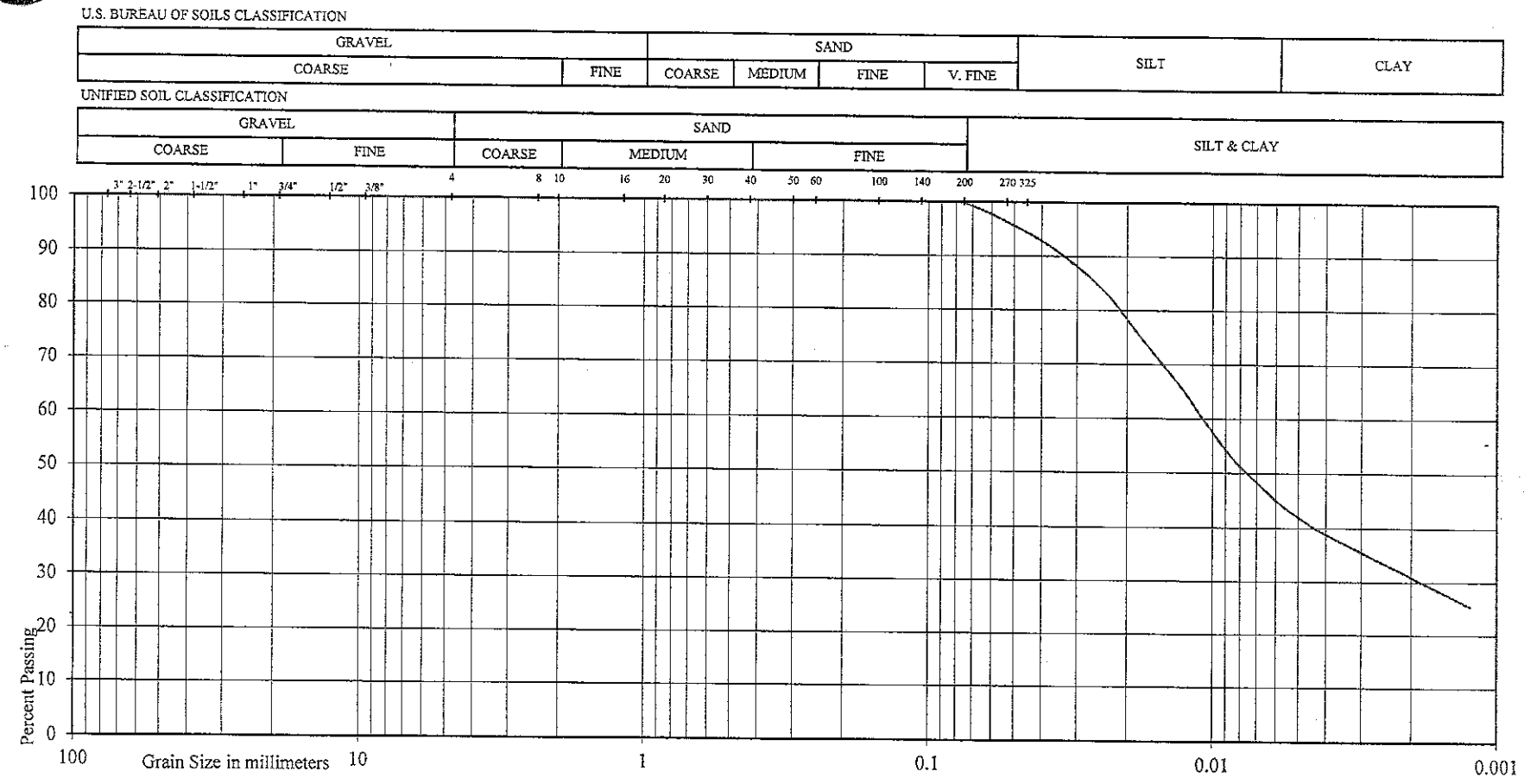
WATER LEVEL

W.L. @ El. 249.7 m upon completion

Soil Engineers Ltd.

Soil Engineers Ltd. GRAIN SIZE DISTRIBUTION

Reference No: 1509-S135



Project: Proposed Fire Hall

Location: 625 St. John's Sideroad, Town of Aurora

Borehole No: 1

Sample No: 6

Depth (m): 4.8

Elevation (m): 248.7

Liquid Limit (%) = 35

Plastic Limit (%) = 19

Plasticity Index (%) = 16

Moisture Content (%) = 26

Estimated Permeability (cm./sec.) = $<10^{-7}$

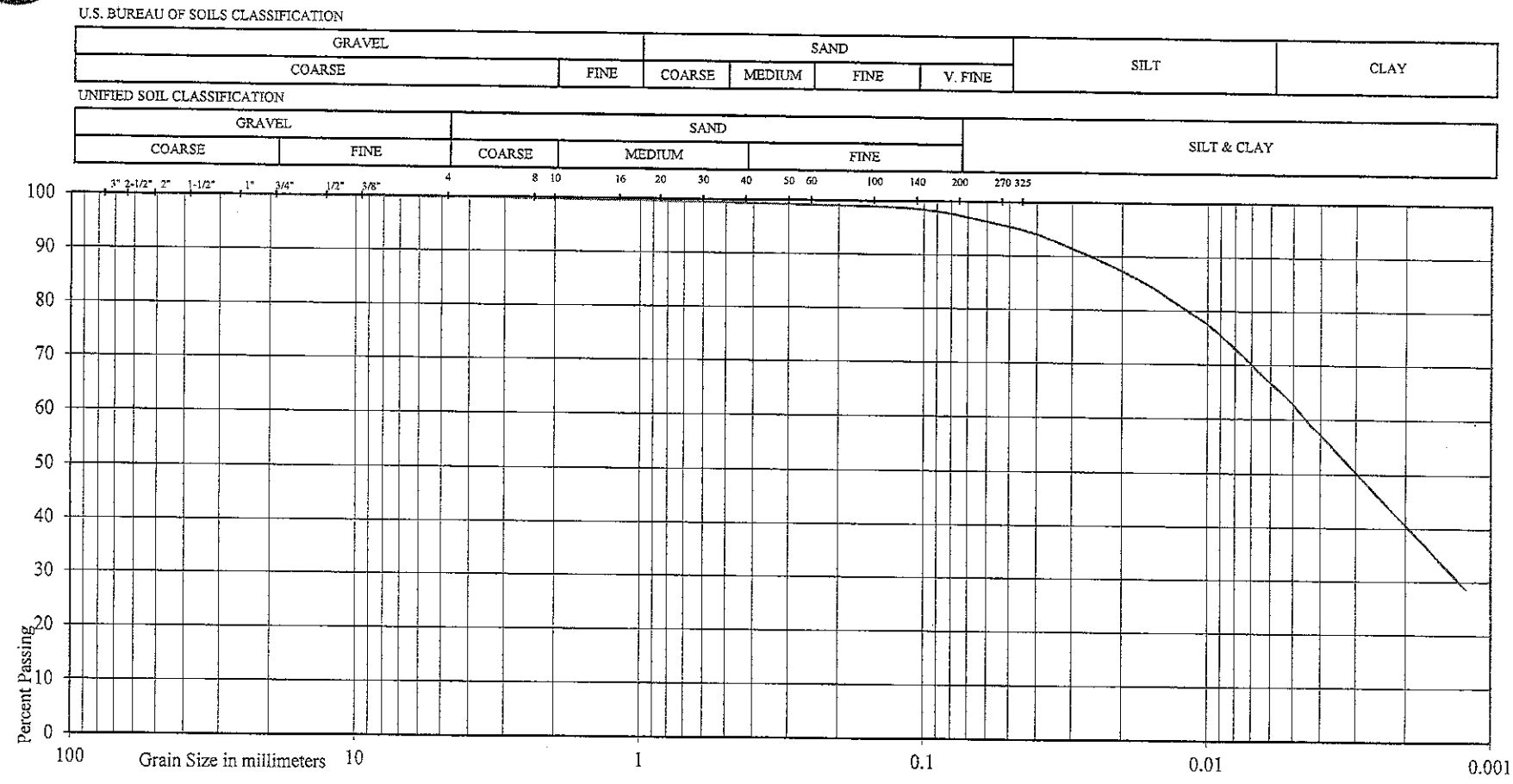
Classification of Sample [& Group Symbol]: SILTY CLAY

