THE CORPORATION OF THE
TOWN OF BLIND RIVER

TENDER FOR NEW WATER INTAKE PHASE 1 & HURON STREET RECONSTRUCTION

CONTRACT NO. 23-0821-1

Consultant

Tender Close: Friday, July 5th, 2024 - 2:00 pm

THE CORPORATION OF THE TOWN OF BLIND RIVER

Tender for Water Intake and Huron Street Reconstruction – Contract No. 23-0821-1

CHECKLIST

The following checklist has been included to ensure that all of the Town's requirements are met:

1. Each Bidder shall submit with their tender a certified cheque or bid bond in the amount of 10% of the contract price. ☐

2. The Bidder must provide an Agreement to provide Performance Security. ☐

3. Return the Form of Tender properly completed and signed where indicated. ☐

4. Ensure the Addendums Received Section of the Form of Tender has been completed **if** any addendums have been issued. Failure to complete this section when addendums have been issued may render your Tender as non-compliant. ☐

5. The Tendering Information, Construction Specifications and Special Provisions Sections have been carefully reviewed and all requirements have been submitted with your Tender. ☐

6. The Bidder has attached a proposed schedule for the works, showing compliance with the start and final completion dates. ☐

The Corporation is not bound to accept the lowest or any tender and reserves the right to reject all tenders. The Corporation also reserves the right to evaluate the tenders in any manner it deems fit.

LIST OF CONTRACT DOCUMENTS

	No. of Pages
Cover Page	1
Tendering Checklist	1
List of Contract Documents	1
Tendering Information	18
Form of Tender	11
Agreement	4
List of OPSS & OPSD Applicable	4
Ontario Provincial Standard Drawings	37
Special Provisions	54
Supplemental General Conditions of Contract	3
OPS General Conditions of Contract	59

LIST OF CONTRACT DRAWINGS

Drawing No.	Revision No.	Description
23-0821-C1	0	Legends & General Notes
23-0821-C2	0	Removals Plan
23-0821-C3	0	Plan & Profile (10+180 to 10+350)
23-0821-C4	0	Plan & Profile (10+350 to 10+500)
23-0821-C5	0	Plan & Profile (10+500 to 10+600)
23-0821-C6	0	Plan & Profile (Murray Street & Berthelot Street)
23-0821-C7	0	Pavement Markings
23-0821-C8	0	Typical Sections & Details
23-0821-C9	0	Structure Schedules & Restraint Tables

ADDITIONAL INFORMATION

New Water Intake & Huron Street Reconstruction Geotechnical Report – June 10, 2024
Figures From Excess Soils Quality Testing Program – DRAFT, March 28, 2024
Enbridge Third-Party Requirements in Vicinity of Natural Gas Facilities Standard – 2024.01.31
Town of Blind River Water Distribution Mapping, Drawing 20-1627-G3, June 18, 2024
International Valve: Vent-Tech Direct Bury Valve Series C
Level 2 Type B Pedestrian Crossover System

TENDERING INFORMATION

TI.01 GENERAL

Please read this section carefully.
These general conditions, instructions to Tenderers, and specifications forming a part of this tender, shall constitute a valid and binding contract between the successful Tenderer and The Corporation of the Town of Blind River and it shall ensure to the benefit of, and be binding upon both their successors, executors, administrators and assigns.

TI.02 DEFINITIONS

The words "Corporation" and "Owner" mean The Corporation of the Town of Blind River.

The words "Director of Public Services" shall be understood as referring to that of the Town of Blind River.

The word "Engineer" shall be understood as referring to TULLOCH Engineering Inc.

The word "Contract" means the agreement to do the work entered into with the Corporation, the general conditions, the specifications, the drawings, and other documents referred to or connected with the said contract.

The words "Contractor" or "Tenderer" means the person or persons who have undertaken to carry out this contract.

The words "Town" and "Corporation" may be used interchangeably with the same intent and meaning for the purpose of the contract.

The word "Work" shall mean the execution of the whole work, and things required to be done, mentioned, or referred to, in the contract documents and including all extra or additional work that may be ordered by the Engineer.

The words "Working Day" mean any weekday,

A. except Saturdays, Sundays, and statutory holidays;

B. except a Day as determined by the Contract Administrator, on which the Contractor is prevented by inclement weather or conditions resulting immediately there from, from proceeding with a Controlling Operation. For the purpose of this definition, this will be a Day during which the Contractor cannot proceed with at least 60% of the normal labour and equipment force effectively engaged on the Controlling Operation for a least 5 hours;

C. except a Day on which the Contractor is prevented from proceeding with a Controlling Operation, as determined by the Contract Administrator by reason of,
    i) any breach of the Contract by the Owner or if such prevention is due to the Owner, another contractor hired by the Owner, or an employee of any one of them, or by anyone else acting on behalf of the Owner.

ii) on-delivery of Owner supplied materials,
iii) any cause beyond the reasonable control of the Contractor, which can be substantiated by the Contractor to the satisfaction of the Contract Administrator.

An exception will not be made to the Contractor for the Contractor's inability to provide the normal labour and equipment force for at least 8 hours per day, 5 days per week, Monday through Friday on a Controlling Operation, as a result of other contracts, projects or activities the Contractor may be completing.

The words "Controlling Operation" mean any component of the Work, which, if delayed, will delay the completion of the work.

TI.03 TENDER DOCUMENTS

A. All tenders must be completed on the printed forms supplied for that purpose. No others will be considered. Each tender shall be in accordance with the Contract Documents and shall include a completed Form of Tender, Tender Deposit, Security Agreement, List of Tenderer's Senior Staff, List of Subcontractors and Proposed Schedule.

TI.04 DELIVERY AND OPENING OF TENDERS

A. SEALED TENDERS, enclosed in an envelope clearly identified as **"Tender for Contract 23-0821-1 – New Water Intake Phase 1 and Huron Street Reconstruction"** and addressed to the **CAO/Clerk** will be received at The Corporation of the Town of Blind River, 11 Hudson Street, Blind River, ON P0R 1B0, up to **2:00 p.m., local time, on Friday, July 5th, 2024.**

B. The tenders will be opened on **Friday, July 5th, 2024,** at **2:15 local time** at the Municipal Office. Bidders can attend the tender opening. Only the Total Tender Price will be announced at the opening.

C. The Corporation reserves the right to reject any or all bids and the lowest tender will not necessarily be accepted.

D. Tenders shall be completed on the Form of Tender included with the Contract Documents.

TI.05 DEADLINE FOR QUESTIONS & RESPONSES

A. All questions during the tendering period must be submitted to the Engineer in writing via email, prior to 12:00pm on June 28th, 2024. No such communications are to be directed to anyone other than the Engineer as follows.

Chris Kirby, P.Eng, Project Manager
TULLOCH Engineering Inc.
Email chris.kirby@tulloch.ca

B. The Engineer will issue all responses as soon as possible after receipt, however no later than 5:00pm on July 2nd, 2024. Responses will be via addendum posted on the Town of Blind River website. No oral interpretation will be effective to modify any provision of the Contract Documents.

TI.06 DISCREPANCIES

A. Should a Tenderer find discrepancies in or omissions from the Contract Documents, or be in doubt as to any meaning, the Tenderer shall notify the Engineer, who may issue a written addendum. Neither the Owner nor the Engineer will make oral interpretations of the meaning of the Contract Documents.

B. Should the Tenderer not agree that the materials and methods specified, or designed on the Drawings, will provide an installation to meet the requirements of the project, the Tenderer shall notify the Engineer in writing, stating the reason for the objection and may submit a suggested alternative. In such an event, the Engineer may choose to issue an addendum.

TI.07 ADDENDA

A. Addenda issued during the tendering period shall be allowed for by the Tenderer. Addenda shall be posted on the Town of Blind River website https://www.blindriver.ca/en/town-hall/bids-and-tenders.aspx. It is the responsibility of all prospective Tenderers to monitor the website and ensure that any change to the tender document in the form of an addendum is responded to appropriately. Addenda will be issued under the following circumstances:

a) Interpretation of Tender documents as a result of queries from prospective Tenderers;

b) Revision, deletions, additions or substitutions of any portion of Tender documents.

B. All such changes as addressed in the addenda shall become an integral part of the Tender documents and shall be allowed for in arriving at the Tender price. Addendums, which have financial implication and have not been acknowledged on the Form of Tender, may be automatically rejected. Oral instructions shall not be considered valid unless confirmed in writing through the Engineer.

TI.08 EXAMINATION OF SITE

A. The Tenderers shall visit the site of the Work before submitting their tender and shall by personal examination satisfy themselves as to the local conditions that may be encountered during construction of the Work. They shall make their own estimate of the facilities and difficulties that may be encountered and the nature of the subsurface materials and conditions. The Tenderer shall contact Mr. Chris Zagar, Director of Public Services at 705-356-2601 to arrange a site visit.

B. The Tenderer shall not claim at any time after submission of their tender that there was any misunderstanding of the terms and conditions of the Contract relating to site conditions.

TI.09 HARMONIZED SALES TAX

A. This project is taxable under the Harmonized Sales Tax (HST).

B. In calculating unit prices, **DO NOT** include HST payable by the Contractor.

C. The HST payable by the Owner is shown as a separate line in the Schedule of Itemized Prices, and is not to be included in the unit prices. It will be added to the net amount of each progress payment and will be paid to the Contractor.

TI.10 INFORMAL OR UNBALANCED TENDERS

A. All entries in the Form of Tender shall be made in ink or by typewriter. Entries or changes made in pencil shall, unless otherwise decided by the Owner, be invalid or informal. Tenders which are incomplete, conditional, illegible or obscure, or that contain additions not called for, reservations, alterations (unless properly and clearly made and initialed by the tenderer's signing officer) or irregularities of any kind, may be rejected as informal. Tenders that contain prices which appear to be so unbalanced as likely to affect adversely the interests of the Owner may be rejected.

Whenever in a tender the amount tendered for an item does not agree with the extension of the estimated quantity and the tendered unit price, the unit price shall govern and the amount and the Total Tender Price shall be corrected accordingly, unless otherwise decided by the Owner.

A discrepancy in addition or subtraction in a tender shall be corrected by the Owner by adding or subtracting the items correctly and correcting the Total Tender Price accordingly, unless otherwise decided by the Owner. Where an error has been made in transferring the amount from one part of the Form of Tender to another, the amount shown before transfer shall, subject to any correction as provided for above, be taken to be correct and the amount shown after transfer and the Total Tender Price shall be corrected accordingly.

If a tenderer has omitted to enter a price for an item of work set out in the Form of Tender, they shall, unless they have specifically stated otherwise in their tender, be deemed to have allowed elsewhere in the Form of Tender for the cost of carrying out the said work and, unless otherwise agreed to by the Owner, no increase shall be made in the Total Tender Price on account of such omission.

The Owner reserves the right to waive formalities at their discretion.

TI.11 PROOF OF ABILITY

A. The Tenderer shall be competent and capable of performing the various items of Work. The Tenderer shall complete the following statement sheets, which shall form a part of the Contract Documents:

1. Tenderer's Experience on Similar Projects with a list of specific examples completed within the last 5 years.

2. Subcontractors to be employed in the project and the value for the subtrades listed.

3. i) Tenderer's Senior Staff to be employed, including designating an on site superintendent of the project. The Site Superintendent can be changed only on the approval of the Engineer.
ii) Tenderer's Equipment to be used.

B. The Tenderer may be required to furnish additional statements covering other matters, including financial resources.

TI.12 CHARACTER OF OPERATORS AND ATTENDANTS EMPLOYED

A. The Contractor shall employ only orderly, competent and skillful individuals to do the work and whenever the Director of Public Services shall inform in writing that anyone carrying out the work is, in the opinion Director of Public Services, incompetent, unfaithful or disorderly, such an individual shall be discharged from the work and shall not again be employed on the work without the consent, in writing, of the Director of Public Services.

TI.13 RECORD AND REPUTATION

A. Without limiting or restricting any other right or privilege of the Town and regardless of whether or not a Tender or Proposal or Proponent/Tenderer otherwise satisfies the requirements of a Tender or RFP, the Town may reject summarily any Proposal or Tender from any person where:

1. In the opinion of the Council of the Town of Blind River or the Director of Public Services, the commercial relationship between the Town and the Tenderer/Proponent has been impaired by the prior and/or current act(s) or omissions(s) of such Tenderer/Proponent including but not limited to:
   i. litigation with Town of Blind River;
   ii. the failure of the Proponent/Tenderer to pay, in full, all outstanding payments (and where applicable, interests and costs) owing to the Town by such Proponent/Tenderer, after the Town has made demand for payment of same;
   iii. the refusal to follow reasonable directions of the Town or to cure a default under any contract with the Town as and when required by the Town or

the Town's Representatives;

iv. the Proponent/Tenderer refusing to enter into a contract with the Town after the Proponent or Tenderers tender or proposal, bid or quote has been accepted by the Town;

v. the Tenderer/Proponent refusing to perform or to complete performance of a contract with the Town, at any time, after the Proponent has been awarded the contract by the Town;

vi. acts(s) or omission(s) resulting in a claim by the Town under a bid bond, a performance bond, a warranty bond or any other security required to be submitted by the Proponent on a RFP or a Tender; within the five (5) year period immediately preceding the date on which the RFP/Tender is awarded;

2. In the opinion of the Council of the Town of Blind River or the Director of Public Services, there are reasonable grounds to believe that it would not be in the best interests of the Town to enter into a contract with the Proponent/Tenderer, including (without limiting the generality of the foregoing);

i. The conviction of that person or any person with whom that person is not at arm's length within the meaning of the Income Tax Act (Canada) of an offence under any taxation statute in Canada;

ii. The conviction or finding of liability of that person under the Criminal Code or other legislation or law, whether in Canada or elsewhere and whether of a civil, quasi-criminal or criminal nature, of moral turpitude including but not limited to fraud, theft, extortion, threatening, influence peddling and fraudulent misrepresentation.

iii. The conviction or finding liability of that person under the Environmental Protection Act, or corresponding legislation of any other province or any member of the European Union or the United States of America, where the circumstances of that conviction evidence a gross disregard of the part of that person for the environmental well-being of the communities in which it carries on business;

iv. the conviction or finding of liability of that person relating to product liability or occupational health or safety, whether of Canada or elsewhere, where the circumstances of that conviction evidence a gross disregard on the part of that person for the health and safety of its workers or customers;

v. The conviction or finding of liability of that person under the Securities Act or the corresponding legislation of any other province or any member of the European Union or the United States of America or any state thereof.

TI.14 TENDER DEPOSIT

A. The tender shall be accompanied by a tender deposit in the form of a **Certified Cheque** or **Bid Bond** payable to the Owner in the amount of **10%** of the contract price.

The Tenderers shall keep their tenders open for acceptance for **90** days after the closing date or until a contract is awarded with the successful Tenderer whichever comes first. Withdrawal during this period will result in forfeiture or enforcement of the tender deposit. Upon being notified that the tender has been accepted, the Contractor shall execute copies of the Agreement, supply bonds and insurance documents as specified, and start Work as specified.

Failure to execute the copies of the Agreement, or to supply bonds and insurance documents, within one week of the date of acceptance of the tender, will automatically mean the forfeiture or enforcement of the tender deposit.

Tender deposits of all Tenderers, except the lowest and second lowest Tenderers, will be returned within fifteen (15) working days after the date of tender closing.

Tender deposits of the two low Tenderers will be retained until a tender has been accepted and the contract properly executed.

TI.15 AGREEMENT TO PROVIDE PERFORMANCE SECURITY

A. Every tender shall be accompanied by either an "Agreement to Bond" completed by a surety company lawfully doing business in the Province of Ontario for a Labour and Material Payment Bond for 50% of the Total Tender Price and a Performance Bond for 100% of the Total Tender Price.

B. Such bonds shall be approved by and acceptable to the Owner and must be furnished when the contract is signed by the Contractor.

TI.16 CONFLICT OF INTEREST

A. All firms are required to disclose to the Town any potential Conflict of Interest, may it be pecuniary or otherwise. If a conflict of interest does exist with the potential successful Tenderer, the Town may, at its discretion, refrain from awarding the project to the Tenderer.

B. The Tenderer covenants that it presently has no interests and it shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of its service hereunder. The Tenderer further covenants that in the performance of this contract no person having such known interest shall be employed.

TI.17 INDEMNIFICATION

A. The successful Tenderer shall indemnify and hold harmless the Town of Blind River, its officers, council members, partners, agents and employees from and against all actions, claims,

demands, losses, costs, damages, suits or proceedings whatsoever which may be brought against or made upon the Town of Blind River and against all loss, liability, judgements, claims, suits, demands or expenses which the Town of Blind River may sustain, suffer or be put to resulting from or arising out of the successful Tenderer's failure to exercise reasonable care, skill or diligence or omissions in the performance or rendering of any work or service required hereunder to be performed or rendered by the successful Tenderer, its agent, officials and employees.

TI.18 ACCEPTANCE OF TERMS

A. Each Tenderer, by submitting a Tender, represents that the Tenderer has read, understands and accepts the terms and conditions of this tender in full.

TI.19 ACCEPTANCE OF TENDERS

A. The Owner is not bound to accept the lowest or any tender and reserves the right to reject any or all tenders and to waive formalities as the interests of the Owner may require without stating reasons therefore.

B. The Owner also reserves the right to evaluate the tenders in any manner it deems fit.

C. If the total tender price exceeds available funding the Owner will negotiate with the low Tenderer to adjust tender quantities. In the event that these negotiations are not successful the Owner will negotiate with the next lowest Tenderer as necessary.

D. The Owner shall not be responsible for any liabilities, costs, expenses, loss or damage incurred, sustained or suffered by any Tenderer before or after, or by reason of, the acceptance or the non-acceptance by the Owner of any tender, or by reason of any delay in the acceptance of a tender. Tenders are subject to a formal contract being prepared and executed.

TI.20 WITHDRAWAL PROCEDURES

A. A Tenderer may request that his or her submitted tender be withdrawn, up until the closing time for a particular contract. Withdrawals can only be made in person and the Tenderer wishing to withdraw from a particular tender must attend the Town Office and execute an appropriate withdrawal form, signed by a principal of the Tenderer, or provide a letter from the Tenderer, signed by a principal, withdrawing the Tender.

B. The withdrawal of a tender does not disqualify a Tenderer from submitting another Tender for the same contract provided that all of the tender procedures are observed and the new tender is received prior to the terminal time for closure. However, unless withdrawal procedures have been followed, more than one tender from the same Tenderer will result in the disqualification of the Tenderer.

C. The Tender Deposit shall be forfeited to the Town when a Tenderer attempts to withdraw his or her Tender after Tenders have been opened, in addition to any consequence or legal penalty that may apply.

TI.21 RESULTS

A. The name of all Tenderers and their total bid price shall be deemed public information following the tender opening; however, unit prices will not be disclosed where tenders were requested as a total contract price.

TI.22 EQUIVALENTS

A. When an article is specified by its trade or other name (whether such name is followed by the phrase 'or equivalent' or not), the Tenderer shall base their tender price on the supply of the named article and no other.

The Tenderer may submit with their tender suggested equivalents to those articles specified by trade or other names. Such submissions shall show the name of the article specified, the name and description of the suggested equivalent, and the total revision to the tender price that would result if the equivalent were accepted.

TI.23 HOLDBACKS

A. The project is subject to the Construction Act. A **statutory holdback of 10% (ten percent)** will be held back from each progress payment. Release of the 10% statutory holdback will be in accordance with provincial statues and Section GC 8.02.04 of the General Conditions.

B. To cover rectification costs during the warranty period, the Owner will **retain 3% (three percent)** of the value of Work done, such amount being held back in each progress certificate. Holdbacks held to cover rectification costs will be retained for a period of twelve months after the date of Completion.

The Contractor shall pay for all additional contract administration, inspection, and material testing costs incurred by the Owner resulting from warranty repair works. Such payments shall be deducted from the warranty holdback amount prior to its release.

TI.24 ROAD CLOSURES

A. Temporary, short term full road closures between intersecting roads may be permitted for the construction of the works, provided notification to affected residents and alternate access is provided. Pedestrian access must be maintained at all times. The road must be reopened to thru traffic each night.

B. The Contractor shall prepare a Traffic Plan for review by the Engineer and Town of Blind River in advance of construction. The Contractor shall be responsible for all traffic control measures required to support the proposed closures, including lane reconfigurations.

C. In areas of closures, resident and business access must always be accommodated with the affected parties and approved by the Engineer prior to undertaking.

D. The Contractor shall be responsible for all notification and detour signage, as well as notifications to all services, including but not limited to emergency services, refuse & recycling collection and Canada Post.

E. Road closures shall include considerations for School Bus traffic.

TI.25 UTILITIES

A. The Contractor shall arrange for buried locates of all utilities prior to commencing construction.

B. The Contractor shall protect all buried and aerial utility lines during construction.

C. On direction of the Utility, the Contractor will be required to have the Utility provide support to utility poles or lines during excavation operations adjacent to the poles.

D. The Contractor shall be responsible for any third party observations as may be required by the utility company.

E. The Contractor shall complete all work near the Enbridge Gas Line in accordance with Enbridge requirements, including, but not limited to monitoring, blasting plans and leak testing.

TI.26 LABOUR & MATERIALS

A. The contractor shall provide and furnish all manner of labour, materials, apparatus, utensils, and cartage of every description needful for the due performance of the work and render all due and sufficient facilities to the Engineer for the proper inspection of the work.

The Engineer may require the contractor to dismiss any workman or workmen who may be incompetent, uncivil, or abusive: the workmen and contractor only being admitted to the grounds for the purpose of proper execution of the work.

B. The Contractor will be required to use local manpower as much as possible for the work under this contract.

TI.27 PROJECT SUPERVISION

A. The contractor shall, during the whole of the contract, provide an on-site Project Superintendent, (the individual of which is to be mutually agreed upon by the Contractor and Contract Administrator), who shall be responsible for and have authority over all work performed under this Contract, or extension to this Contract.

B. The Project Superintendent shall be fully conversant in the terms and requirements of the Contract Documents, all Provincial and Municipal Health and Safety Regulations, OPSS, and OPSD, and any other specification referred to in the Contract Documents.

C. The Project Superintendent shall remain on site at all times that work is being performed whether by the Contractor or Subcontractor.

D. Replacement of the Project Superintendent is strictly forbidden unless prior written approval is obtained from the Contract Administrator.

TI.28 ASSIGNMENT & SUBLETTING

A. The work, to be performed under this Contract, or any part thereof, shall not be assigned or sublet by the Contractor without the written permission of the Owner. It is further agreed that the said written authority shall not, under any circumstances, relieve the Contractor of their liabilities and obligations under this Contract.

TI.29 PROJECT SCHEDULE

A. Time is of the essence on this project. Hours of work will be a minimum of 8 hours per day, 5 days per week, Monday to Friday. Any additional expenses, including overtime, to meet this schedule and completion date will be the responsibility of the Contractor and are to be included in the Contractor's Tender Price.

B. Work must begin as soon as possible after award of contract, no later than **July 22nd, 2024,** with completion date of **August 16th, 2025.** The total construction period allowed is twenty-eight (28) weeks, with a winter shutdown.

C. In order to expedite construction, the Contractor shall attend a Construction Prestart meeting with the Town of Blind River, at the Town of Blind River Municipal Office on July 16th, 2024 at 1:30pm. Additionally, the Contractor shall attend a Public Open House, at the Town of Blind River Municipal Office, on July 18th, 2024 from 2pm to 8pm, to address any questions raised by the Public regarding construction operations.

D. Concrete works may require cold weather protection, which is the responsibility of the contractor to provide.

E. Asphalt paving must be completed outside cold weather windows; therefore the Contractor

must schedule their works accordingly. No paving will be permitted outside of the applicable weather standards, or any later than November 15, 2024.

F. The roadway shall not be left as gravel for the winter shutdown. Surface paving in areas of work must be completed to protect concrete curb and gutter.

G. The Contractor shall work expeditiously to complete the reconstruction works between Woodward Avenue and Murray Street, excluding Murray Street intersection, prior to a proposed winter shutdown.

H. The Contractor shall leave the site for the winter shutdown in a manner acceptable to the Owner and the Engineer and restart no later than June 1st, 2024 to complete the works no later than August 16th, 2025.

TI.30 CLEANING UP

A. After all work is completed, the site of the work shall be cleared of all remaining materials, waste, etc., and left in a neat and tidy condition to the satisfaction of the Owner and Engineer.

TI.31 DRAWINGS & SPECIFICATIONS

A. The drawings and specifications form a part of the official contract. One complete copy of all contract documents in good order shall be kept by the Contractor at the site of work.

B. The Engineer may furnish additional drawings to clarify the work; such drawings shall become part of the contract documents.

TI.32 CONDUCT OF CONTRACT

A. During the course of the execution of the contract, should any discrepancies appear, or differences of opinion or misunderstanding arise as to the meaning of the contract, or of the specifications, or as to the due and proper execution of the work, or as to any other questions or matters arising out of the contract, the same shall be determined by the Engineer, whose decision shall be final and binding upon all parties concerned, and from it there shall be no appeal.

TI.33 LIABILITY INSURANCE

A. The Contractor shall at their own expense, procure and maintain liability insurance in accordance with GC6.0 of the General Conditions of OPSS MUNI 100 and the requirements set out below. The insurance shall be entirely comprehensive for all phases of the work

pertaining to this contract.

a. Contractor's Public Liability and Property Damage for bodily injury or property damage, not less than $5,000,000.00.
b. Automobile Public Liability and Property Damage for bodily injury or property damage, not less than $5,000,000.00.
c. Have a limit of not less than $5,000,000.00 inclusive for any one occurrence.
d. Be Comprehensive Liability Insurance covering all operations and liability assumed under contract with the Municipality.
e. Not contain any exclusions or limitations in respect of shoring, underpinning, raising or demolition of any building or structure or subsidence of any property, structure subsidence of any property, structure or land from any cause.
f. Include insurance against liability for bodily injury and property damage caused by vehicles owned by the contractor and used on the work, and in addition, shall include insurance against liability for bodily damage caused by vehicles not owned by the contractor and used on the work. Each insurance shall have a limit of liability of not less than $5,000,000.00 inclusive for any occurrence. A vehicle shall be as defined in the Highway Traffic Act.
g. Be endorsed to provide that the policy or policies will not be altered, cancelled or allowed to lapse within 30 days prior written notice to the Municipality.
h. Protect the insured from any losses arising out of contractual liabilities and completed operations. The policy shall name the Owner and the Engineer as "additional Insureds" and shall contain a cross-liability clause insuring each person, firm or corporation in the same manner to the same extent as if a separate policy was issued to each, but not so as to increase the limits of the insurance company's liability.
i. Be kept in force for a period of 12 months from the date of substantial performance or until the work is accepted by the Owner and a Final Certificate has been issued, whichever is later.

B. The deductible amount or amounts in any insurance policy required by the Corporation pursuant to this contract shall be subject to the approval of the Corporation. In the event the Corporation does not accept the deductible amount as proposed by the Contractor, the Contractor shall provide insurance with a deductible amount acceptable to the Corporation.

C. The Contractor shall indemnify and save harmless the Owner and the Engineer from and against all claims, demands, loss, damages and costs resulting directly or indirectly from the performance of the work.

D. The certificate(s) of insurance and copies of insurance policy(ies), each naming the Owner and the Engineer as "additional Insureds", must be filed with the Town Clerk upon execution of the Contract.

TI.34 WORKPLACE SAFETY & INSURANCE BOARD

A. The **Successful Tenderer** shall furnish evidence of compliance with all requirements of the Workplace Safety & Insurance Act of Ontario. Such evidence shall include a Certificate of Good Standing issued prior to the execution of the contract, and further certificates issued prior to the release of the payment recommendations.

TI.35 RENEWAL OF INSURANCE AND WSIB

A. The **Successful Tenderer** will provide proof of valid Insurance and WSIB on each and every anniversary date of the policy during the life of this or any other contract with the Town of Blind River. Verification is to be sent to the Director of Public Services, Town of Blind River, 11 Hudson Street, Blind River, Ontario P0R 1B0.

TI.36 OCCUPATIONAL HEALTH AND SAFETY ACT

A. For purposes of the Occupational Health and Safety Act, the Contractor for this project will be designated as the Constructor and will have the responsibilities of the Constructor as set out in the current Act and its Regulations.

B. To this end the Ministry of Labour shall be notified of the commencement of work on the project, with copies of such notification to be forwarded to the Engineer.

C. The Contractor will agree to take responsibility for any health and safety violations as well as the cost to defend any charges as a result of any violation.

D. The Contractor will be required to furnish a copy of their Health & Safety Policy and proof of orientation of their staff.

TI.37 STATUTORY DECLARATION OF PAYMENTS, LIENS & LIABILITIES

A. Prior to the release of the Construction Act Holdback, the Contractor shall be required to complete a "Statutory Declaration of Payments, Liens and Liabilities" form.

TI.38 ENGINEER'S AUTHORITY

A. The Engineer may supervise all the work to the extent of ensuring the fulfillment of the contract and the completion of the work in accordance with the plans and specifications.

B. The Engineer shall determine the quantities of the several kinds of work which are to be paid for under contract and determine all questions relating to the said work and construction thereof. The Engineer shall in all cases decide every question which may arise

relative to the performance of the contract, and their estimate and findings shall be final.

C. The Engineer shall, within a reasonable time, render a decision on all claims by the contractor and all questions which may arise relative to the performance of the work, or the interpretation of the contract. The contractor shall at all times and at their own expense furnish all reasonable aid and assistance required by the Engineer or any Inspector for the proper inspection and examination of the work or part thereof.

D. The contractor, at their own expense, shall furnish samples for testing when required and shall furnish all reasonable facilities for the inspection of the material and workmanship. The contractor shall obey the directions and instructions of any Inspector and they shall be made in writing at the request of the Contractor.

E. Notwithstanding any inspection that the Corporation might carry out, the failure of the Engineer or the Inspector to condemn or object to any defective work or material shall not constitute a waiver of any specifications of the approval or acceptance of such defective work or material and, except as otherwise provided herein, the contractor shall be and remain liable for such defective work or material and any loss, costs, charges, or expenses in connection therewith.

TI.39 NOTICE TO THE ENGINEER

A. The contractor must notify the Engineer of their intention to begin work a minimum of two weeks prior to start of work.

TI.40 POWER OF OWNER TO COMPLETE WORK

A. Should the contractor become insolvent or at any time refuse to or neglect to supply sufficient properly skilled workers or materials of the proper quality, or fail in any respect at any time to prosecute the work with promptness or diligence, or fail in the performance of any agreements herein contained, such refusal, neglect, or failure being certified by the Engineer, the Owner shall be at liberty after three days written notice to the contractor to provide any such labor or materials, and to deduct the cost thereof from any money then due under the contract or thereafter to become due under the contract to the contractor. If the Engineer should notify the Owner that such refusal, neglect, or failure is sufficient grounds for such actions, the Owner shall also be at liberty to terminate the employment of the contractor for said work and to enter upon the premises and take possession for the purpose of completing the work under the contract, all materials, tools, and appliances thereof and employ any other persons to furnish the work.

B. In case of any discontinuance of the employment of the contractor, they shall not be entitled to receive further payments under the contract until the said work will be wholly finished, at which time, if the unpaid balance of the amount to be paid under the contract shall exceed such unpaid balance the contractor shall pay the difference to the Owner. The

expense incurred by the Owners as hereinafter provided either for furnishing materials or for finishing work, and any damage incurred through such default shall be audited and certified by the Engineer whose certificate shall be conclusive upon all parties.

TI.41 CONTRACTOR'S RESPONSIBILITY FOR DAMAGES

A. If The Contractor, agents, and all workers and persons employed by him/her, or under his/her control, including subcontractors, shall use due care that no person or property is injured and that no rights are infringed upon in the execution of the work, and the Contractor shall be solely responsible for all damages by whomsoever claimable in respect of any injury to persons or to lands, buildings, structures, fences, livestock, trees, crops, roadways, ditches, drains and water courses whether natural or artificial, or property of whatever description, and in respect of any infringement on any right, privilege, or work or any part thereof, or by any neglect, misfeasance or nonfeasance on the Contractor's part or on the part of any of their agents, workers, or persons employed by him/her, or under his/her control, including subcontractors and shall bear the full cost thereof, and shall at his/her own expense make such temporary provisions as may be necessary to ensure the avoidance on any such damage, injury, or menace to the persons and owners the uninterrupted enjoyment of all their rights, in and during the performance of the work, and the Contractor shall indemnify and save harmless the owners from and against all claims, demands, loss, costs, damages, actions, suits or other proceedings by whomsoever made, brought, or prosecuted in any manner based upon, occasioned by, or attributed to any such damage, injury, or infringement.

B. Notwithstanding the indemnity provision contained in this tender, where in the opinion of the Director of Public Services, the Contractor has failed to rectify any damage, injury, or infringement or has failed to adequately compensate any person for any damage, injury, or infringement for which the Contractor is responsible under this Contract, the Corporation, following notice in writing to the Contractor of its intention to do so, may withhold payment of monies due to the Contractor under this or any other contract until the Contractor has rectified such damage, injury, or infringement, or has paid adequate compensation for such damage, injury, or infringement provided however that the Corporation will not withhold such monies where there is a reasonable disagreement with respect to the rights of the party affected and the Contractor has given such person a reasonable time in which to take court action to establish the validity of the claim.

TI.42 FORFEITURE OF CONTRACT

A. In the event that the Contractor fails to carry out any of the obligations, covenants, and terms herein provided, whether by reason of strikes, force majeure, bankruptcy or insolvency, or for any reason, the Town may cause the operation to be carried out with its own or other forces and may charge the cost for so doing to the Contractor as against money owing to the Contractor or from the bond herein referred to.
If the Contractor:

- neglects or refuses to sign an agreement within seven (7) days of being advised in writing that their bid has been accepted;
- neglects or fails to commence Infrastructure Services of the date specified in the agreement;
- becomes bankrupt or insolvent or compound with their creditors;
- commits any act of insolvency;
- transfers, assigns, sublets or attempts to transfer, assign or sublet this contract or any part thereof, without consent of the Director of Public Services;
- fails in the opinion of the Director of Public Services after having been given seventy-two (72) hours written notice to execute the work or any part thereof in a sound and competent manner satisfactory in all respects in strict conformity with the contract. Then in each and every case, after seventy-two (72) hours written notice from the Director of Public Services to the Contractor, the Director of Public Services shall have full right and power, at his/her discretion, without process or action at law, to take over the whole contract, or any part or parts thereof specified in the said notice out of the hands of the Contractor. The Contractor upon receiving notice to that effect, shall vacate possession and give up said Infrastructure Services, on the part or parts thereof specified in the said notice, peaceably to the Director of Public Services, who may either relet the same to any other person or persons, with or without its previously being advertised or may employ workers and provide the necessary plant at the expense of the Contractor or may take any other steps as the Director of Public Services may consider necessary or advisable in order to secure the completion of the said contract to his satisfaction; and the Contractor and their surety in every case shall be liable for all damages, expenditures and extra expenditure, and for all additional cost of the work which may be incurred by reason thereof.

TI.43 GOVERNMENT REGULATIONS AND PERMITS

A. The Contractor(s) shall comply with all provisions of the rules, regulations and orders of Federal, Provincial, and Municipal Government agencies applicable to the work under this Contract. The Contractor(s) shall co-operate with the Corporation in promptly furnishing any information that may be required by such governmental agencies. It shall be the obligation of the Contractor(s) to keep themselves informed of these governmental rules, regulations, and orders and the Contractor(s) shall make the requirements of this article a part of any subcontract he/she may enter into. In addition, the Contractor(s) shall secure and provide, at their own expense, all other permits that may be necessary under any by-law of the appropriate municipality or any act of the Federal or Ontario Legislature or any regulation made under Federal or Provincial Authority.

FORM OF TENDER

FT.01 TENDER PRICE

A. Offer by - Contractor –

Address –

City/Province –

Postal Code –

Date -

To the **Corporation of the Town of Blind River**

We, the undersigned, having examined the site of the Work, having carefully investigated the conditions pertaining to the Work and having secured all the information necessary to enable us to submit a bona fide tender, and having inspected all the Contract Documents and Drawings, hereby agree to enter into a contract and to perform all the Work in accordance with the Contract Documents and Drawings to the satisfaction of the Engineer for the total tender price of:

_____

_____ ($).

FT.02 CONTINGENCIES

A. We agree that the tender price includes the contingency sum of **$ 300,000.00** and that no part of this sum shall be expended without the written direction of the Engineer, and any part not so expended shall be deducted from the tender price.

FT.03 QUANTITIES

A. The tender price is compiled from the Schedule of Tender Prices included hereinafter. The quantities in the schedule being approximate, we agree that the final valuation will be made on the basis of actual quantities measured during and on completion of the Work at the prices in the schedule.

FT.04 ADDITIONS AND DEDUCTIONS

A. We agree that the valuation of additions to, and deductions from, the contract shall be made as follows:

1. The unit prices in the Schedule of Tender Prices shall apply where appropriate.

2. If the prices in subsection 1 are not appropriate, valuation will be made by one of the following methods:
   (i) The Engineer may ask the Contractor for a quotation for the proposed work.

   (ii) If the quotation referred to in (i) above is not accepted by the Engineer, payment will be made on a Time and Material Basis according to GC 8.02.05. of the General Conditions.

FT.05 ADDENDA

A. We agree that we have received addenda __ to __ inclusive, and the tender price includes the provisions set out in such addenda.

FT.06 MEETINGS

A. We agree to attend both the Construction Prestart meeting on July 16th, 2024 at 1:30pm, at the Town of Blind River Municipal Office, as well as the Public Open House, at the Town of Blind River Municipal Office, on July 18th, 2024 from 2pm to 8pm.

FT.07 COMMENCEMENT

A. We agree to commence Work onsite no later than **July 22nd, 2024,** with the anticipated award date of **July 15th, 2024.**

FT.08 COMPLETION

A. We agree to complete all construction works from Woodward Avenue to Murray Street, including paving, expeditiously up to winter shutdown, with final completion no later August 16th, 2025. The Contractor is to allow for ramping of asphalt if the surface is not completed by the November 15th, 2024, no-pave deadline. Winter shutdown date is flexible based on weather conditions; however, all work must be completed within a 28-week combined construction period.

FT.09 LIQUIDATED DAMAGES

A. We agree that in case all Work called for under the Contract is not finished or completed within the Date of Completion specified aforementioned to or as extended in accordance with subsection GC3.06, Extension of Contract Time, of the General Conditions of Contract a loss or damage will be sustained by the Owner. We agree that the Contractor will pay to the Owner the sum of **$1,500.00** as liquidated damages for each and every working day delay to finish the work beyond the date of completion prescribed. We agree that this amount is an estimate of the actual loss or damage to the Owner which will accrue during the period in excess of the prescribed date of completion.

FT.10 SCHEDULE OF TENDER PRICES

This Schedule is referred to in Clause FT.03 above.