Figure: 7

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1509-S135



Project: Proposed Fire Hall

Location: 625 St. John's Sideroad, Town of Aurora

Borehole No: 3

Sample No: 4

Depth (m): 2.5

Elevation (m): 251.0

Liquid Limit (%) = 44

Plastic Limit (%) = 20

Plasticity Index (%) = 24

Moisture Content (%) = 25

Estimated Permeability (cm./sec.) = $<10^{-7}$

Classification of Sample [& Group Symbol]: SILTY CLAY

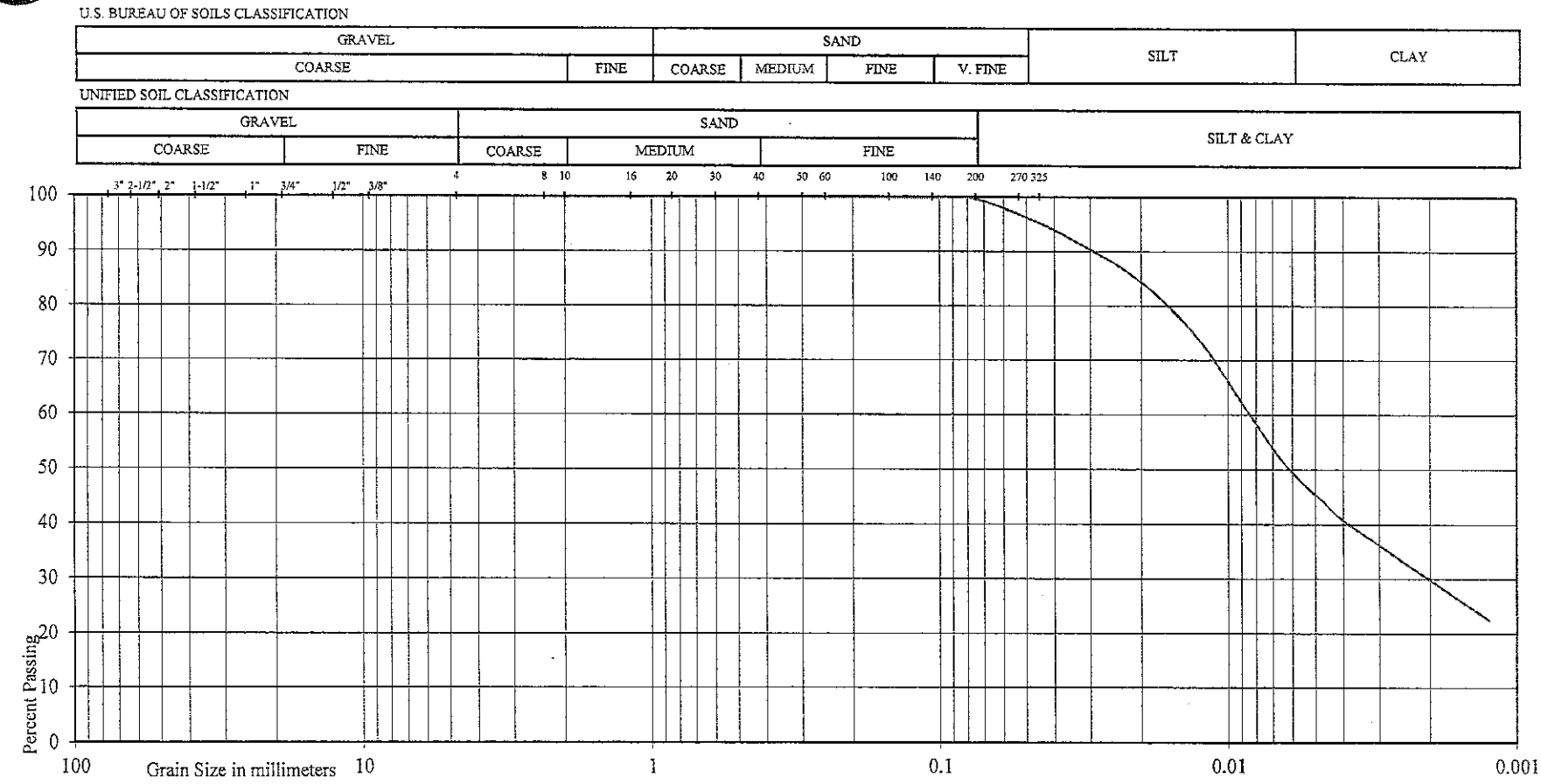
a tr. of fine sand

Figure: 8

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1509-S135



Project: Proposed Fire Hall

Location: 71 Pedersen Drive, Town of Aurora

Borehole No: 5

Sample No: 2

Depth (m): 1.0

Elevation (m): 254.2

Liquid Limit (%) = 37

Plastic Limit (%) = 18

Plasticity Index (%) = 19

Moisture Content (%) = 22

Estimated Permeability (cm./sec.) = $<10^{-7}$

Classification of Sample [& Group Symbol]: SILTY CLAY

Figure: 9

LEGEND

Borehole Location

Soil Engineers Ltd.
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Borehole Location Plan