Item No.	Description	Estimated Quantity	Units	Unit Price	Item Amount
MISC LANEOUS ITEMS					
1	Mobilization/Demobilization	Sum			$
2	Bonding	Sum			$
3	Traffic Control	Sum			$
4	Contingency	Sum			$ 300,000.00
5	Subsurface Utility Investigations	Sum			$ 15,000.00
6	Soils Investigations and Remediations	Sum			$ 10,000.00
REM S ITEMS					
7	Asphalt Pavement Removal, Full Depth	6,260	m²		
8	Asphalt Pavement Removal, Partial Depth (Milling)	20	m²		
9	Concrete Curb & Gutter Removal	61	m		
10	Concrete Sidewalk Removal	1,045	m²		
11	Paving Stone Sidewalk Removal	12	m²		
12	Steet Light and Overhead Wire Removal	Sum			$
13	Existing Watermain & Appurtenance Removal	Sum			$
14	Existing Sanitary Sewer & Appurtenance Removal	Sum			$
15	Existing Storm Sewer & Appurtenance Removal	Sum			$
STO WER					
16	CB2 - Precast Catch Basin, 600x600mm	Sum			$
17	CB3 - Precast Catch Basin, 600x600mm	Sum			$
18	CB4 - Precast Catch Basin, 600x600mm	Sum			$
19	CB5 - Precast Catch Basin, 600x600mm	Sum			$
20	CB6 - Precast Catch Basin, 600x600mm	Sum			$
21	CB7- Precast Catch Basin, 600x600mm	Sum			$
22	CB8 - Precast Catch Basin, 600x600mm	Sum			$
23	CB9 - Precast Catch Basin, 600x600mm	Sum			$
24	CB10 - Precast Catch Basin, 600x600mm	Sum			$
25	CB11 - Precast Catch Basin, 600x600mm	Sum			$
26	CB12 - Precast Catch Basin, 600x600mm	Sum			$
27	CBMH13 - Precast Catch Basin Maintenance Hole, 1200mmØ	Sum			$

Item No.	Description	Estimated Quantity	Units	Unit Price	Item Amount
28	CBMH14 - Precast Catch Basin Maintenance Hole, 1200mmØ	Sum			$
29	DICB15 - Precast Ditch Inlet Catch Basin, 600x600mm	LumSum			$
30	DICB16 - Precast Ditch Inlet Catch Basin, 600x600mm	LumSum			$
31	CB17 - Remove, Salvage and Relocate	Sum			$
32	300mmØ HDPE Storm Sewer Outlet CB2 to Existing CB505	8.6	m		
33	300mmØ HDPE Storm Sewer - CB3 to CB2	29.6	m		
34	300mmØ HDPE Storm Sewer - CB4 to CB5	9.8	m		
35	300mmØ HDPE Storm Sewer - CB5 to CB3	29.1	m		
36	300mmØ HDPE Storm Sewer - CB7 to CB5	51.4	m		
37	300mmØ PVC Storm Sewer - CB6 to CB7	7.8	m		
38	300mmØ PVC Storm Sewer - CB9 to CB7	25.1	m		
39	300mmØ PVC Storm Sewer - CB8 to CB9	7.8	m		
40	300mmØ PVC Storm Sewer - CB10 to CB11	7.8	m		
41	300mmØ PVC Storm Sewer - CB11 to CBMH13	90.5	m		
42	300mmØ PVC Storm Sewer - CB12 to CBMH13	9.3	m		
43	450mmØ PVC Storm Sewer - CBMH13 to CBMH14	41.9	m		
44	300mmØ PVC Storm Sewer - DICB15 to DICB16	13.9	m		
45	450mmØ PVC Storm Sewer - DICB16 to CBMH13	6.6	m		
46	600mmØ PVC Storm Sewer CBMH14 to Existing STMH11	40.8	m		
47	Adjust Existing Catch Basin Maintenance Hole STMH11	Sum			$
48	Sump & Weeping Tile Connections	100	m		
49	Rock Trenching - Storm Sewer ($\geq$ 5m from Gas Line	215	m		
50	Rock Trenching - Storm Sewer (< 5m of Gas Line)	15	m		
SANI Y SEWER					
51	Sanitary Sewer Bypass System	Sum			$
52	SAMH20 - Precast Maintenance Hole, 1200mmØ	Sum			$
53	SAMH21 - Precast Maintenance Hole, 1200mmØ	Sum			$
54	SAMH22 - Precast Maintenance Hole, 1200mmØ	Sum			$
55	Adjust Sanitary Maintenance Hole - SAMH19	Sum			$
56	200mmØ PVC DR35 Sanitary Sewer SAMH19 to Ex. SAMH (Causley)	70.2	m		

Item No.	Description	Estimated Quantity	Units	Unit Price	Item Amount
57	200mmØ PVC DR35 Sanitary Sewer SAMH20 to SAMH21	61.2	m	$	$
58	200mmØ PVC DR35 Sanitary Sewer SAMH21 to SAMH22	48.6	m	$	$
59	200mmØ PVC DR35 Sanitary Sewer SAMH22 to Ex. SAMH9	75.7	m	$	$
60	Sanitary Service Connection & Appurtenances	21	ea	$	$
61	Rock Trenching - Sanitary Sewer (≥ 5m from Gas Line)	225	m	$	$
62	Rock Trenching - Sanitary Sewer (< 5m of Gas Line)	165	m	$	$
WAT AIN					
63	Temporary Potable Water Supply Services	Sum			$
64	Connection to Town's Watermain System	3	ea		
65	150mmØ PVC DR18 Watermain	11	m		
66	200mm x 250mm Reducer	1	ea		
67	250mmØ Coupler	1	ea		
68	250mmØ Cap	1	ea		
69	250mmØ Gate Valve	2	ea		
70	250mm x 250mm x 250mm Ø PVC Tee	1	ea		
71	250mm x 250mm x 150mm Ø PVC Tee	2	ea		
72	250mmØ PVC Elbow - 11¼°	2	ea		
73	250mmØ PVC Elbow - 45°	2	ea		
74	250mmØ PVC DR18 Watermain	415	m		
75	300mmØ Cap	2	ea		
76	300mmØ Gate Valve	2	ea		
77	300mm x 300mm x 300mm Ø PVC Tee	1	ea		
78	300mmØ PVC Elbow - 45°	9	ea		
79	300mmØ PVC Elbow -90°	1	ea		
80	300mmØ PVC DR18 Watermain	655	m		
81	400mm x 400mm x 300mm Ø PVC Tee	1	ea		
82	400mmØ Gate Valve	1	ea		
83	Fire Hydrant & Valve Installation	2	ea		
84	Air Release Valves - 250mmØ Watermain	1	ea		
85	Air Release Valves - 300mmØ Watermain	2	ea		

Item No.	Description	Estimated Quantity	Units	Unit Price	Item Amount
86	19mmØ Water Service Connection & Appurtenances	27	ea	$	$
87	50mmØ Water Service Connection & Appurtenances	1	ea	$	$
88	Extruded Expanded Polystyrene - 25mm Thickness	200	m^2	$	$
89	Rock Trenching - Water Main	282	m	$	$
90	Rock Trenching - Water Services ($\geq$ 5m from Gas Line)	85	m	$	$
91	Rock Trenching - Water Services (< 5m of Gas Line)	95	m	$	$
ROA AY					
92	Earth Excavation - Grading, Roadway	2,775	m^3		
93	Rock Excavation - Grading Roadway	230	m^3		
94	Pipe Subdrain - 150mmØ	780	m		
95	Geotextile	4,150	m^2		
96	Geogrid	4,150	m^2		
97	Granular “B”, Roadway (In-Place)	1,250	m^3		
98	Granular “A”, Roadway (In-Place)	625	m^3		
99	HL8 Hot Mix Asphalt - Base Course	545	tonne	$	
100	HL3 Hot Mix Asphalt - Surface Course	440	tonne	$	
101	HL3 Hot Mix Asphalt - Temporary Surface Course	330	m^2		
102	HL3 Hot Mix Asphalt - Driveway & Boulevards	275	m^2		
103	Tack Coat	4,150	m^2		
104	Concrete Curb & Gutter	780	m		
105	Reinforced Concrete Curb & Gutter	34	m		
106	Concrete Sidewalk	1,040	m^2		
107	Reinforced Concrete Sidewalk (200mm Thickness)	30	m^2		
108	Concrete Walkways	11	m^2		
109	Tactile Indicators	10	ea		
110	Pedestrian Crossover System	Sum			$
111	Pavement Markings, Pedestrian Crossover System	Sum			$
112	Pavement Markings, 10cm Yellow Solid	450	m		
113	Pavement Markings,10cm White Solid	73	m		
114	Pavement Markings,10cm White Dashed	30	m		
115	Pavement Markings,25cm White Solid	55	m		

Item No.	Description	Estimated Quantity	Units	Unit Price	Item Amount
116	Pavement Markings, Stop Blocks 60cm	4	ea	$	$
117	Pavement Markings, Directional Arrows	2	ea	$	$
118	Restore Retaining Walls & Gardens	Sum			$
119	Topsoil & Sod	1,850	m²		

SUBTOTL MISCLLNEOUS ITE	$
SUBOTAREOVALS ITE	$
SUBTOATORM SEW R	$
SUBTOTAATARY SEW R	$
SUBTTL WATERMA N	$
SUB TAL ROADY	$
CONTRACT VALE	$
HST (13)	$
TO TNDER PRI	$

Defitions: ea – each, m – Linear Metres, m2 Square Metres, m³ - Cubic Metres

OFFERED ON BEHALF
OF THE CONTRACTOR

_____

COMPANY NAME

_____

SIGNATURE

CONTRACTOR'S SEAL

_____

SIGNATURE

_____

WITNESS

_____

COMPANY STREET ADDRESS

_____

CITY, PROVINCE, POSTAL CODE

_____

DATE OF OFFER

TENDERER'S EXPERIENCE ON SIMILAR PROJECTS

Similar projects where Tenderer acted as prime or subcontractor.

SUBCONTRACTORS TO BE EMPLOYED

TRADE	SUBCONTRACTOR (Name & Address)	VALUE

TENDERER'S STAFF AND EQUIPMENT

STAFF (Please indicate designated on site superintendent)

EQUIPMENT

EQUIPMENT TO BE USED	OWNED OR RENTED

AGREEMENT BETWEEN OWNER & CONTRACTOR

THIS AGREEMENT made ON THE ____ Day of _____ **2024**

by and between:

The Corporation of the Town of Blind River

(hereinafter called the "Owner")

- and

(hereinafter called the "Contractor")

The Owner and the Contractor agree as follows:

ARTICLE 1 - THE WORK

A general description of the work is:

(a) Sanitary sewer, storm sewer, and watermain replacement through conventional methods and full street reconstruction including concrete curbs, sidewalks, and asphalt paving along Huron Street from Highway 17 to Woodward Avenue, including intersecting streets, as well as a new pumping station and pipeline to convey raw water from Lake Huron to the existing raw water intake pipeline at Berthelot Street.

(b) The Contractor shall, for the prices set out in the Form of Tender and except as otherwise specifically provided, provide at no additional cost to the Owner all and every kind of labour, machinery, plant, structures, roads, ways, materials, appliances, articles and things necessary for the due execution and completion of all the work set out in these Contract Documents and shall forthwith according to the instructions of the Engineer, commence the works and diligently execute the respective portions thereof, and deliver the works complete in every particular to the Owner within the time specified in the Contract Documents.

ARTICLE 2 - CONTINGENCY ALLOWANCE

In the event that the Form of Tender provides for and contains a Contingency Allowance, it is understood and agreed that such Contingency Allowance is merely for the convenience of accounting by the Owner, and the Contractor is not entitled to payment thereof except for extra or additional work carried out by the Contractor as directed by the Engineer and in accordance with the Contract Documents and only to the extent of such extra or additional work.

ARTICLE 3 - CONFLICT

In case of any inconsistency or conflict between the provisions of this Agreement and the Contract Documents and Drawings the Provisions of such documents shall take precedence and govern according to subsection GC2.02 of the General Conditions as detailed following:

(a) Agreement
(b) Addenda
(c) Special Provisions
(d) Contract Drawings
(e) Standard Specifications
(f) Standard Drawings
(g) Instructions to Tenderers
(h) Tender
(i) Supplemental General Conditions
(j) General Conditions
(k) Working Drawings

ARTICLE 4 - AMENDMENTS

The Contract may be amended only as provided in the Contract Documents.

ARTICLE 5 - CONTRACT PRICE

The Owner covenants with the Contractor that the Contractor having in all respects complied with the provisions of this Contract, will be paid for and in respect of the work the sum of**:**

_____ ($_____)

subject to Article 2 hereof and subject to such additions and deductions as may properly be made under the terms hereof, subject to the provision that the Owner may make payments on account monthly or otherwise as may be provided in the General Conditions attached hereto.

ARTICLE 6 - ADDRESSES FOR NOTICES

Notices in writing between the parties or between them and the Engineer shall be considered to have been received by the addressee on the date of delivery if delivered to the individual, or to a member of the firm, or to an officer of the corporation for whom they are intended by hand or by registered post; or if sent by regular post, to have been delivered within 5 Working Days of the date of mailing when addressed as follows:

The Owner at **The Corporation of the Town of Blind River**
Owner's Name

11 Hudson Street
Street and Number and Postal Box Number if Applicable

Blind River, Ontario, P0R 1B0
Post Office or District, Province, Postal Code

The Contractor at _____
Contractor's Name

_____
Street and Number and Postal Box Number if Applicable

_____
Post Office or District, Province, Postal Code

The Engineer at **TULLOCH Engineering Inc.**
Engineering Company

P.O. Box 579, 200 Main Street
Street and Number and Postal Box Number if Applicable

Thessalon, Ontario, P0R 1L0
Post Office or District, Province, Postal Code

ARTICLE 7 - CONTRACT DOCUMENTS

A copy of each of the Specifications, General Conditions, Supplemental General Conditions, Special Provisions, Form of Tender, Tendering Information and Contract Drawings hereto annexed and together with Issued for Tender Drawings 23-0821-C1, 23-0821-C2, 23-0821-C3, 23-0821-C4, 23-0821-C5, 23-0821-C6, and 23-0821-C7, 23-0821-C8, 23-0821-C9 sealed June 18, 2024, are made part of this Contract as fully to all intents and purposes as though recited in full herein.

ARTICLE 8 - EXPRESSED COVENANTS

No implied contract of any kind whatsoever by or on behalf of the Owner shall arise or be implied by or inferred from anything in this Contract contained, nor from any position or situation of the parties at any time, it being clearly understood that the express covenants and agreements herein contained made by the Owner shall be the only covenants and agreements upon which any rights against the Owner may be founded.

ARTICLE 9 - TIME OF THE ESSENCE

Time shall be deemed the essence of this Contract.

ARTICLE 10 – CONTRACTOR'S RESPONSIBILITY

The Contractor declares that in tendering for the works and in entering into this Contract they have either investigated for themselves the character of the work and all local conditions that might affect their tender or their acceptance or performance of the work, or that not having so investigated, they acknowledge that their responsibility under the Contract is in no way reduced or limited thereby and, in either case, they are willing to assume and does hereby assume all risk of conditions arising, developing, or being revealed in the course of the work which might or could make the work, or any items thereof, more expensive in character, or more onerous to fulfill, than was contemplated or known when the tender was made or the Contract signed. The Contractor also declares that they did not and does not rely upon information furnished by any methods whatsoever by the Owner or its officers, employees or agents, being aware that any information from such sources was and is approximate and speculative only, and was not in any manner warranted or guaranteed by the Owner.

ARTICLE 11 - SUCCESSION

The Contract shall apply to and be binding on the parties hereto and their successors, administrators, executors and assigns and each of them.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals the day and year first above written or caused their corporate seals to be affixed, attested by the signature of their proper officers, as the case may be.

SIGNED AND DELIVERED
in the presence of:

OWNER

The Corporation of the Town of Blind River
Owner's name

signature

name and title of person signing

WITNESS

signature

name and title of person signing

signature

name and title of person signing

CONTRACTOR

Contractor's name

signature

name and title of person signing

WITNESS

signature

name and title of person signing

signature

name and title of person signing

LIST OF OPSS & OPSD APPLICABLE TO CONTRACT

The Ontario Provincial Standard Specifications (OPSS) listed below and those referenced therein form part of the Contract Documents. Specifications listed following can be downloaded at: https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/opsViews.aspx

OPSS	VOLUME	ABBREVIATED TITLES	DATE
100	7	General Conditions of Contract	NOV 2019
102	7	Weighing of Materials	NOV 2018
120	7	Use of Explosives	NOV 2019
127	5	Rental Rates for Construction	APR 2024
180	7	Management and Disposal of Excess Material	NOV 2021
201	7	Clearing, Close Cut Clearing, Grubbing	APR 2019
206	7	Grading	APR 2019
308	5	Tack Coating & Joint Painting	JUL 2023
310	7	Hot Mix Asphalt	NOV 2017
311	7	Asphalt Boulevard	NOV 2018
314	7	Granulars	NOV 2023
351	7	Concrete Sidewalk	NOV 2021
353	7	Concrete Curb & Gutter Systems	NOV 2021
355	7	Interlocking Concrete Pavers	NOV 2020
401	7	Trenching, Backfilling and Compacting	NOV 2021
402	7	Excavating, Backfilling, and Compacting for MH's & CB's	NOV 2023
403	7	Rock Excavation - Pipelines, Utilities & Structures, Open Cut	NOV 2023
405	7	Pipe Subdrains	NOV 2017
407	7	Maintenance Hole and Catch Basin Installation	NOV 2021
408	7	Adjusting or Rebuilding MH's, CB's, DI's and VC's	NOV 2021
409	7	CCTV Inspection of Pipelines	NOV 2023
410	7	Pipe Sewer Installation in Open Cut	NOV 2018
441	7	Watermain Installation in Open Cut	NOV 2021
442	7	Corrosion Protection of Watermains	NOV 2020
490	7	Site Preparation for Pipelines	NOV 2020
491	7	Preservation & Protection of Existing Facilities	NOV 2017
492	7	Site Restoration	NOV 2020
493	7	Temporary Potable Water Supply Services	NOV 2019
501	7	Compacting	NOV 2017

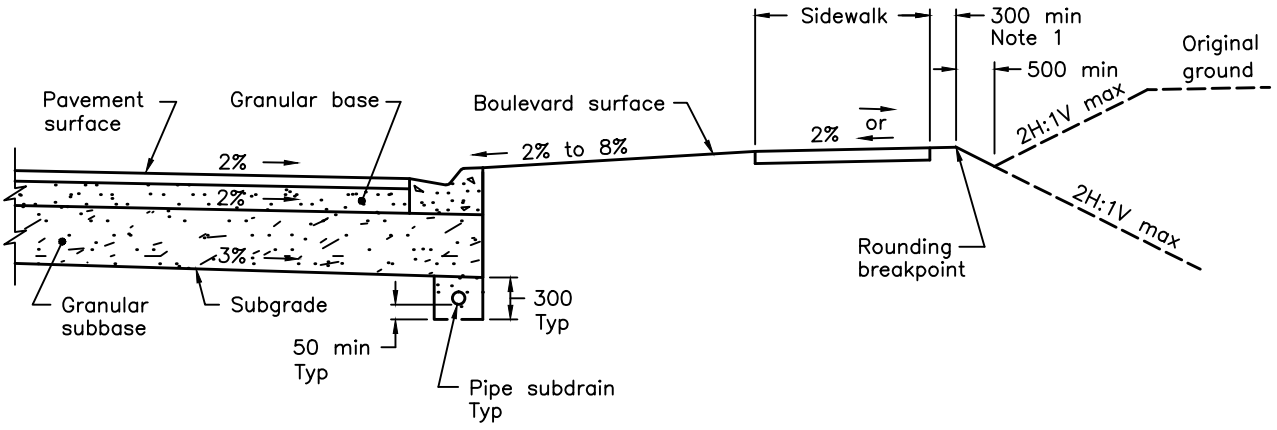
506	7	Dust Suppressants	NOV 2017
	7	Removals	NOV 2018
	7	Dewatering	NOV 2021
	7	Temporary Protection Systems	NOV 2021
	7	Installation of Poles	NOV 2022
	7	Permanent Small Signs and Support Systems	APR 2019
	7	Temporary Traffic Control Devices	APR 2018
	7	Pavement Marking	NOV 2021
	7	Topsoil	NOV 2019
	7	Sodding	APR 2018
	7	Temporary Erosion & Sediment Control Measures	NOV 2021
	7	Formwork	NOV 2021
01	8	Aggregates - General	NOV 2021
02	8	Aggregates - Concrete	NOV 2013
03	8	Aggregates - Hot Mix Asphalt	NOV 2013
04	8	Aggregates - Miscellaneous	NOV 2021
10	8	Aggregates - Granular A, B, M & Select Subgrade	NOV 2013
01	8	Performance Graded Asphalt Cement (PGAC)	NOV 2016
03	8	Emulsified Asphalt	NOV 2019
50	8	Hot Mix Asphalt	NOV 2020
01	8	Cementing Materials	NOV 2018
02	8	Water	NOV 2019
08	8	Joint Filler in Concrete	NOV 2019
50	8	Concrete – Materials and Production	NOV 2023
51	8	Precast Concrete Components	NOV 2019
40	8	Steel Reinforcement for Concrete	NOV 2016
05	8	Extruded Expanded Polystyrene Insulation	NOV 2018
16	8	Water-Borne Traffic Paint	NOV 2021
50	8	Traffic Paint Reflectorizing Glass Beads	NOV 2021
40	8	Non-Pressure Polyethylene (PE) Plastic Pipe Products	NOV 2019
41	8	Non-Pressure Polyvinyl Chloride (PVC) Pipe Products	NOV 2019
42	8	Pressure Polyethylene Pipe Products	NOV 2020
50	8	Frame, Grates, Covers and Gratings	NOV 2020