SITE 625 St. John's Sideroad & 71 Pedersen Drive, Town of Aurora

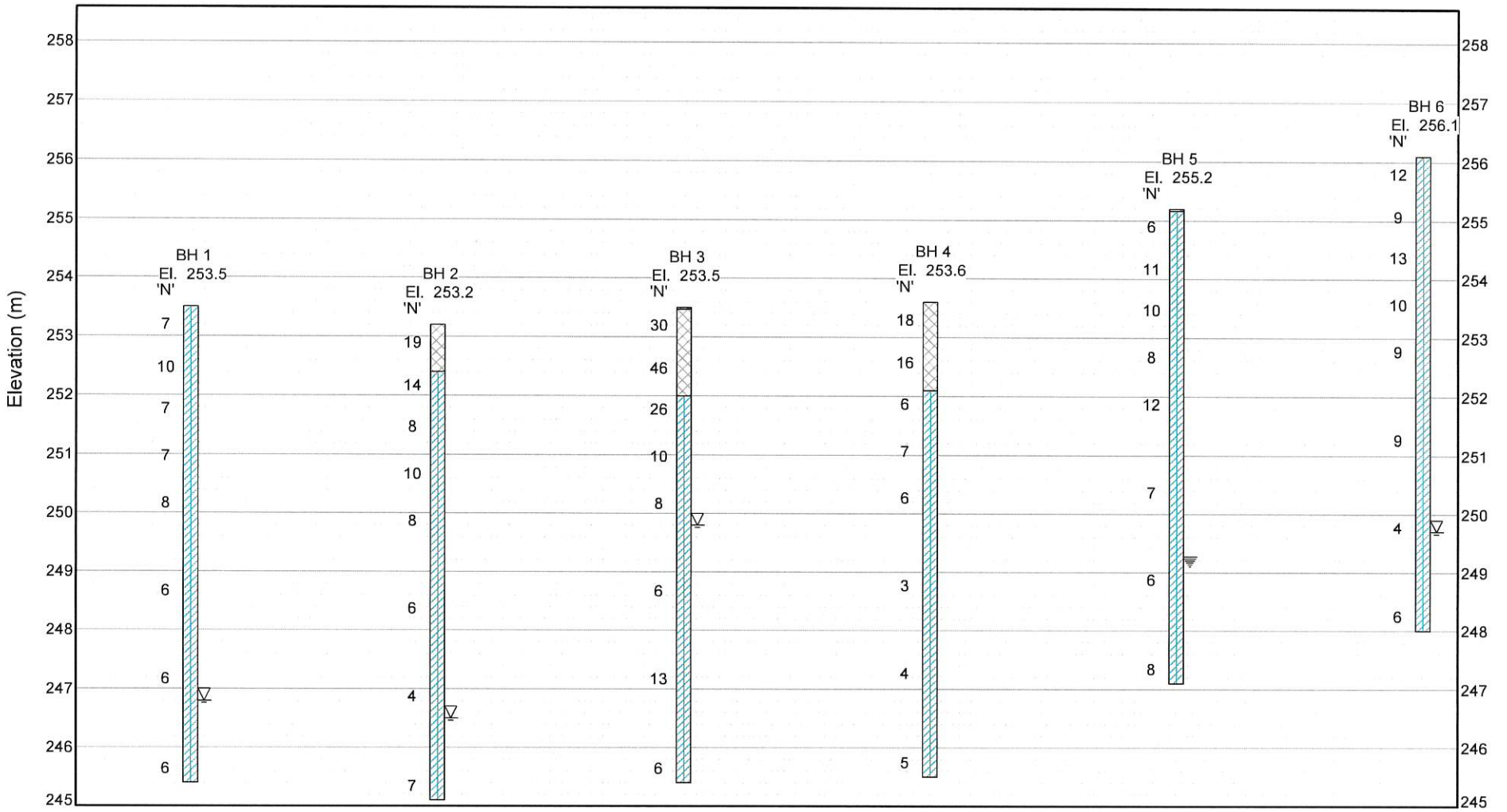
DESIGNED BY K.L.	**CHECKED BY** B.L.	**DWG NO.** 1	
SCALE 1:2500	**REF. NO.** 1509-S136	**DATE** December 2015	**REV**

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | HYDROGEOLOGICAL | BUILDING SCIENCE

SUBSURFACE PROFILE
DRAWING NO.: 2
SCALE: AS SHOWN

LEGEND
Water Level (End of Drilling) | Cave-In | Water Level (Stabilized)
Silty Clay | Fill | Granular Fill

JOB NUMBER: 1509-S135
REPORT DATE: December 2015
JOB LOCATION: 625 St. John's Sideroad and 71 Pedersen Drive, Town of Aurora
JOB DESCRIPTION: Proposed Fire Hall



RANGE OF SERVICES

Environmental Consulting
- Air Quality Monitoring
- Asbestos Abatement Inspections
- Designated Substance Surveys
- Due Diligence Screening Reports
- Phases I and II Environmental Assessments
- Site Decommissioning and Remediation
- Underground Storage Tank Decommissioning

Geotechnical and Material Consulting
- Concrete Floor Slabs
- Foundation Engineering
- Geotechnical and Material Analysis
- Pavement Analysis and Design
- Retaining Walls
- Slope Stability Study
- Subsurface Investigation

Hydrogeological Consulting
- Baseline Hydrogeologic Assessment
- Dewatering and Aquifer Depressurization Studies; Compliance Monitoring
- Groundwater Monitoring Wells
- Infiltration and Water Balance Studies
- Landfill Compliance Monitoring and Reporting
- Nitrate Loading Studies for Sewage Works and Septic Systems
- Permit To Take Water
- Stormwater Management and Low Impact Development Assessment
- Surface Water/Groundwater Assessment