1860 8 Geotextiles NOV 2018

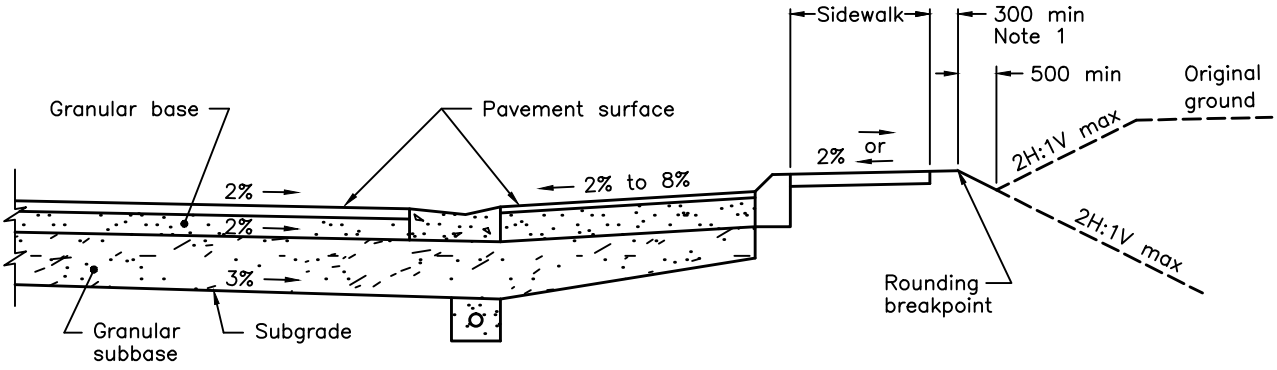
The Ontario Provincial Standard Drawings (OPSD) listed below and those referred therein form part of the Contract Drawings. Drawings listed following can be downloaded at:
https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/opsViews.aspx

OPSD No.	ABBREVIATED TITLES	REVISION
216.010	Boulevard Treatments – Urban Section	2
216.020	Asphalt on Granular Base – Urban Section	2
216.021	Subdrain Pipe – Urban Section	3
219.110	Light-Duty Silt Fence Barrier	3
310.010	Concrete Sidewalk	3
310.020	Concrete Sidewalk Adjacent to Curb with Gutter	3
310.039	Tactile Walking Surface Indicators	1
310.050	Concrete Sidewalk – Entrance Details	3
350.010	Urban Entrances	2
351.010	Urban Residential Entrances	2
400.020	Cast Iron, Square Frame, Square Flat Grate for CB's & MH's	3
401.010	Cast Iron, Square Frame, Circular Closed Cover for MH's	4
403.010	Galvanized Steel Honeycomb Grating, Ditch Inlets	3
405.020	Maintenance Hole Steps, Solid	4
561.010	Interlocking Concrete Pavers	2
600.040	Concrete Barrier Curb with Standard Gutter	2
600.100	Concrete Mountable Curb with Narrow Gutter	2
608.010	Termination of Concrete Curb with Gutter	2
701.010	Precast MH, 1200mm Diameter	5
701.021	Maintenance Hole Benching	4
701.030	MH Components, 1200mm Diameter Tapered Top & Flat Cap	4
701.031	MH Components, 1200mm Diameter Riser & Base	2
701.032	MH Components, 1200mm Diameter Base Slab	2
701.100	Frost Strap Installations	3
704.010	Precast Concrete Adjustment Units for MH & CB's	3
705.010	Precast Concrete Catch Basin, 600 x 600 mm	4
705.030	Precast Concrete Ditch Inlet, 600 x 600 mm	4
802.010	Flexible Pipe Embedment and Backfill, Earth Excavation	3

802.013	Flexible Pipe Embedment and Backfill, Rock Excavation	3
1006.010	Sewer Service Connections for Main Pipe Service	4
1101.020	Valve Operator	4
1104.010	Water Service Connection Detail – 19 & 25mm Dia. Sizes	4
1104.020	Water Service Connection Detail – 32, 38 & 50mm Dia. Sizes	3
1105.010	Hydrant Installation	3
1109.011	Cathodic Protection for PVC Watermain	3
1109.025	Waterproofing of Splices	1
1109.030	Insulation for Sewers & Watermains in Shallow Trench	1



CUT AND FILL SECTION WITH BARRIER CURB



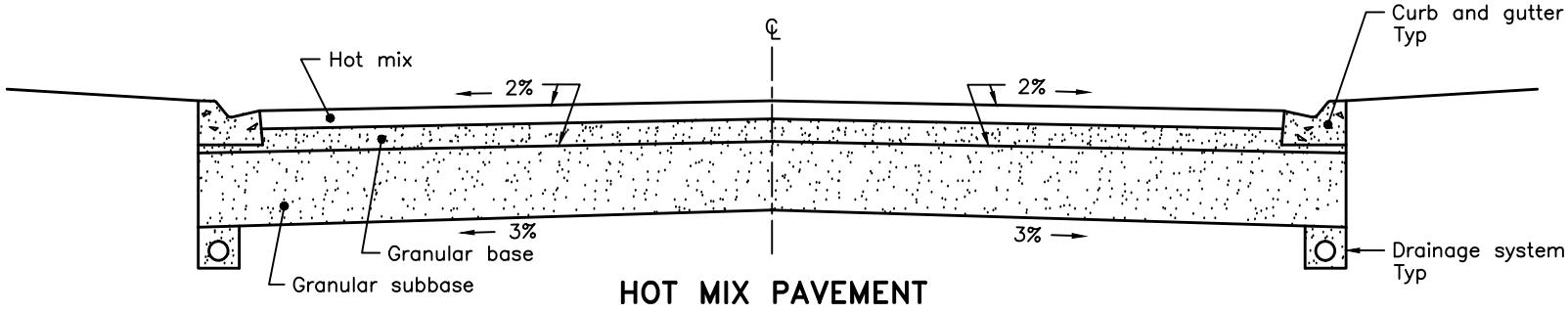
CUT AND FILL SECTION WITH MOUNTABLE CURB

NOTES:

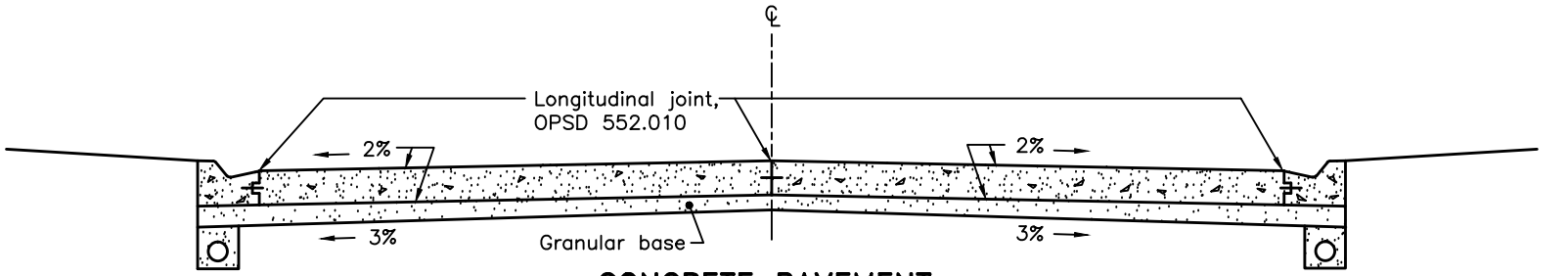
1 Where steel beam guide rail is indicated, the minimum rounding shall be 1.0m, with 0.5m required from edge of sidewalk to rounding breakpoint.

A All dimensions are in millimetres unless otherwise shown.

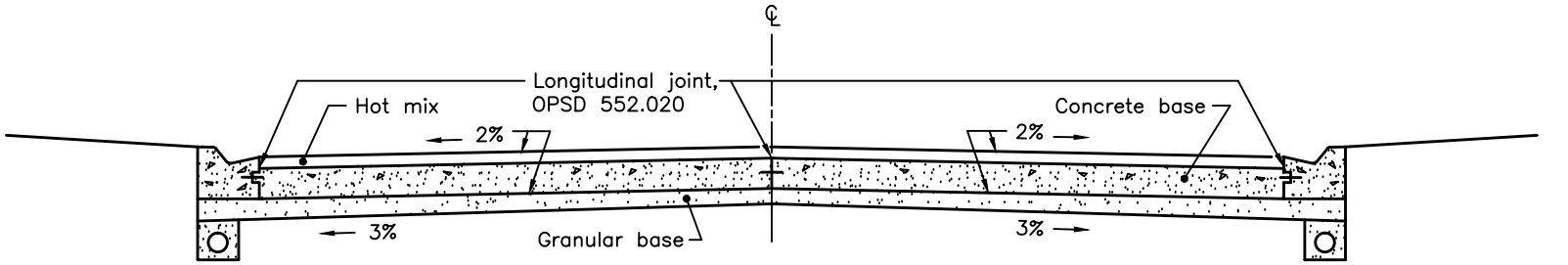
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	2
BOULEVARD TREATMENTS URBAN SECTION			
	OPSD 216.010		



HOT MIX PAVEMENT



CONCRETE PAVEMENT



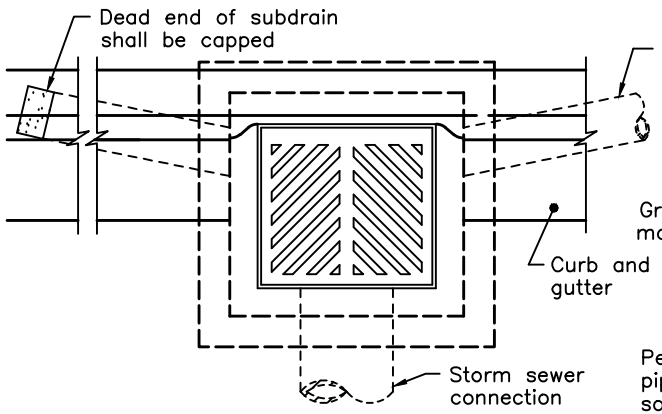
COMPOSITE PAVEMENT

NOTES:

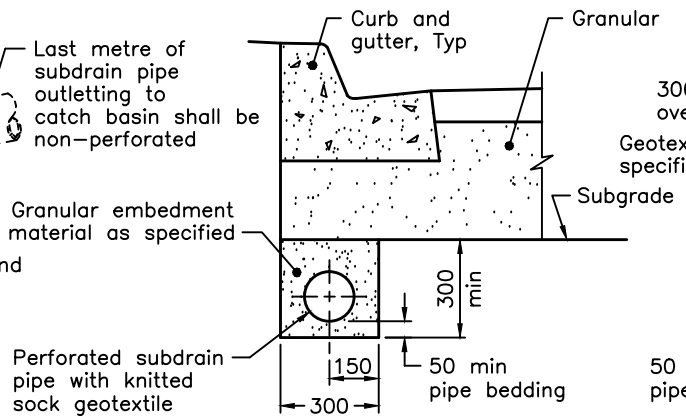
A Drainage system connection at every catch basin.

B Tie bars at all longitudinal joints.

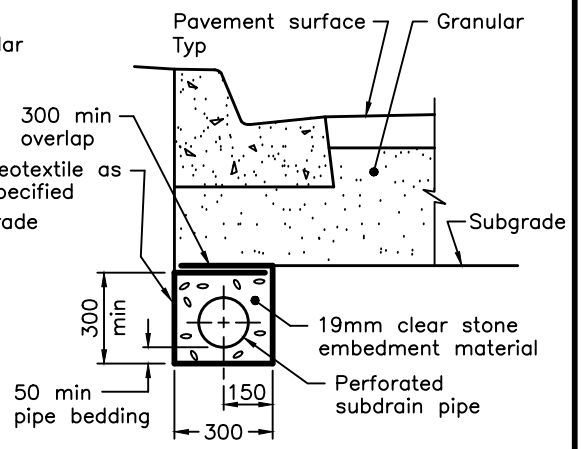
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	2
HOT MIX, CONCRETE, AND COMPOSITE PAVEMENT ON GRANULAR BASE URBAN SECTION			
	OPSD 216.020		



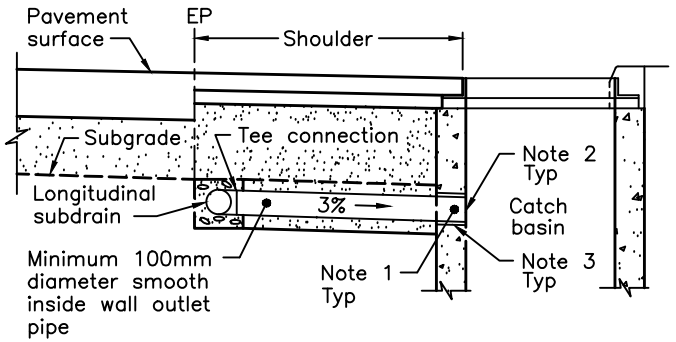
LONGITUDINAL SUBDRAIN CONNECTION TO CATCH BASIN



UNWRAPPED TRENCH



WRAPPED TRENCH



LATERAL SUBDRAIN OUTLET PIPE CONNECTION TO CATCH BASIN

NOTES:

1 Core hole diameter to allow outlet pipe into structure.

2 Install outlet pipe flush with inside face of catch basin.

3 Annular space around pipe shall be filled with non–shrink grout.

A Use compatible manufactured fittings for all connectors, couplings, and caps.

B Trench dimensions shown to accommodate 100 or 150mm diameter subdrain pipe.

C Longitudinal subdrain pipe shall be installed parallel to the grade of the gutter.

D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

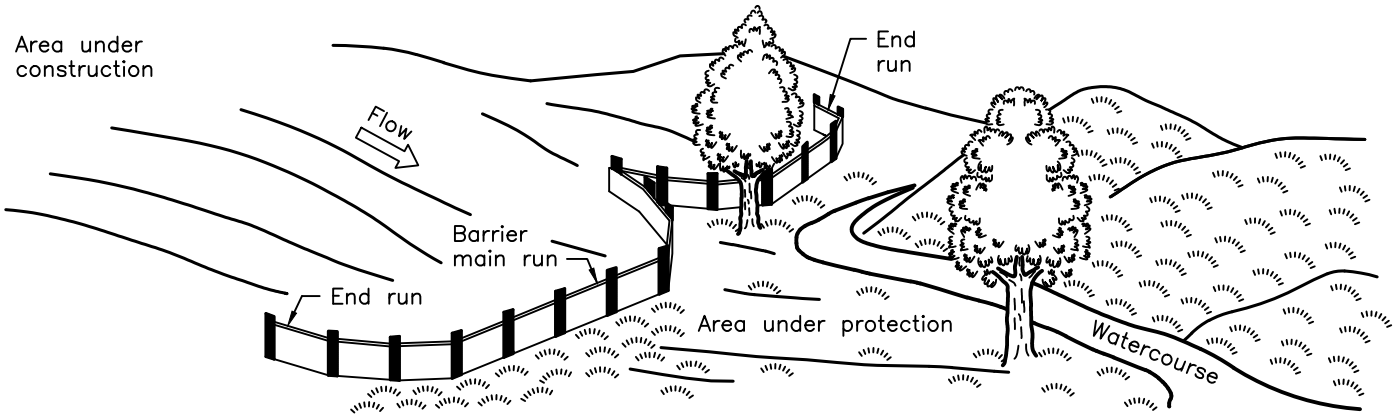
SUBDRAIN PIPE CONNECTION AND OUTLET

URBAN SECTION

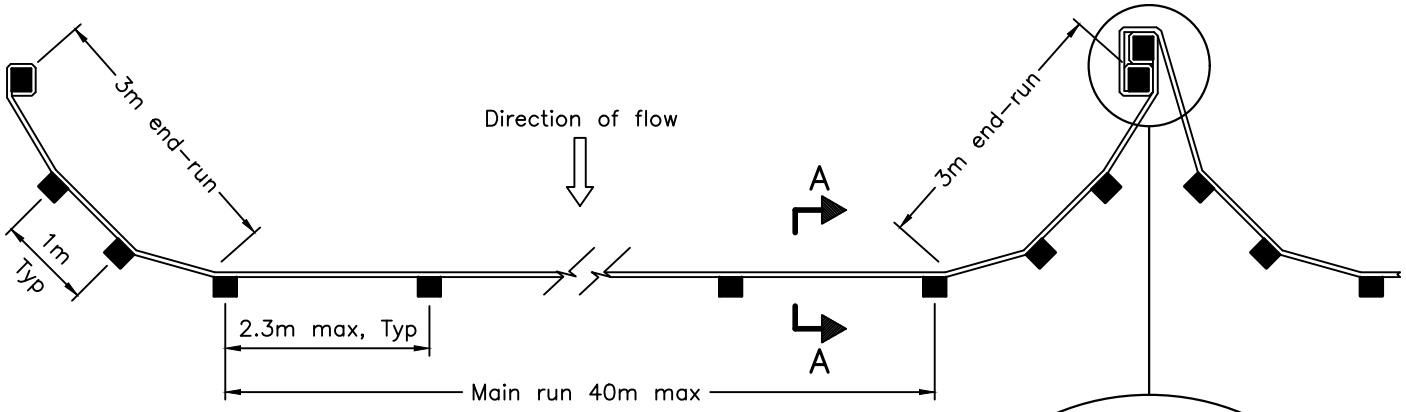
Nov 2017 | Rev 3

ONTARIO STANDARDS MUNICIPAL – PROVINCIAL

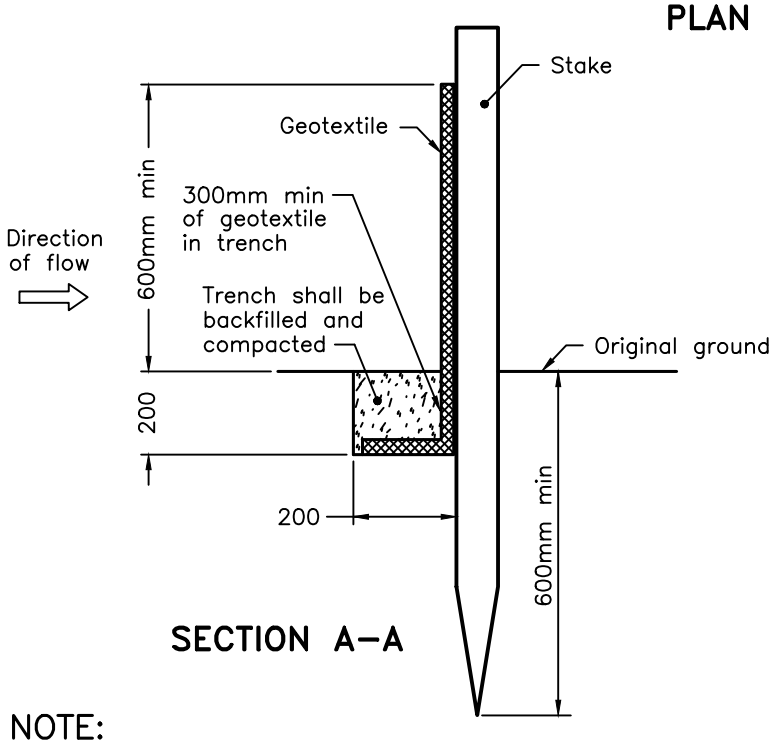
OPSD 216.021



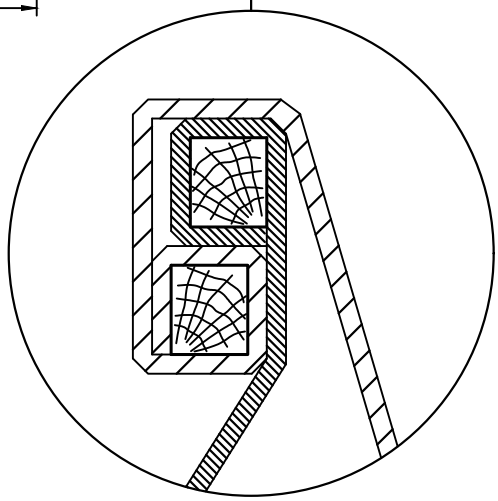
PERSPECTIVE VIEW



PLAN



SECTION A–A

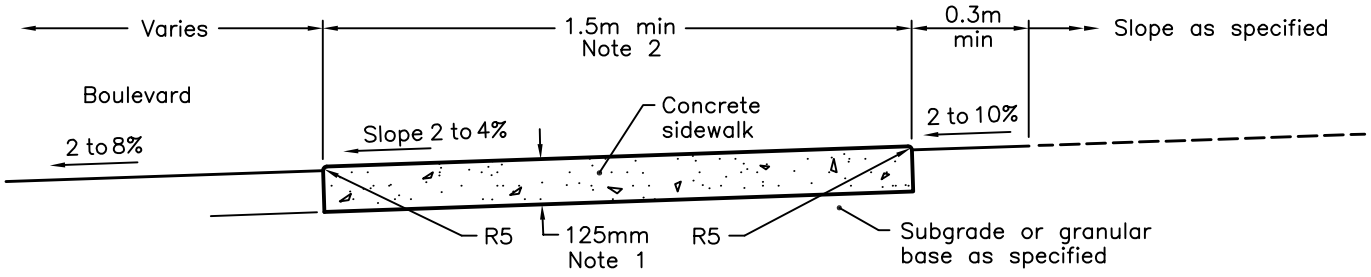


JOINT DETAIL

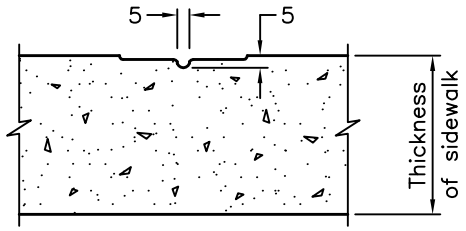
NOTE:

A All dimensions are in millimetres unless otherwise shown.

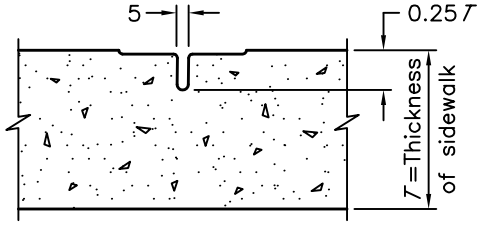
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev	3
LIGHT–DUTY SILT FENCE BARRIER			
	OPSD 219.110		



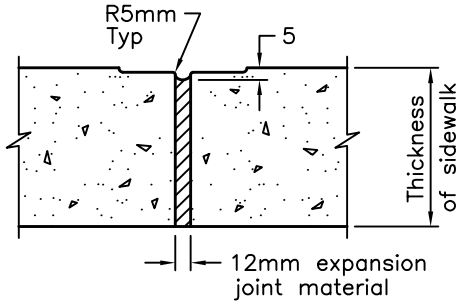
TYPICAL SECTION



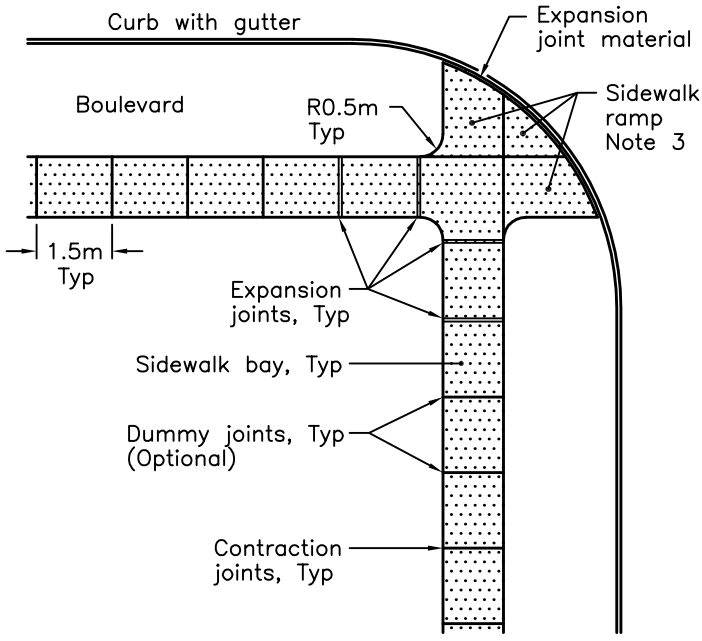
DUMMY JOINT (OPTIONAL)



CONTRACTION JOINT (Note 4)



EXPANSION JOINT



JOINT LAYOUT

NOTES:

1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.

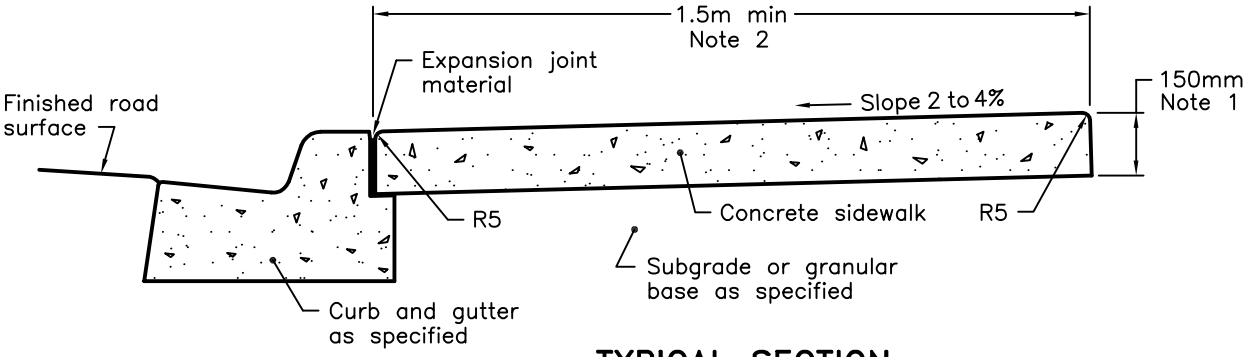
2 Sidewalk width shall be wider when specified.

3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.033, and 310.039.

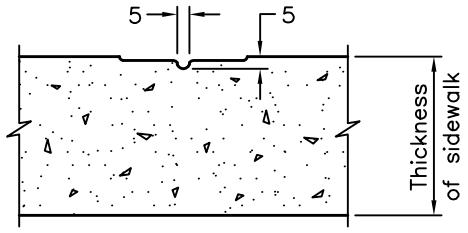
4 Contraction Joint may be tooled or sawcut.

A All dimensions are in millimetres unless otherwise shown.

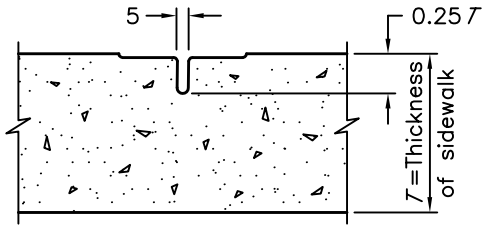
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	3
CONCRETE SIDEWALK			
		OPSD 310.010	



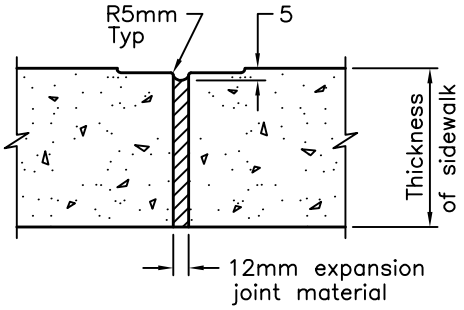
TYPICAL SECTION



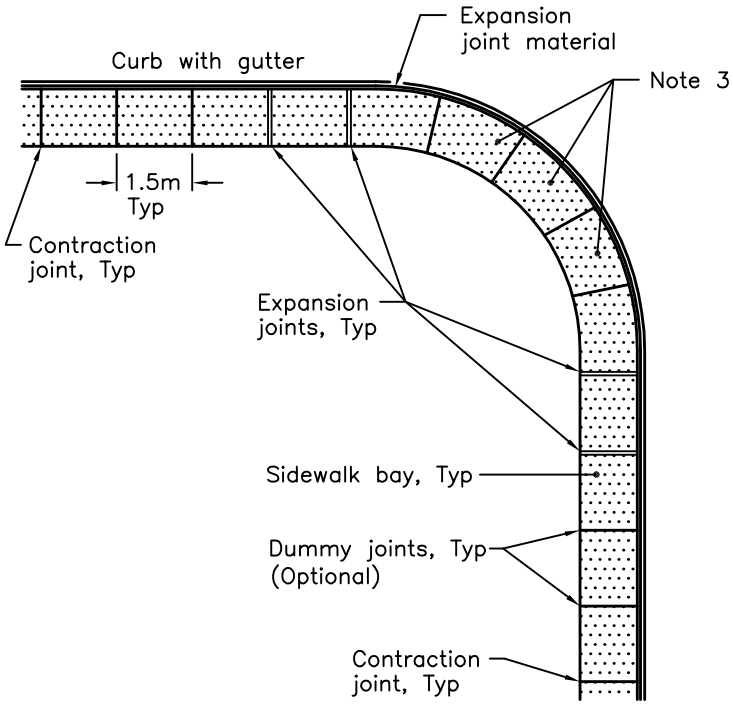
DUMMY JOINT



CONTRACTION JOINT



EXPANSION JOINT



JOINT LAYOUT

NOTES:

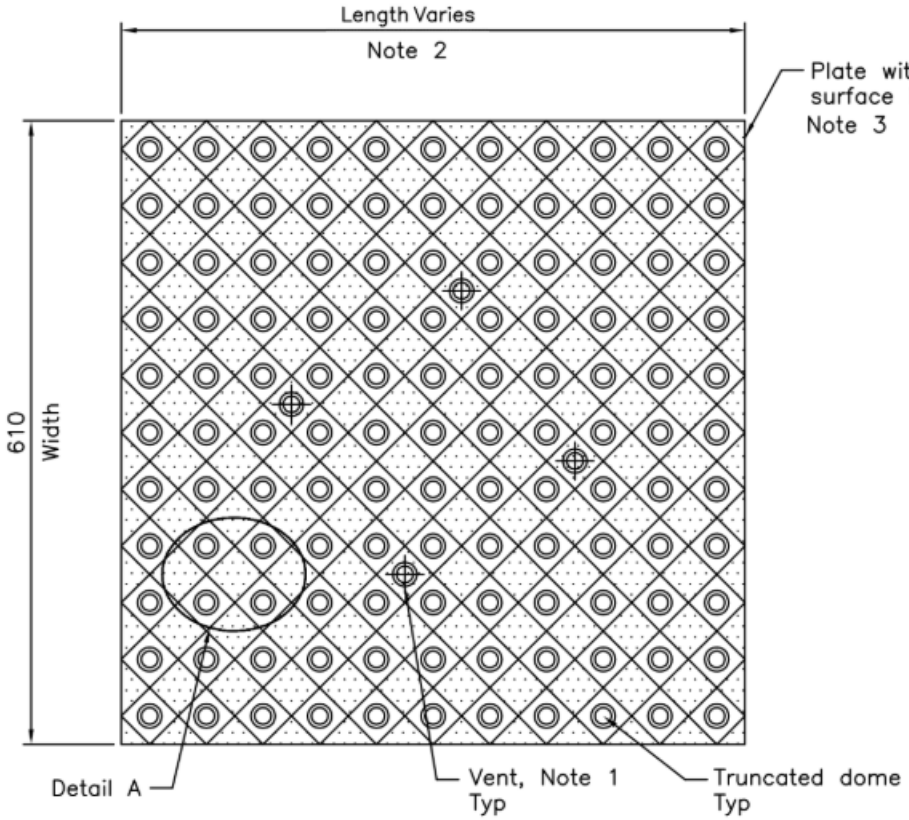
1 At commercial and industrial driveways, the thickness shall be 200mm.

2 Sidewalk width shall be wider when specified.

3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.033, and 310.039.

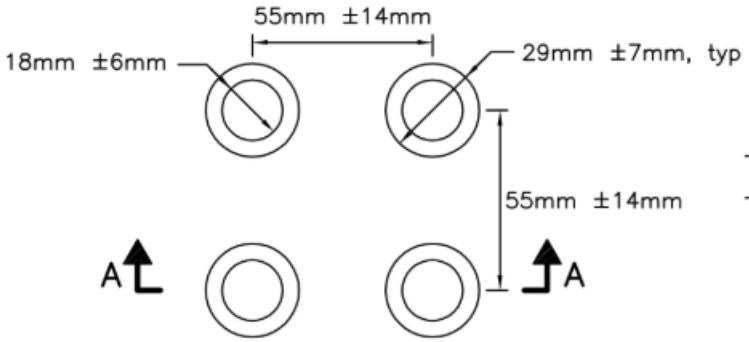
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	3
CONCRETE SIDEWALK ADJACENT TO CURB WITH GUTTER			OPSD 310.020

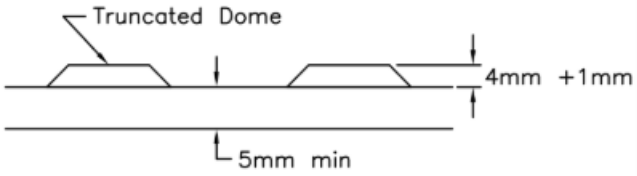


PLAN

ELEVATION



DETAIL A
TRUNCATED DOMES PLAN

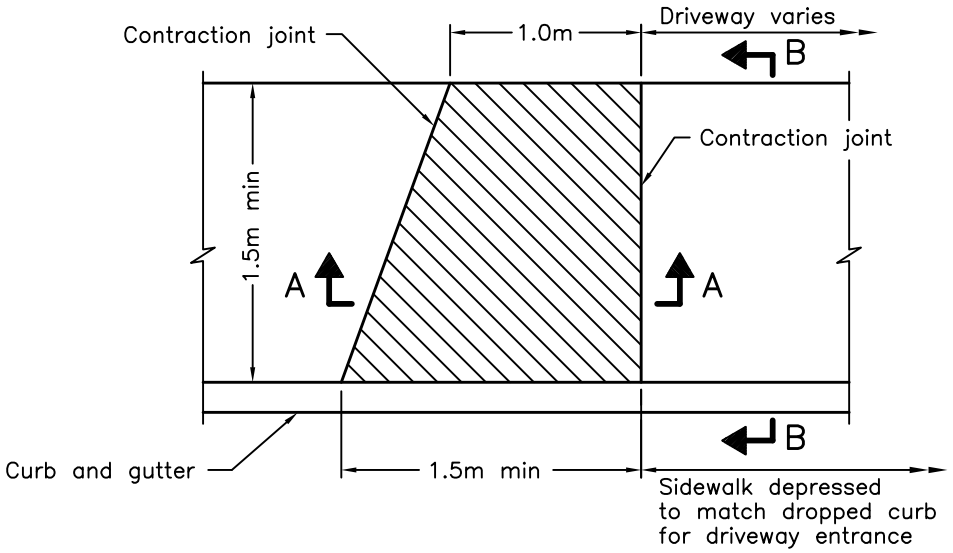


SECTION A–A

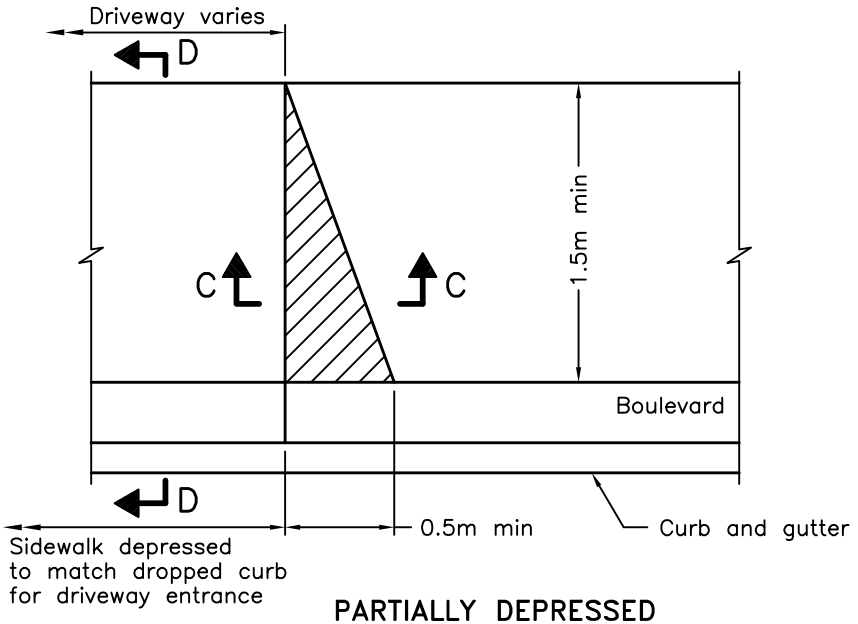
NOTES:

1 Vents shall be as specified by the manufacturer.
2 Length of plate may be increased to suit the curb depression width.
3 Material of plate shall be as specified in Contract Documents.
A Adjacent cast iron plates shall be permanently connected using a locking mechanism and any hardware shall be hot dipped galvanized.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	1
CONCRETE SIDEWALK RAMPS TACTILE WALKING SURFACE INDICATORS COMPONENT			
	OPSD 310.039		

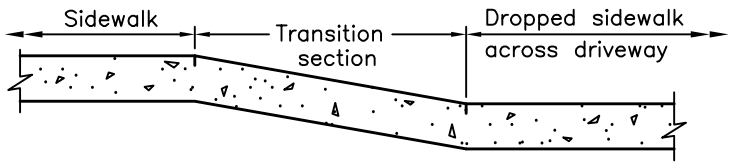


FULLY DEPRESSED

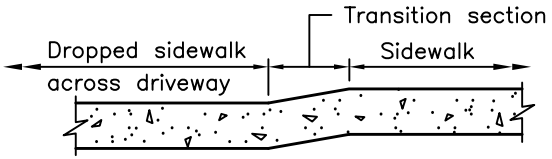


PARTIALLY DEPRESSED

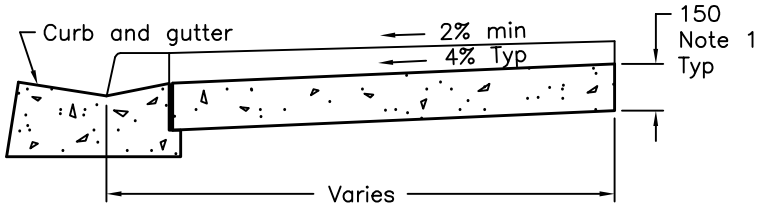
PLAN



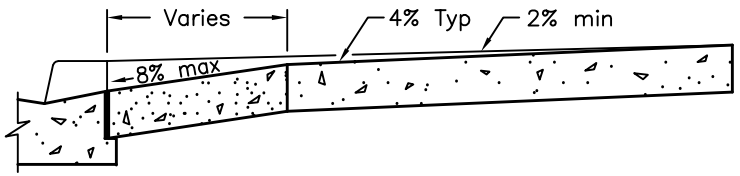
SIDEWALK WITHOUT BOULEVARD
SECTION A–A



SIDEWALK WITH BOULEVARD
SECTION C–C



SECTION B–B



SECTION D–D

NOTES:

1 At commercial and industrial driveways, the thickness shall be 200mm.

A For contraction joint detail, see OPSD 310.010.