Field Work
- Air Content, Slump and Slump Flow of Concrete
- Automated Groundwater Monitoring
- Benkelman Beam
- Compaction and Density
- Concrete Coring
- Concrete Moisture Vapour Emission
- Concrete Pullout
- Fill Characterization and Monitoring
- Floor Flatness (F_F) and Levelness (F_L)
- Hydraulic Conductivity
- LOK
- Material Inspection and Testing
- Maturity Meter
- Percolation, Permeability and Slug/Bail (K) Tests
- Pumping Tests; Yield and Drawdown Interference for Water Supply Development
- Quality Control
- Roof Anchors
- Schmidt Hammer
- Settlement Monitoring
- Standard Penetration
- Thermography

Building Inspections
- Building Envelope
- Fireproofing
- Pre-Cast Concrete
- Reinforcing Bar
- Roofing
- Structural Steel
- Waterproofing and Dampproofing

CCIL Certified Aggregate, Asphalt and Concrete Laboratory
- Amount of Asphalt Coated Particles
- Bulk Relative Density
- Compressive Strength of Cylinders and Cores
- Compressive Strength of Mortar Cubes
- Compressive Strength of Grout
- Compressive Strength of High Performance Concrete
- Dry Rodded Density of Coarse Aggregate
- Extraction of Asphalt Cement and Fine Correction and Analysis of Extracted Aggregate
- Material Finer than 75µm Sieve by Washing
- Microscopical Determination of Air Void System in Hardened Concrete
- Penetration
- Percent Air Voids
- Percent Compaction of Cores
- Percent Crushed Particles
- Percent Flat and Elongated Particles
- Percent Moisture Pickup
- Percent Particles with Two or More Crushed Faces and Uncrushed Particles
- Preparation of Marshall Specimens
- Recovery of Asphalt from Solution
- Relative Density and Absorption
- Resistance to Plastic Flow Using Marshall Apparatus
- Sieve Analysis
- Standard, Modified and One Point Proctor
- Theoretical Maximum Relative Density
- Voids in Mineral Aggregate

Soils Laboratory
- California Bearing Ratio
- Chemical Tests for pH, Sulphates, Chlorides, Organic Content, Nitrates, Phosphorus and Potassium
- Classification
- Consolidation
- Corrosivity Analysis
- Liquid Limit, Plastic Limit and Plasticity Index
- Particle Size Analysis
- Permeability
- Relative Density
- Shear Strength (Triaxial)
- Shrinkage Limit
- Specific Gravity
- Unit Weight