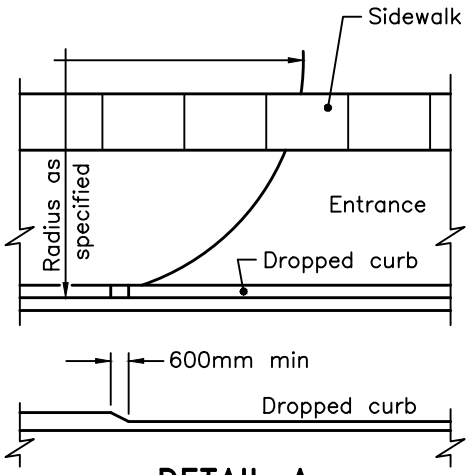
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

CONCRETE SIDEWALK DRIVEWAY ENTRANCE DETAILS

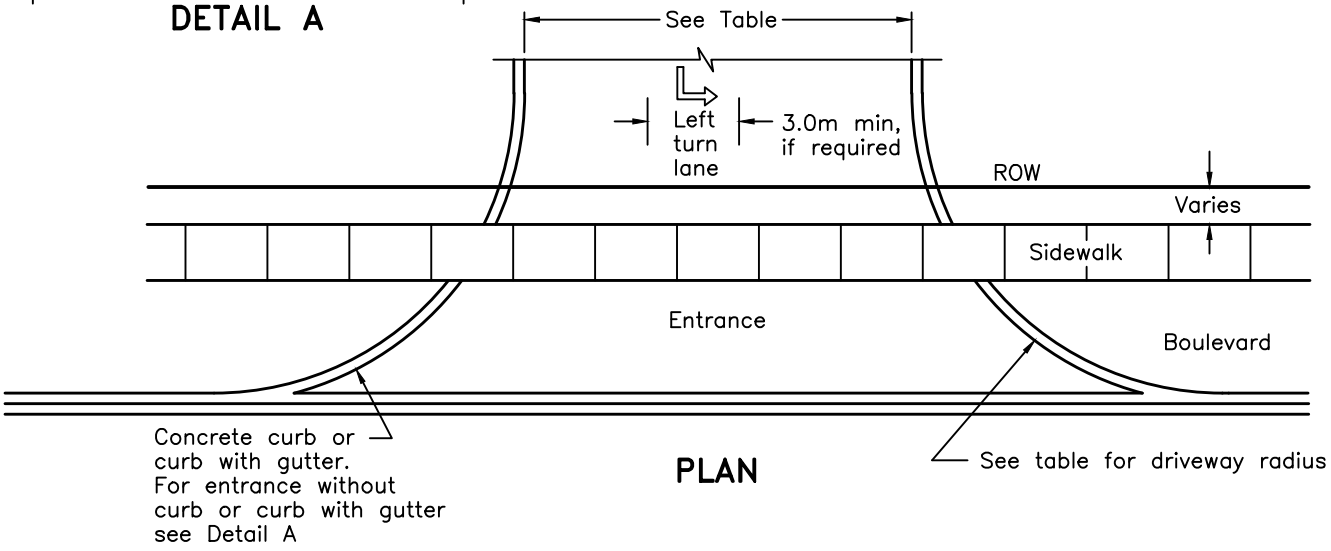
Nov 2019 | Rev | 3

OPSD 310.050

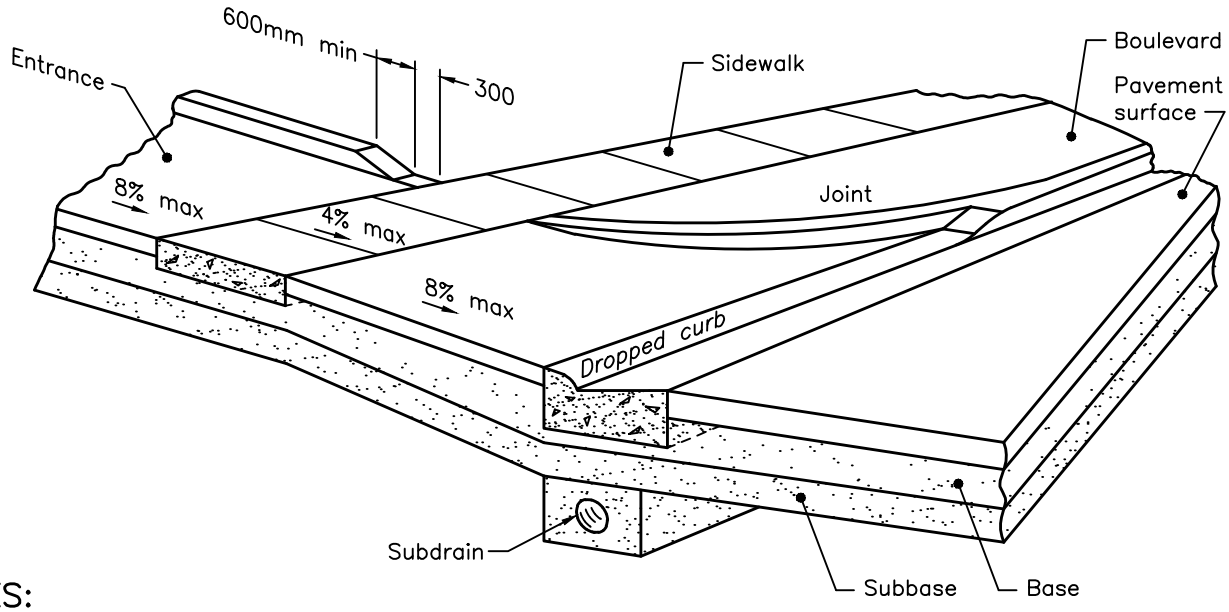


DETAIL A

DRIVEWAY DIMENSIONS						
LAND USE	WIDTH m				RADIUS m	
	One–Way		Two–Way			
	min	max	min	max	min	max
Light Industrial, Commercial, and Apartment	4.5	7.5	7.2	12.0	4.5	12.0
Heavy Industrial	5.0	9.0	9.0	15.0	9.0	15.0



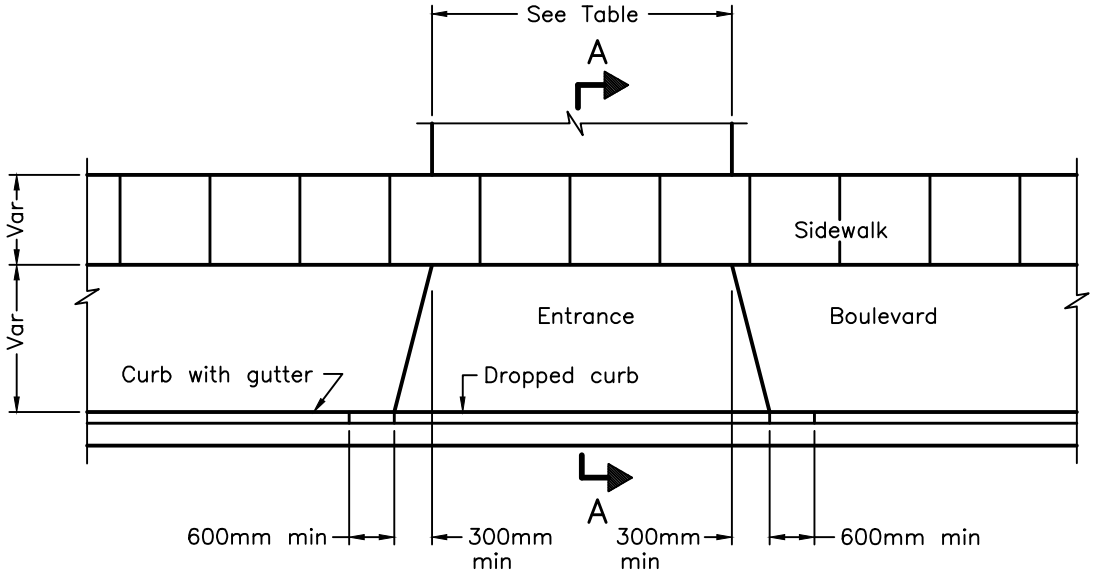
PLAN



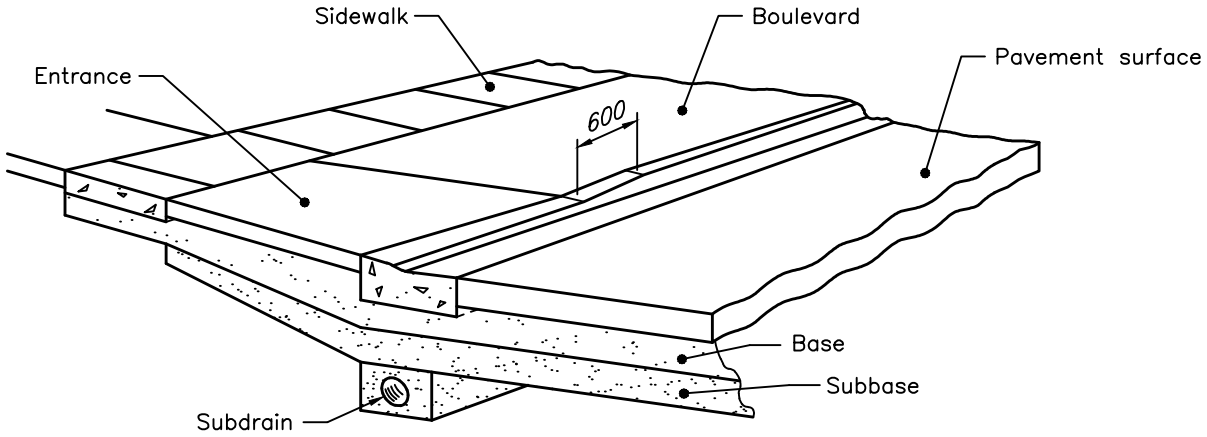
NOTES:

A All dimensions are in millimetres unless otherwise shown.

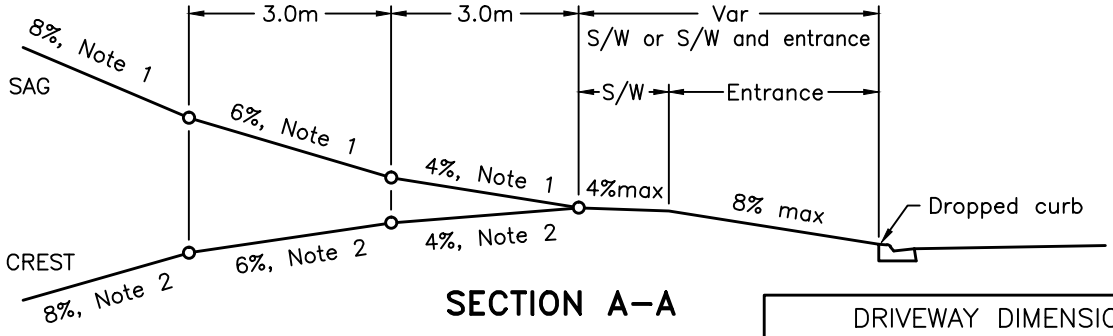
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	2
URBAN INDUSTRIAL, COMMERCIAL, AND APARTMENT ENTRANCES			
			OPSD 350.010



PLAN



ISOMETRIC VIEW



SECTION A–A

DRIVEWAY DIMENSIONS				
LAND USE	WIDTH m			
	Single		Double	
	min	max	min	max
Residential	3.0	4.3	6.0	7.3

NOTES:

1 Maximum upgrade shall be 10%.

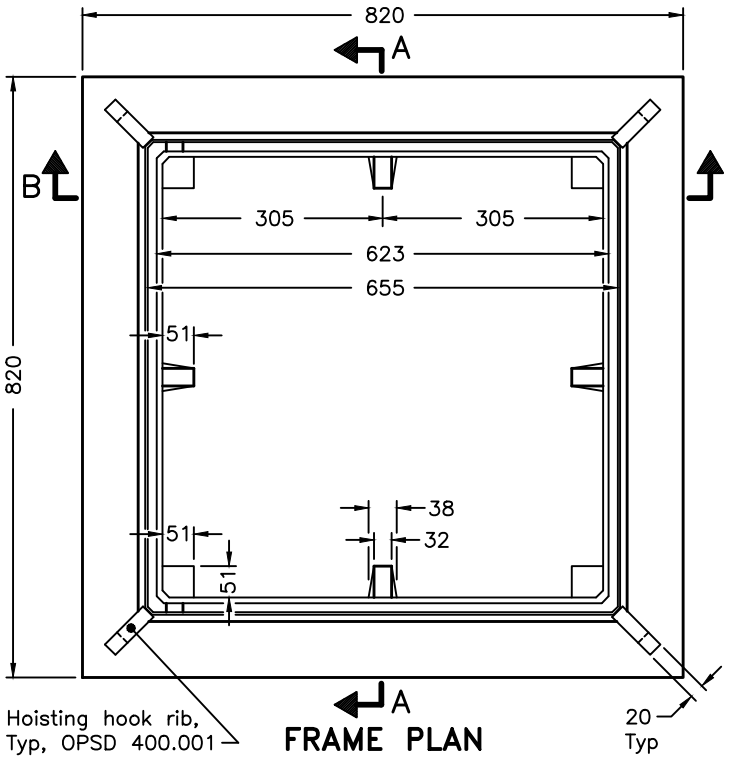
2 Maximum downgrade shall be 8%.

A All dimensions are in millimetres unless otherwise shown.

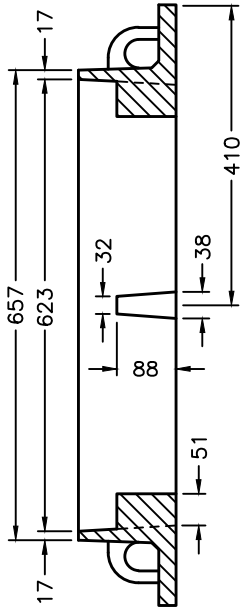
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	2

URBAN RESIDENTIAL ENTRANCE

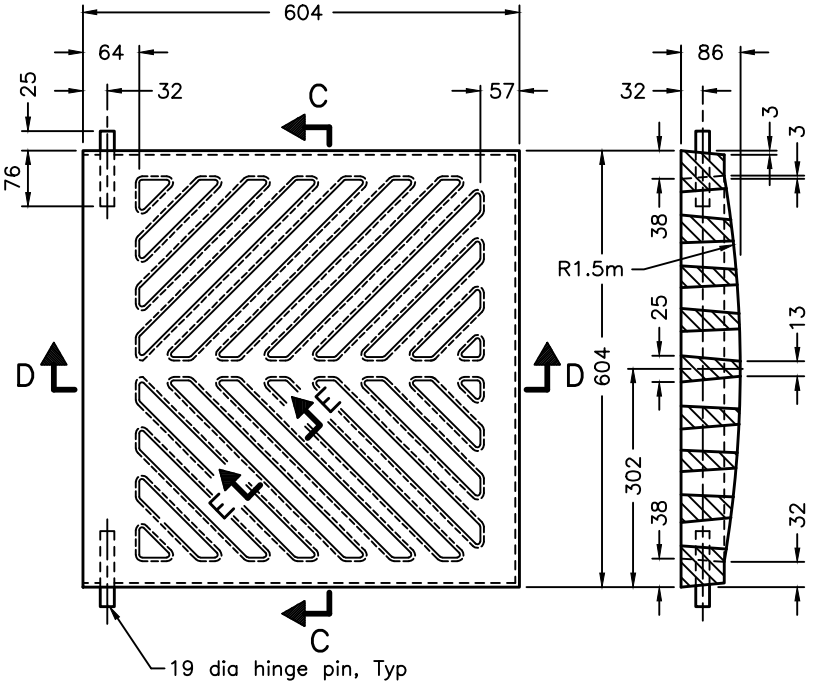
OPSD 351.010



FRAME PLAN

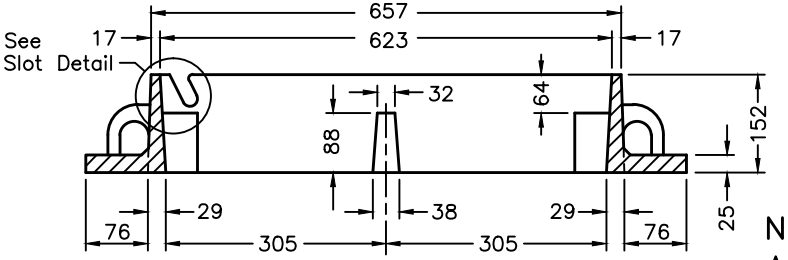


SECTION A–A

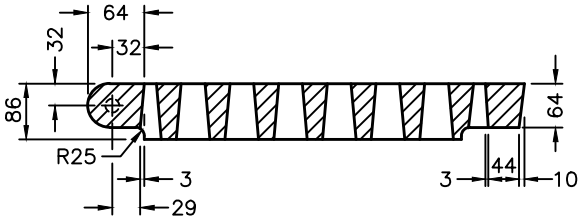


GRATE PLAN

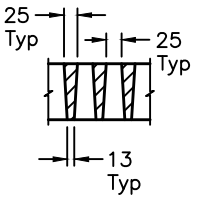
SECTION C–C



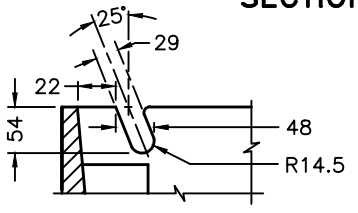
SECTION B–B



SECTION D–D



SECTION E–E



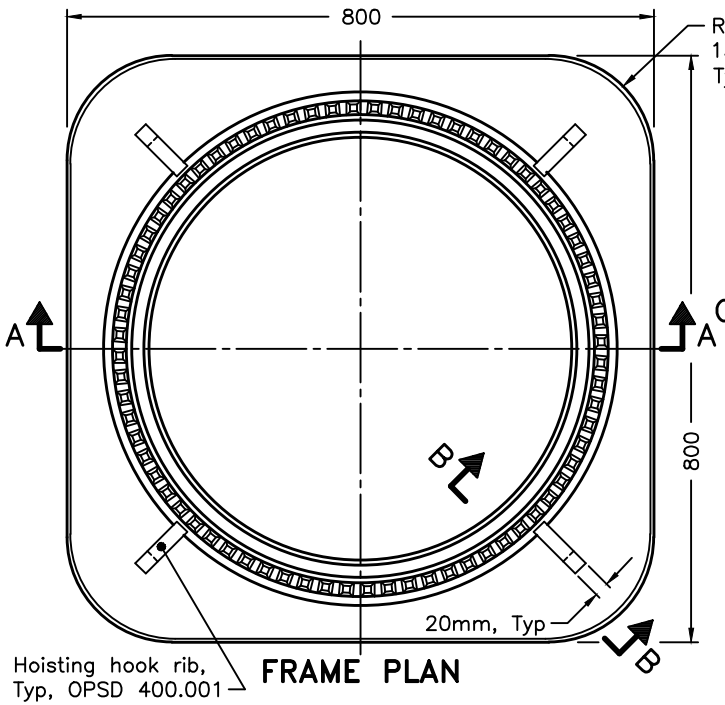
SLOT DETAIL

NOTES:

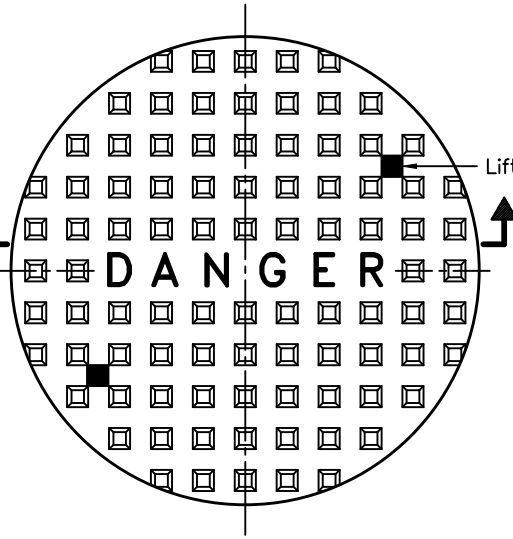
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.

B All dimensions are in millimetres unless otherwise shown.