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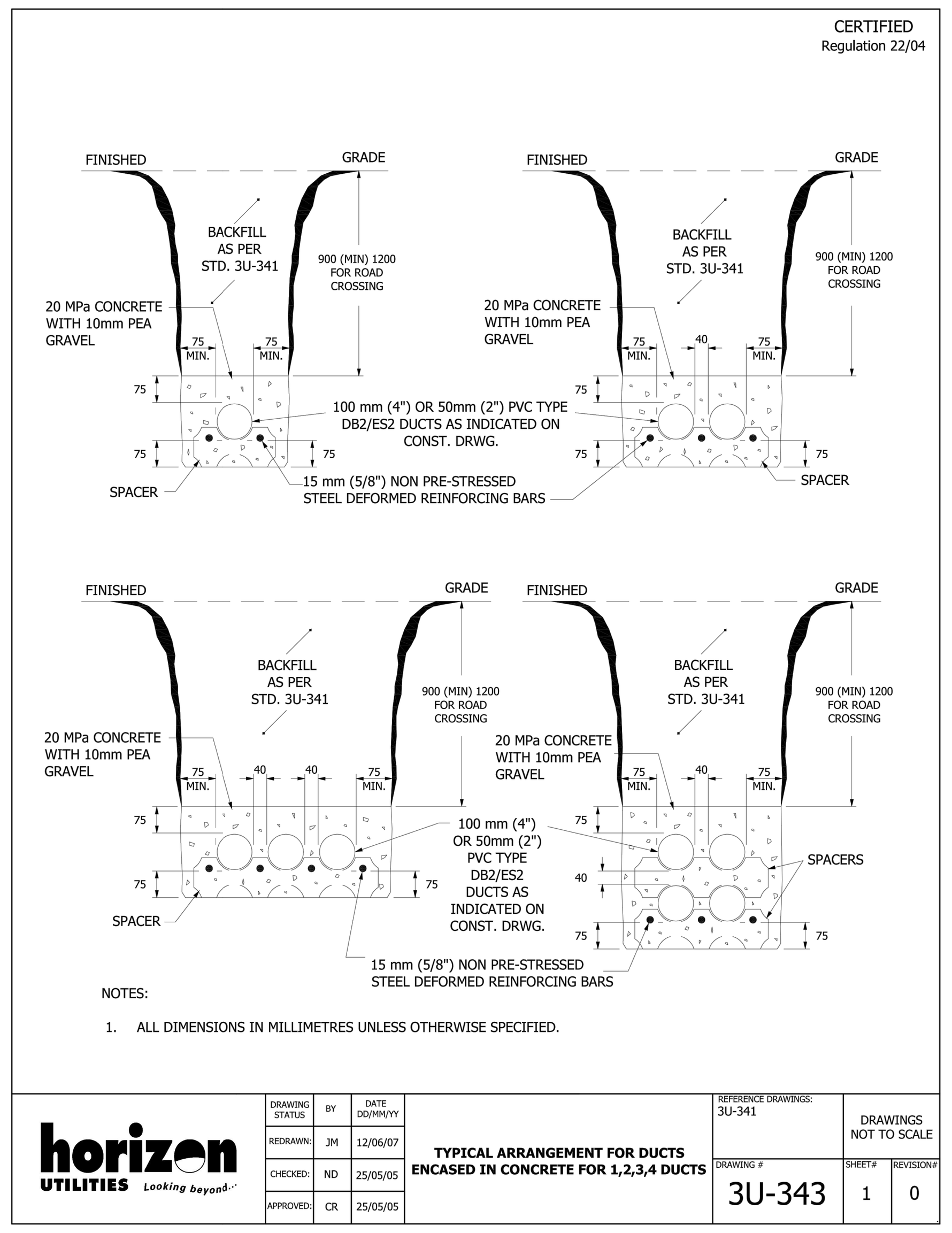
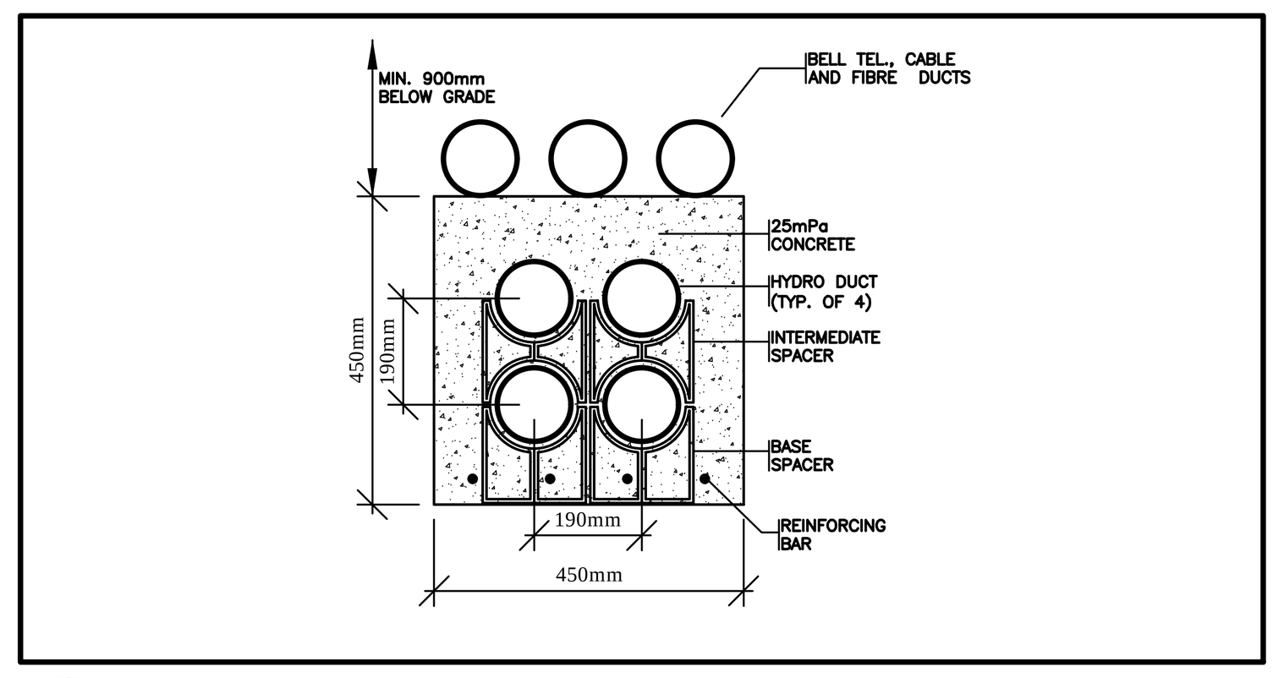
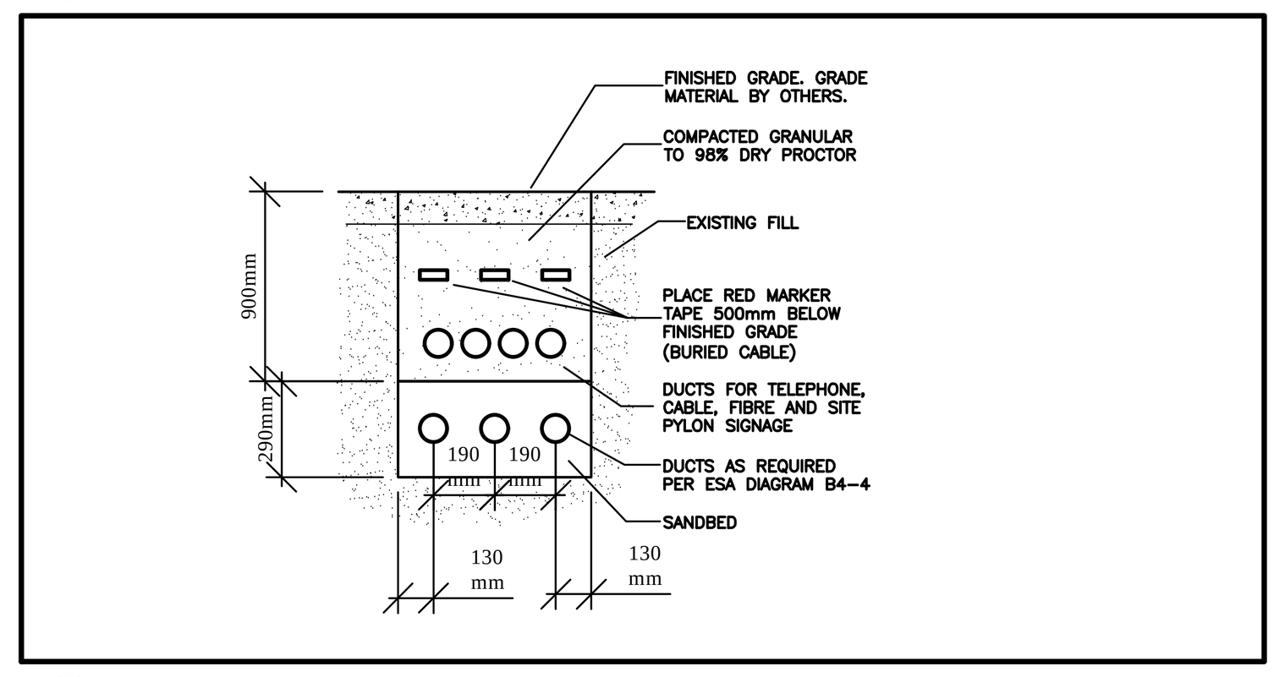
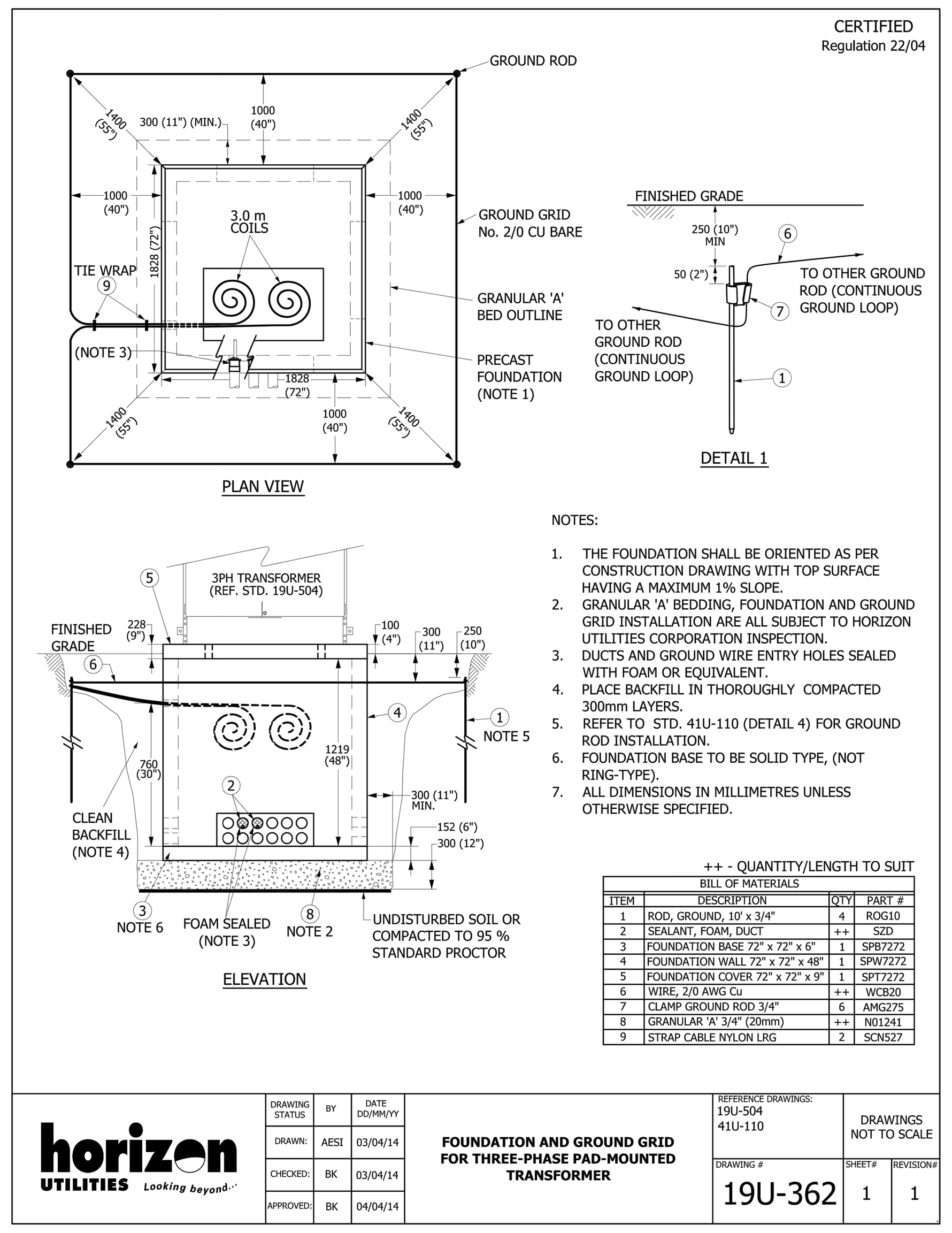