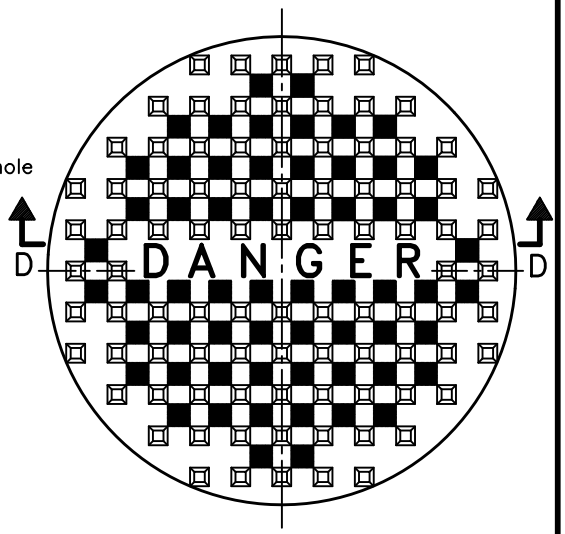
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	3
CAST IRON, SQUARE FRAME WITH SQUARE FLAT GRATE FOR CATCH BASINS, HERRING BONE OPENINGS			
	OPSD 400.020		



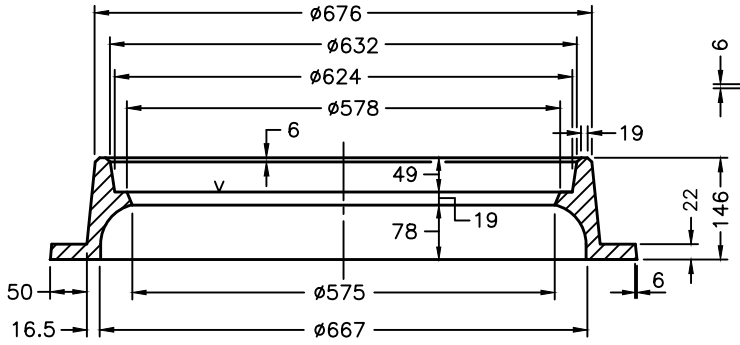
FRAME PLAN



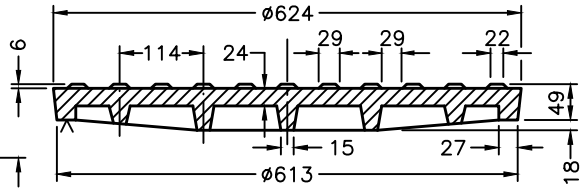
TYPE A
CLOSED COVER



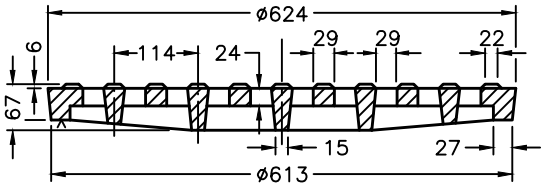
TYPE B
OPEN COVER



SECTION A–A



SECTION C–C

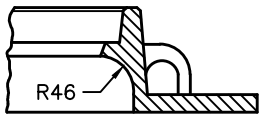


SECTION D–D

NOTES:

A Covers shall be Type A or Type B, as specified.

B All dimensions are in millimetres unless otherwise shown.



SECTION B–B

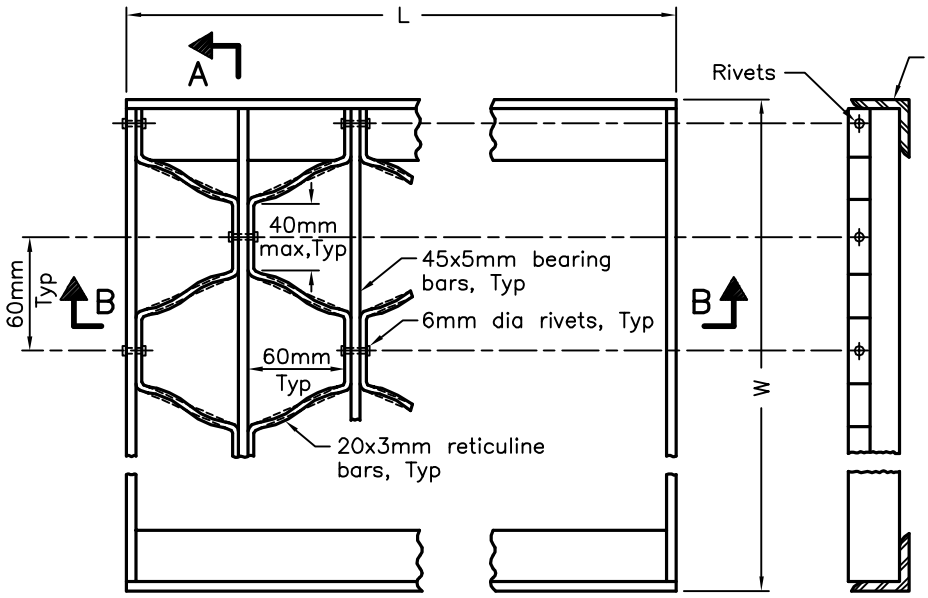
ONTARIO PROVINCIAL STANDARD DRAWING

CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES

Nov 2018 | Rev 4

ONTARIO STANDARDS • MUNICIPAL – PROVINCIAL •

OPSD 401.010

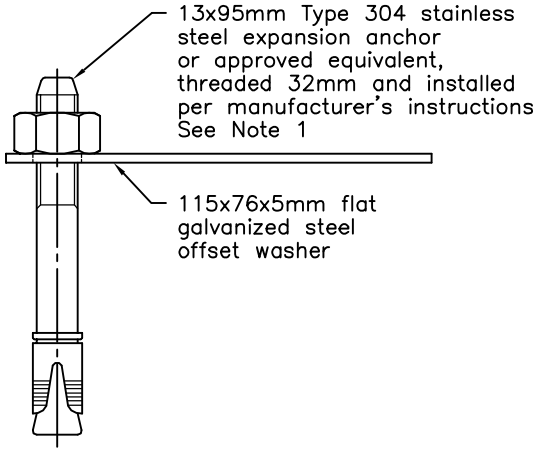


Grating Type	Grating Size	
	Length L	Width W
A	762	768
B	1338	768
C	1465	768

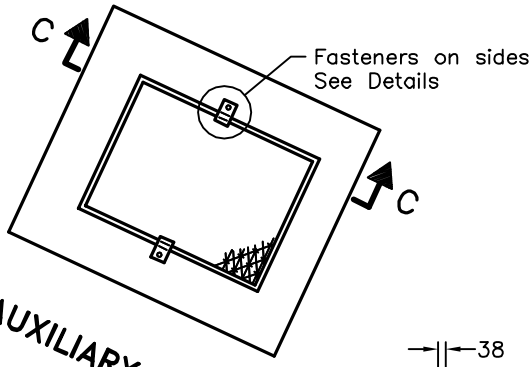
A PLAN OF GRATE

SECTION A–A

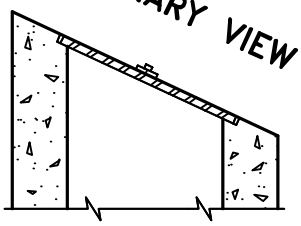
SECTION B–B



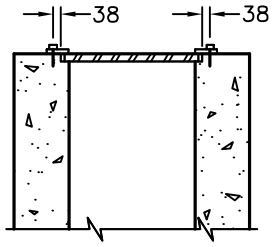
FASTENER DETAIL



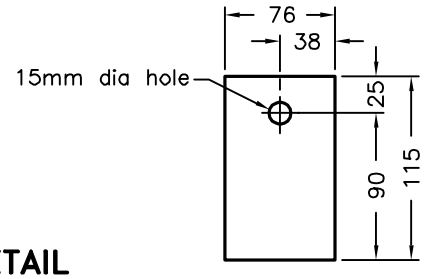
AUXILIARY VIEW



SECTION C–C



FASTENER EMBEDMENT DETAIL



OFFSET WASHER DETAIL

NOTES:

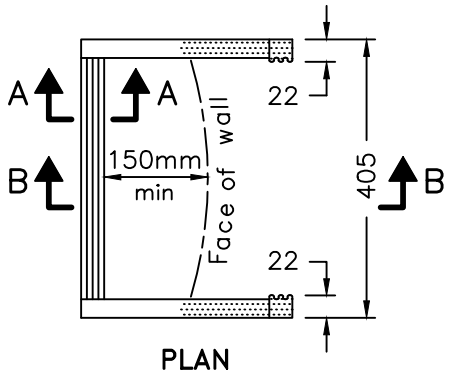
1 Equivalent (13x100mm Galvanized J–Bolt) cast–in–place anchor may be used.

A Fastener shall be inserted to maintain minimum concrete cover requirements.

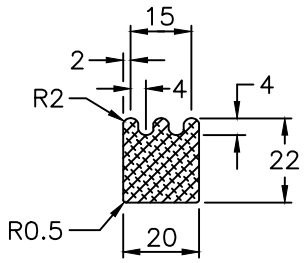
B All steel components and rivets shall be galvanized.

C All dimensions are in millimetres unless otherwise shown.

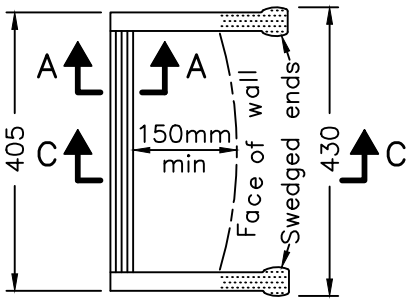
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev	3
GALVANIZED STEEL HONEYCOMB GRATING FOR DITCH INLETS			
	OPSD 403.010		



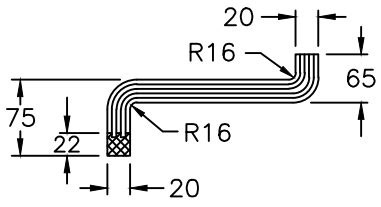
PLAN



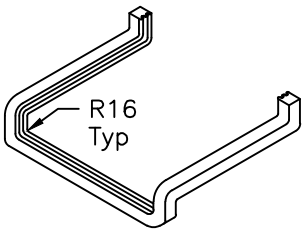
SECTION A–A



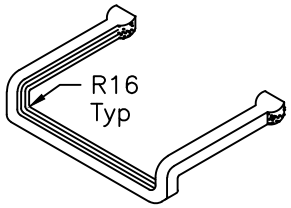
PLAN



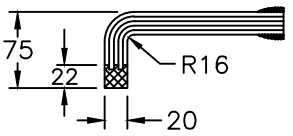
SECTION B–B



AUXILIARY VIEW



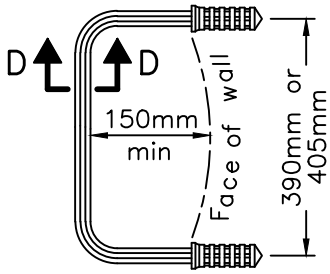
AUXILIARY VIEW



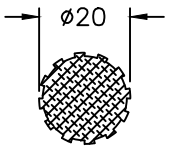
SECTION C–C

TYPE A **TYPE B**

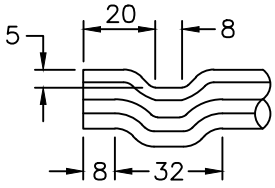
RECTANGULAR ALUMINUM



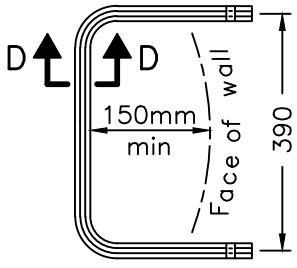
PLAN



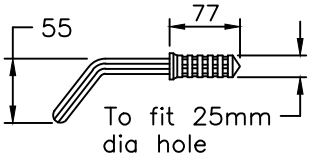
SECTION D–D



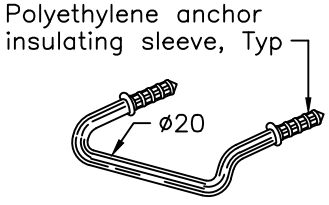
FORMED ANCHOR LOCK DETAIL



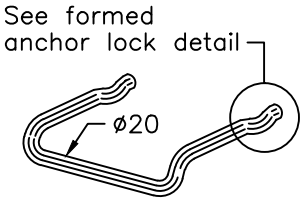
PLAN



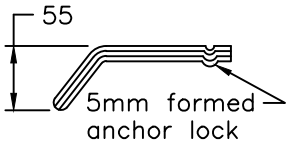
SIDE VIEW



AUXILIARY VIEW



AUXILIARY VIEW



SIDE VIEW

TYPE A **TYPE B**

CIRCULAR ALUMINUM

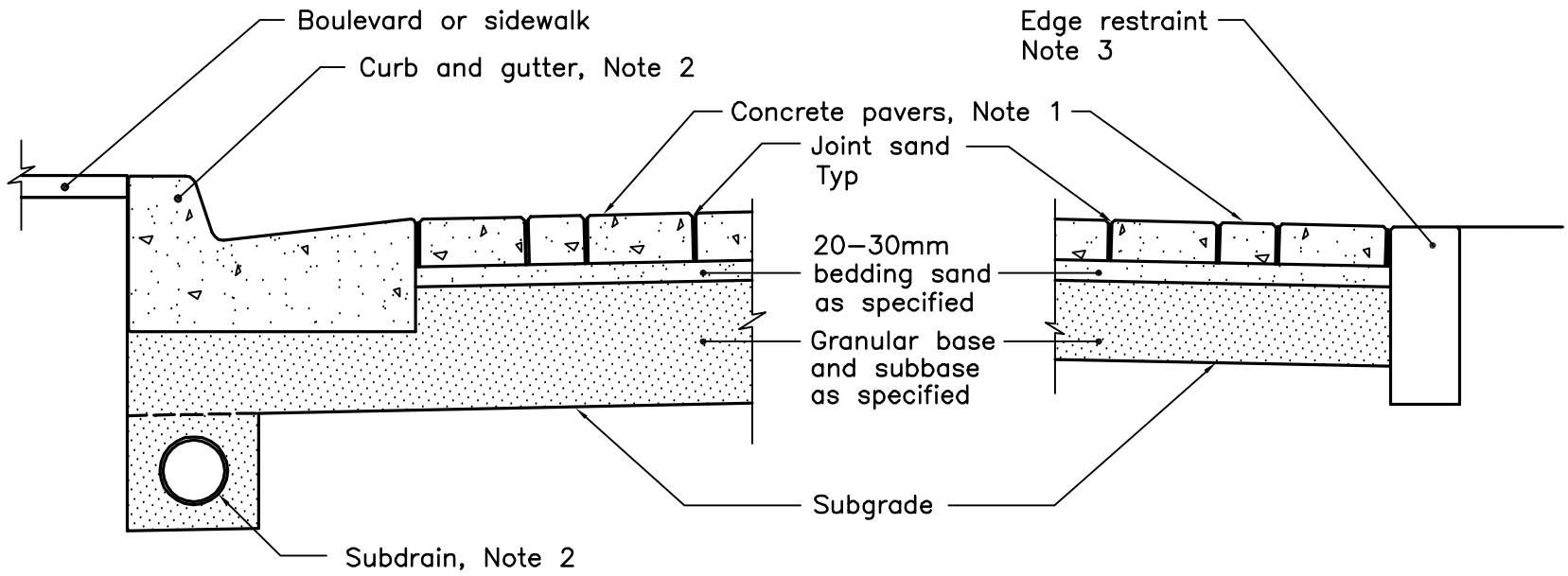
NOTES:

A All aluminum components shall be 6000 series structural aluminum.

B All aluminum in contact with concrete shall be thoroughly coated with asphalt paint.

C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	4
MAINTENANCE HOLE STEPS SOLID			
			OPSD 405.020



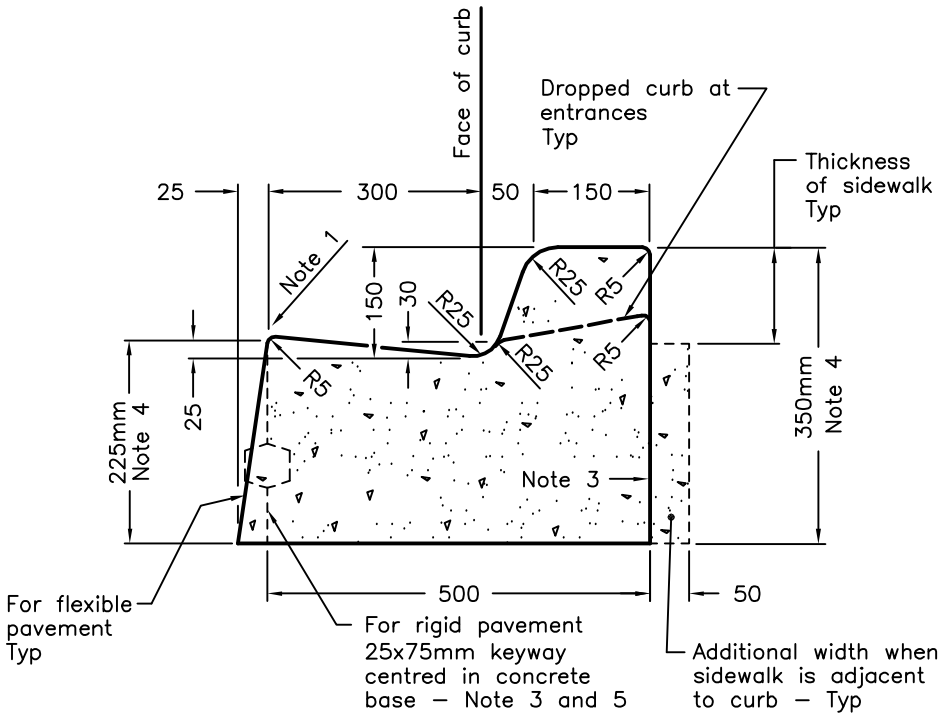
VEHICULAR **NON–VEHICULAR**

NOTES:

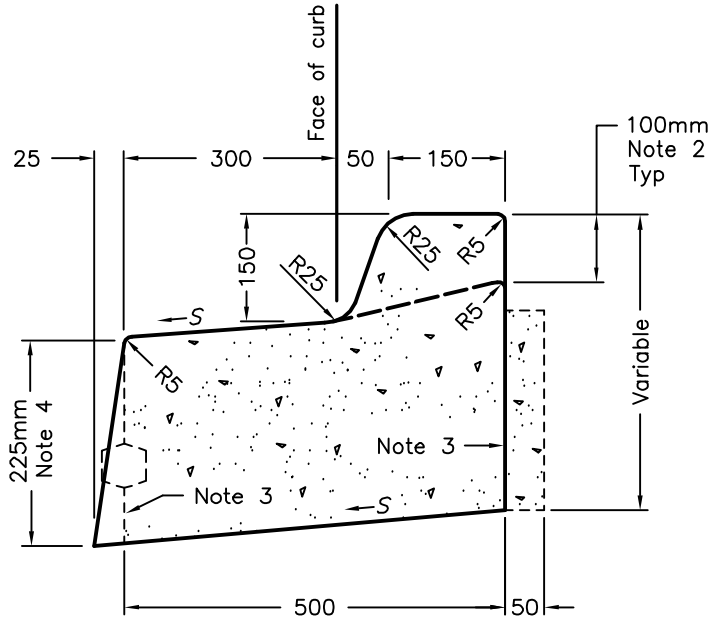
1 Concrete paver thickness:
  – for vehicular traffic – 80mm minimum.
  – for non–vehicular traffic – 60mm minimum.
2 This OPSD shall be read in conjunction with OPSD 200 and 600 series drawings.
3 Edge restraint according to manufacturer's requirements.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev	2
INTERLOCKING CONCRETE PAVERS ON GRANULAR BASE			
	OPSD 561.010		



TANGENT



SUPERELEVATED

LEGEND:

S – Rate of pavement superelevation in percent, %.

NOTES:

1 Flexible and composite pavement shall be placed 5mm above the adjacent edge of gutter.
2 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
3 For slipforming procedure a 5% batter is acceptable.
4 For composite pavement the depth of concrete curb shall be adjusted to depth of concrete pavement.
5 When tie bars are specified, refer to OPSD 552.010 and 552.020 for details.