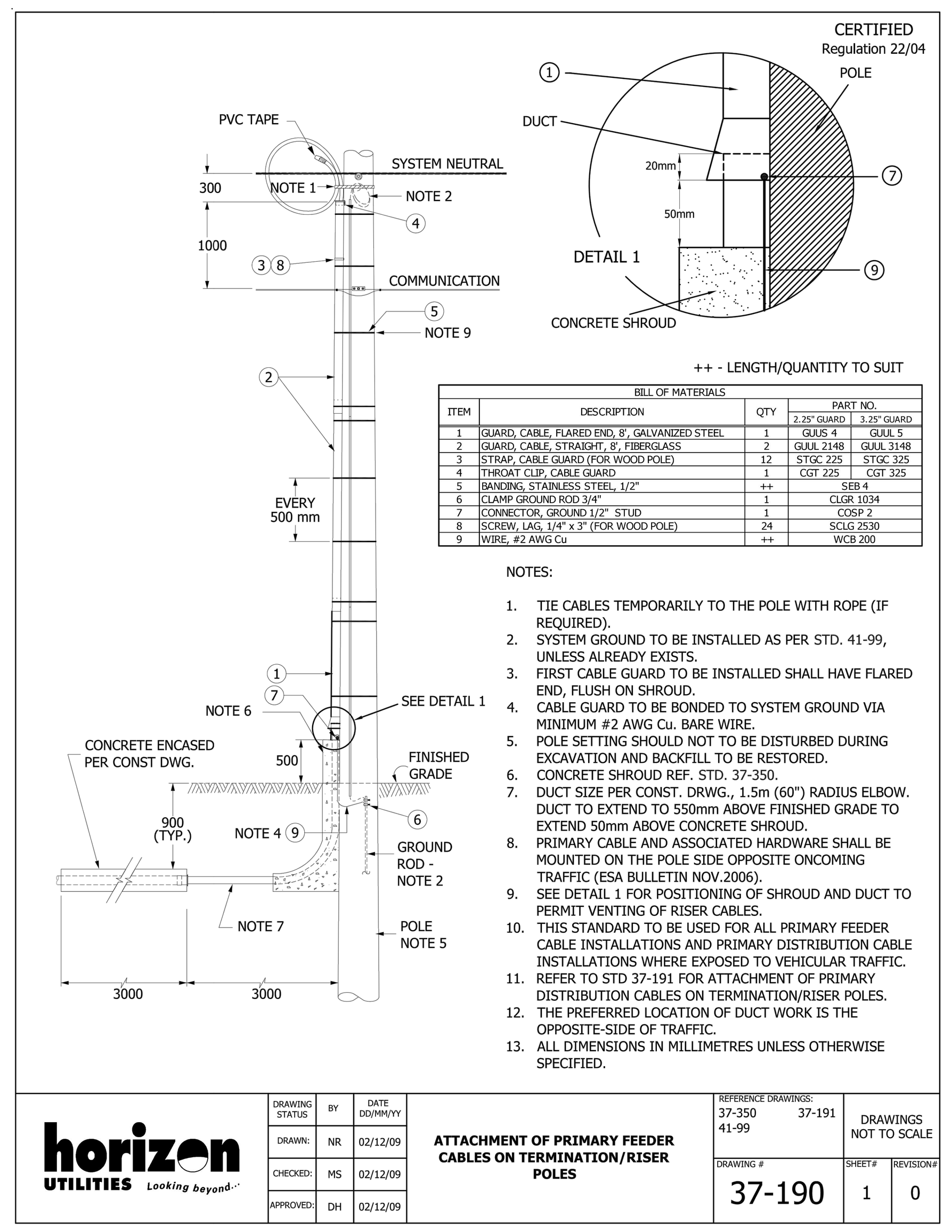


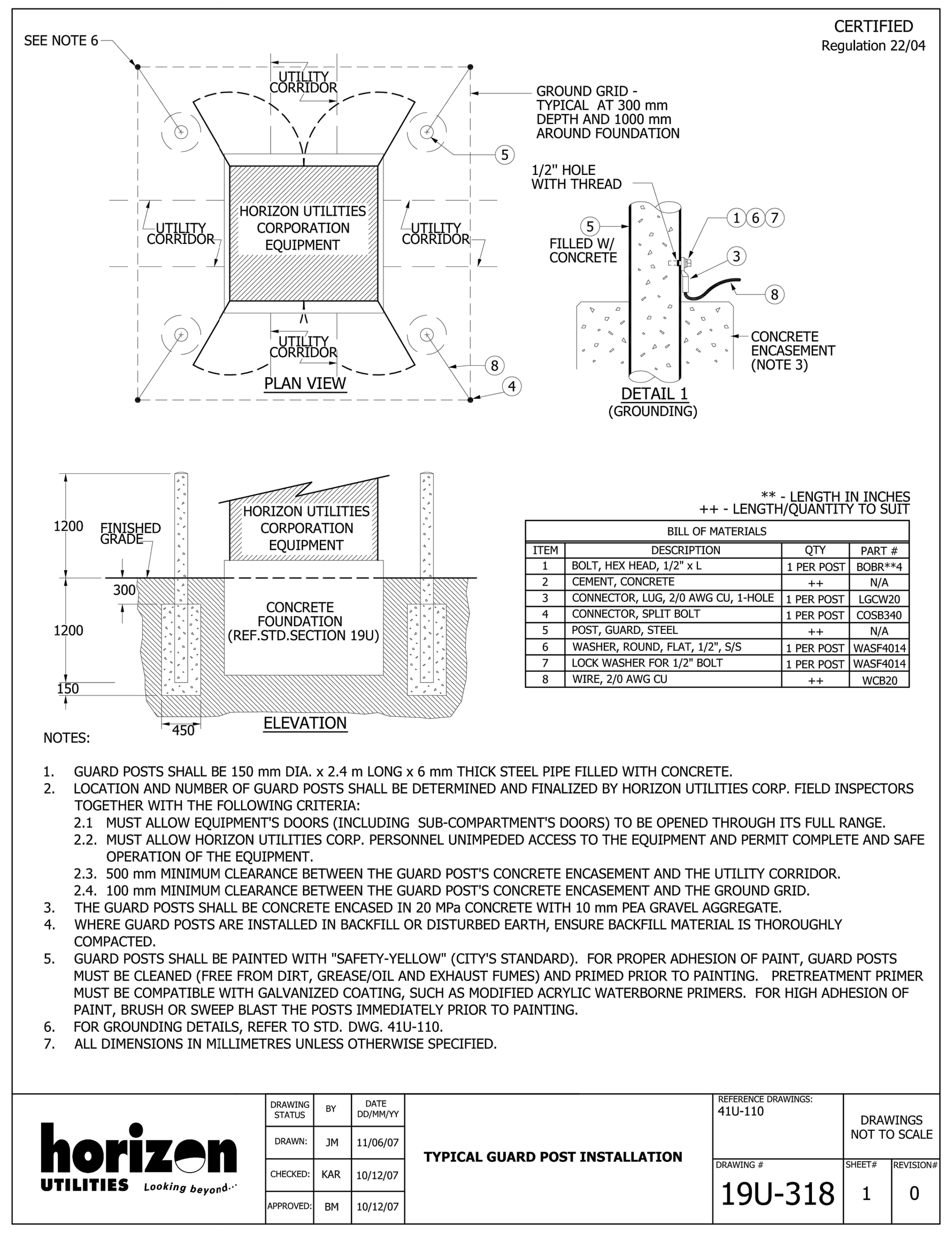
CONCRETE ENCASED DUCTBANK DETAIL
N.T.S.

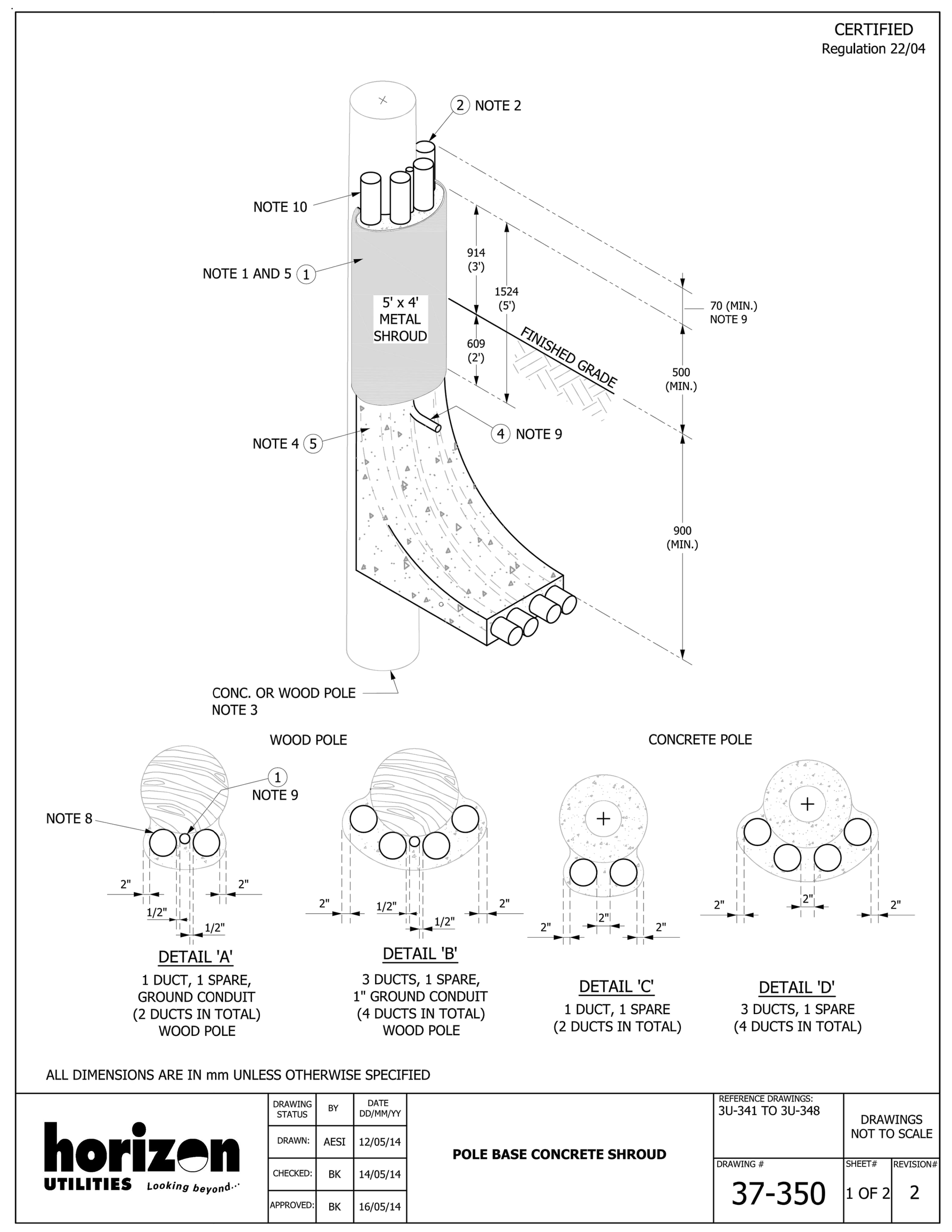


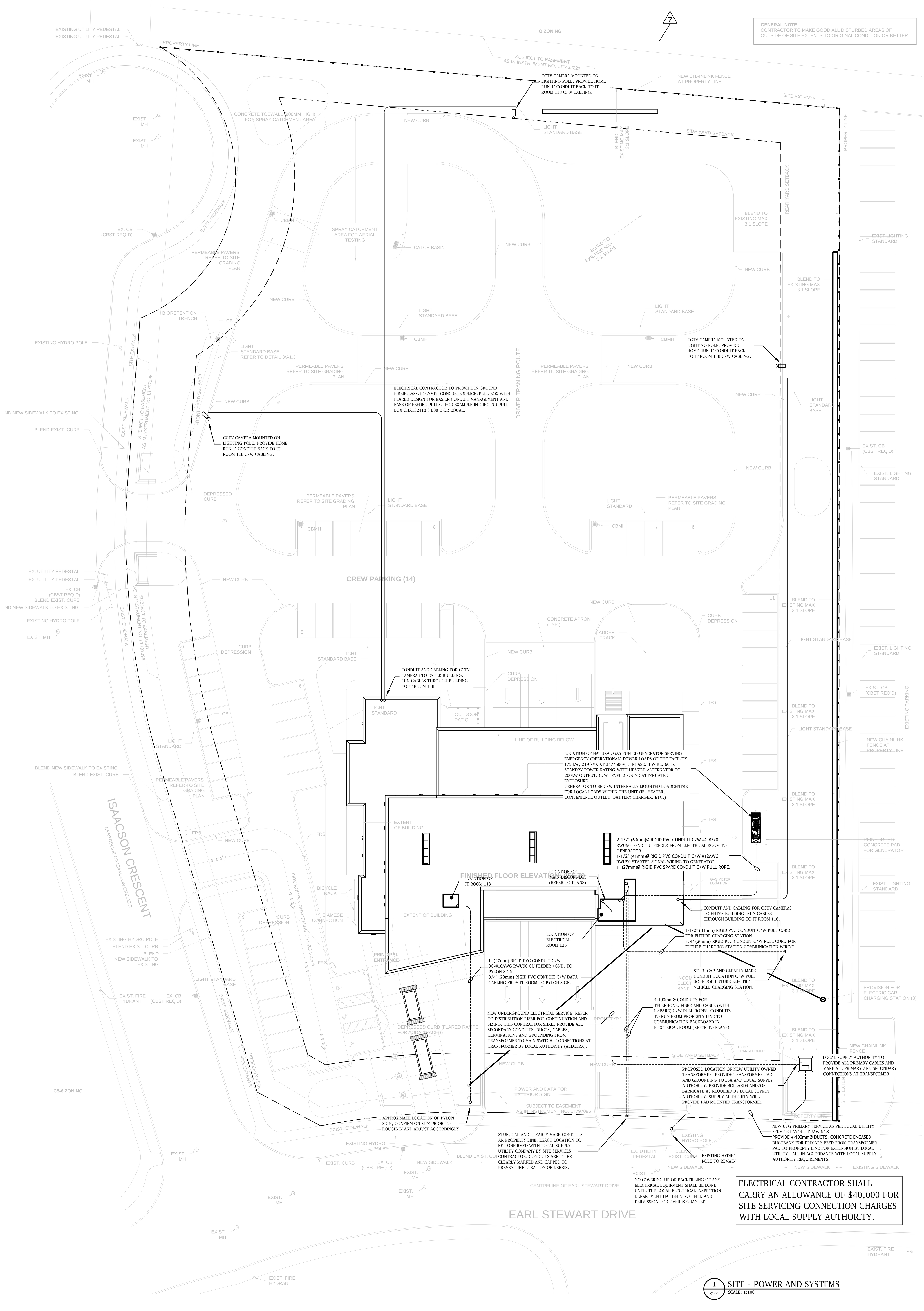
TYPICAL DIRECT BURIED DUCT DETAIL
N.T.S. ASPHALT/CONCRETE SURFACE











ISSUE OR REVISION

NO.	ISSUED FOR	DATE
1	ISSUED FOR PERMIT/TENDER	2019.03.15
2	ISSUED FOR ADDENDUM ADD-01	2019.03.25
3	RE-ISSUED FOR TENDER	2019.11.21
4	ISSUED FOR CONSTRUCTION	2020.02.19

PROJECT

CENTRAL YORK FIRE SERVICES HQ STATION 4-5

300 EARL STEWART DRIVE, AURORA, ONTARIO

CLIENT

Newmarket AURORA

CONSULTANT

SEI Electrical Engineering
12 Argyle Street N., Caledonia, ON, N3W 1B6

ARCHITECT

THOMASBROWN ARCHITECTS
197 SPADINA AVE, SUITE 500, TORONTO, ON
T: 416-364-5710 EXT 101
W: WWW.TBROWNARCH.COM

PROFESSIONAL SEAL

DWG TITLE

SITE - POWER AND SYSTEMS

ORIENTATION

TRUE NORTH
CONSTRUCTION NORTH

DATE: AUGUST 2018

SCALE: AS NOTED
DRAWN BY: J.R./C.B.

DWG STATUS: CONSTRUCTION

PROJECT No: 18-110

DRAWING No: E101
REVISION: 4