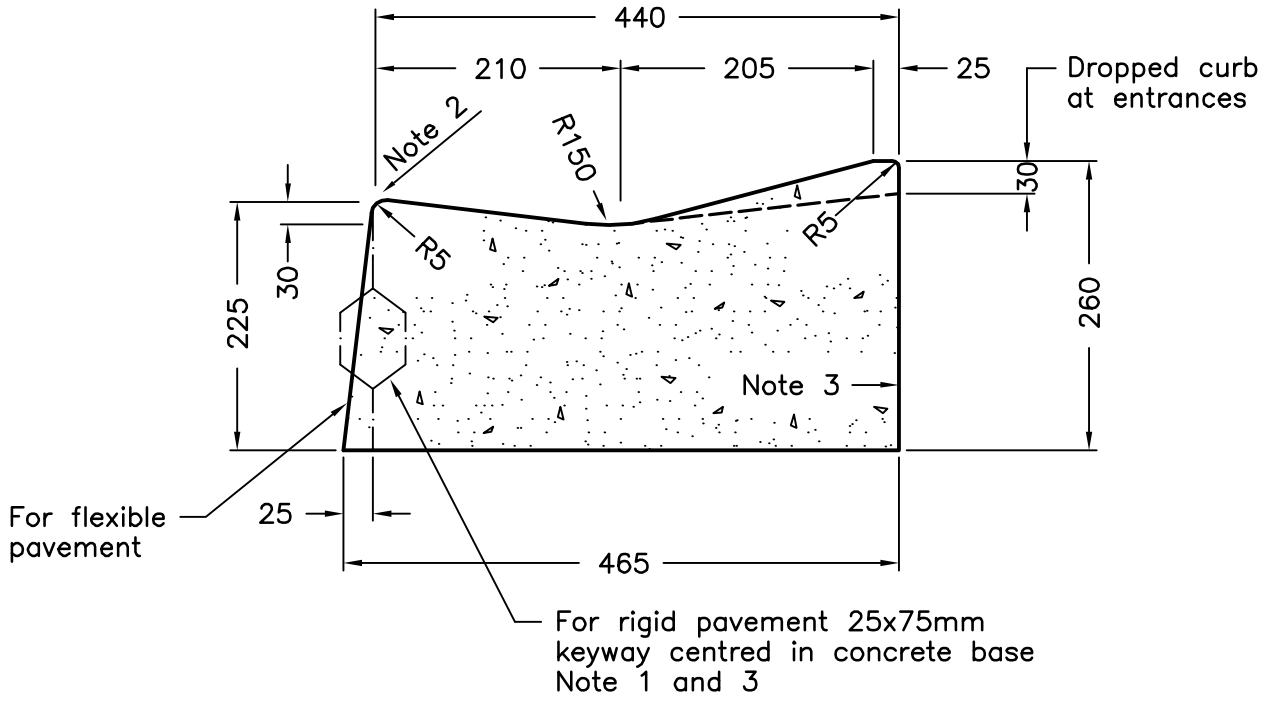
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

CONCRETE BARRIER CURB WITH STANDARD GUTTER

Nov 2012 | Rev 2

OPSD 600.040



NOTES:

1 When curb and gutter is adjacent to concrete pavement or base, this drawing shall be used in conjunction with OPSD 552.010 and 552.020.

2 Flexible and composite pavement shall be placed 5mm above the adjacent edge of gutter.

3 For slipforming procedure a 5% batter is acceptable.

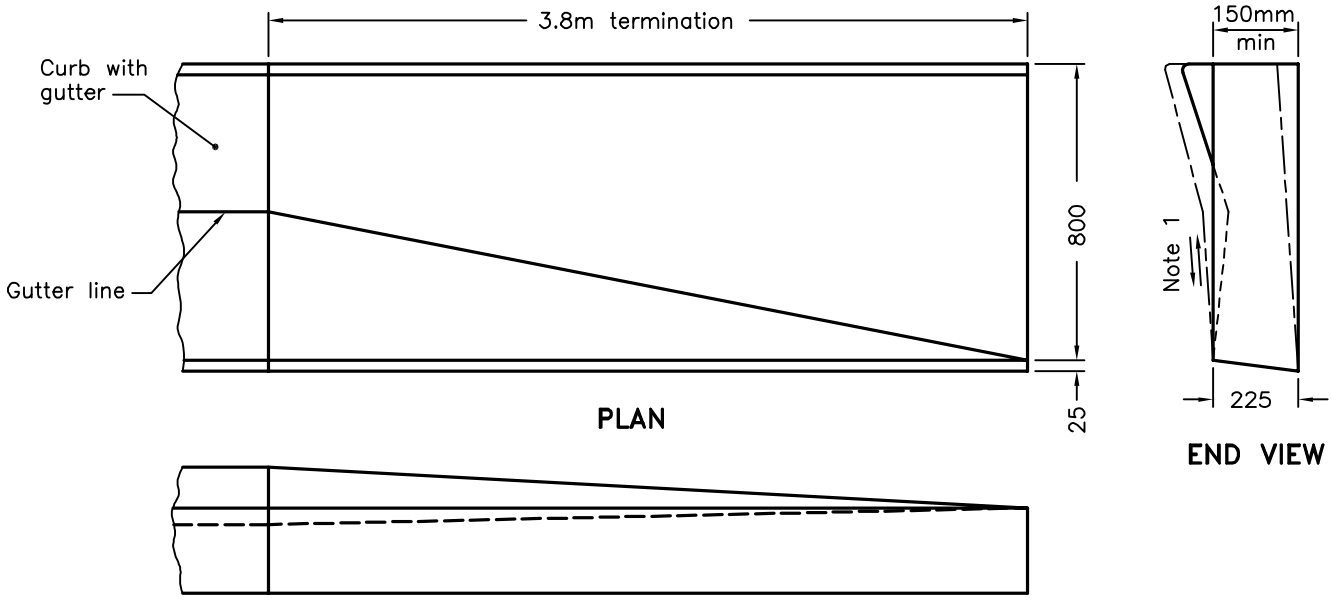
A Treatment at entrances shall be according to OPSD 351.010.

B Outlet treatment shall be according to the OPSD 610 Series.

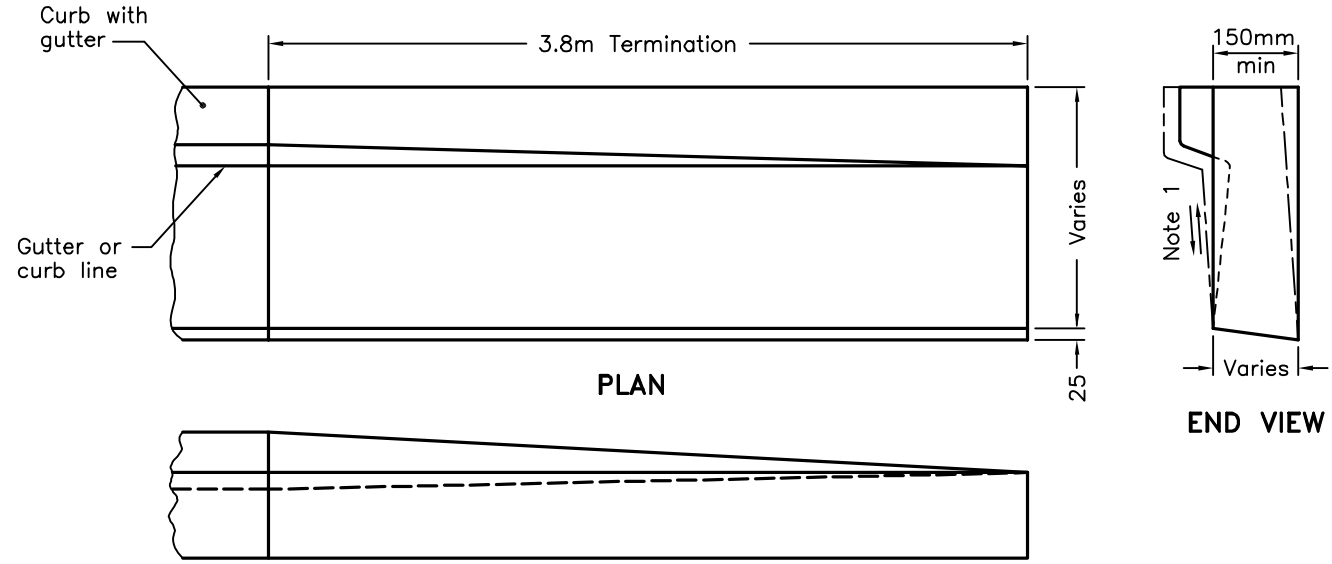
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.

D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev	2
CONCRETE MOUNTABLE CURB WITH NARROW GUTTER			
	OPSD 600.100		



MOUNTABLE CURB WITH GUTTER



BARRIER AND SEMI–MOUNTABLE CURB WITH GUTTER

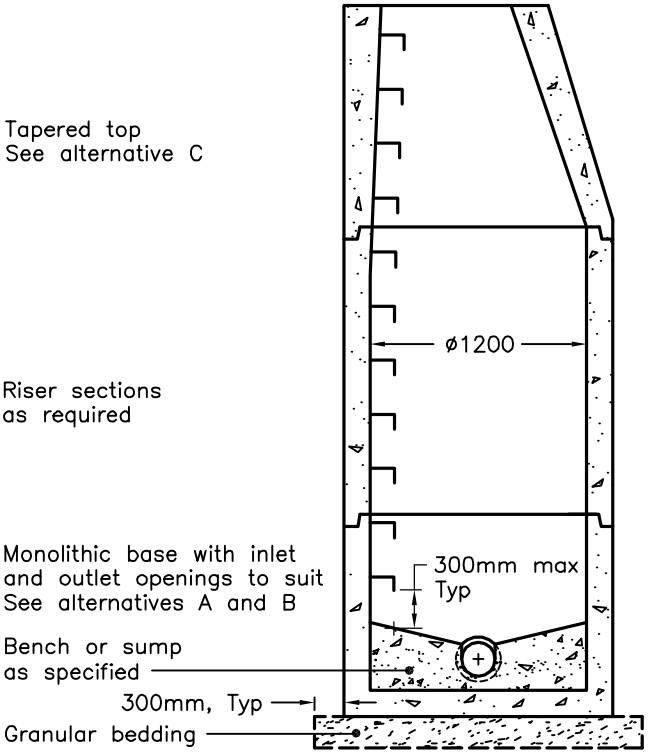
NOTES:

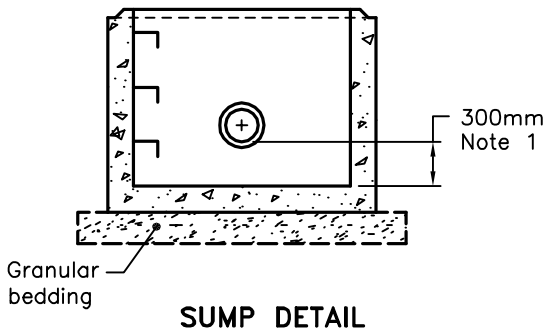
1 Slope shall match existing shoulder.

A This drawing shall be read in conjunction with OPSD 600 series curb with gutter drawings.

B All dimensions are in millimetres unless otherwise shown.

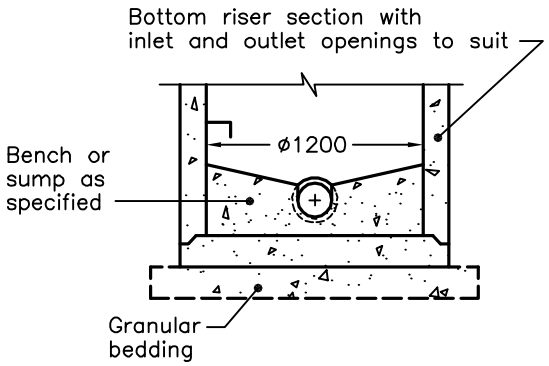
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev	2
METHOD OF TERMINATION FOR CONCRETE CURB WITH GUTTER			
	OPSD 608.010		



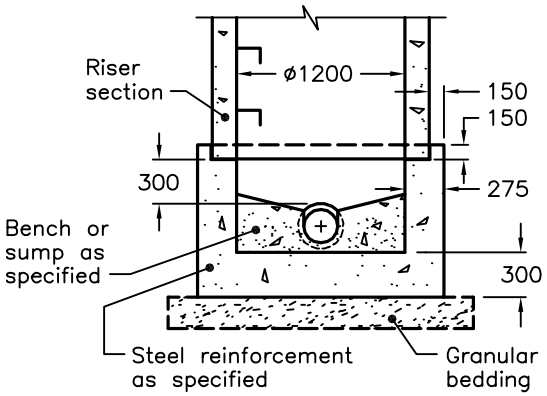


SUMP DETAIL

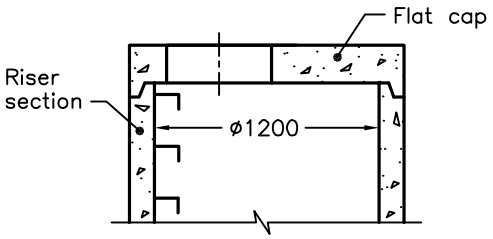
ALTERNATIVES



A PRECAST SLAB BASE



B CAST–IN–PLACE BASE



C PRECAST FLAT CAP

NOTES:

1 The sump is measured from the lowest invert.

A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.

B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.

C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.

D Pipe support according to OPSD 708.020.

E For benching and pipe opening details, see OPSD 701.021.

F For adjustment unit and frame installation, see OPSD 704.010.

G All dimensions are nominal.

H All dimensions are in millimetres unless otherwise shown.

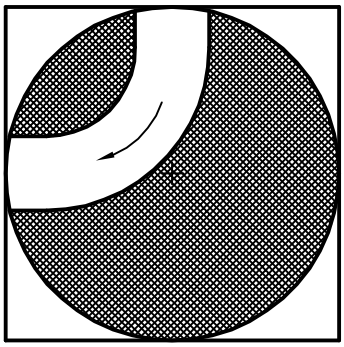
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014 | Rev 5

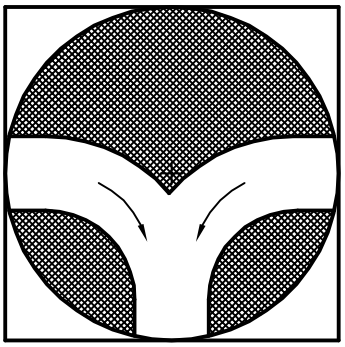
PRECAST CONCRETE MAINTENANCE HOLE

1200mm DIAMETER

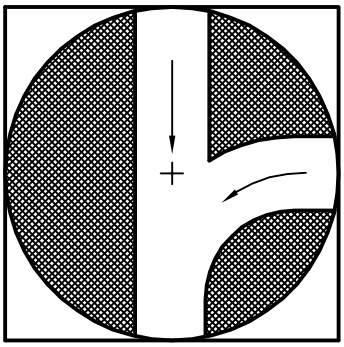
OPSD 701.010



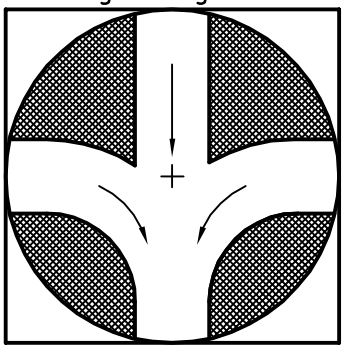
1. Right angle bend



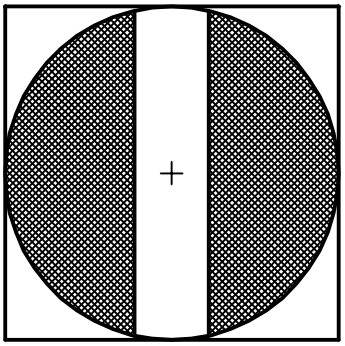
2. Tee connection



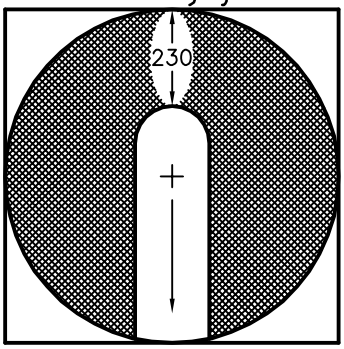
3. Three way junction



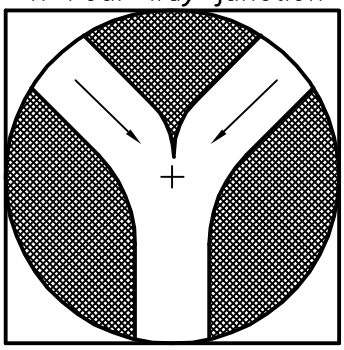
4. Four way junction



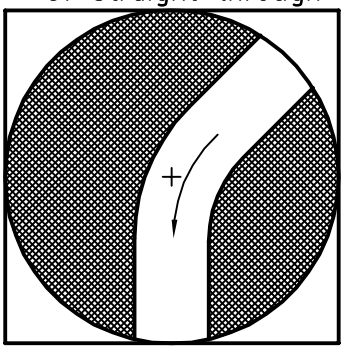
5. Straight through



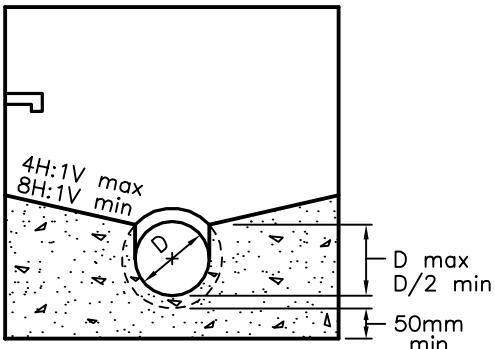
6. Dead end



7. Wye connection



8. 45° bend



Section

MAXIMUM SIZE HOLE IN THE WALL IN PRECAST RISER SECTIONS					
Maintenance Hole Diameter	No. 1–4	No. 5 and 6	No. 8	No.7	
				Inlet Hole	Outlet Hole
1200	700	860	780	700	860
1500	860	1220	960	860	1170
1800	1220	1485	1220	1220	1485
2400	1485	2020	1760	1485	2020
3000	1930	2450	2300	1930	2450
3600	2470	3085	2730	2470	3085

NOTES:

1 Slopes shall be maintained from the outlet hole opening for top of benching.

A Concrete for benching shall be 30MPa.

B When benching is hand–finshed, it shall be given wood float finish, channel shall be given steel trowel finish.

C Benching slope and height shall be as specified.

D When specified, maintenance holes that are 1200mm in diameter with a uniform channel for 200 or 250mm pipe may be prebenched at the manufacturer with standardized benching slope and channel orientation.

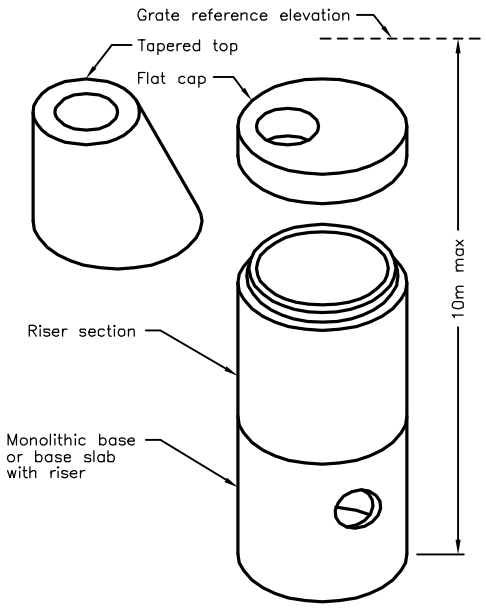
E All dimensions are nominal.

F All dimensions are in millimetres unless otherwise shown.

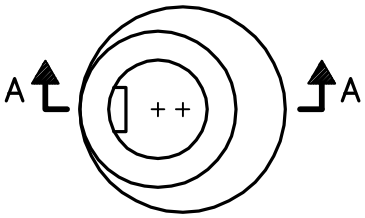
ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2014 | Rev 4

MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES

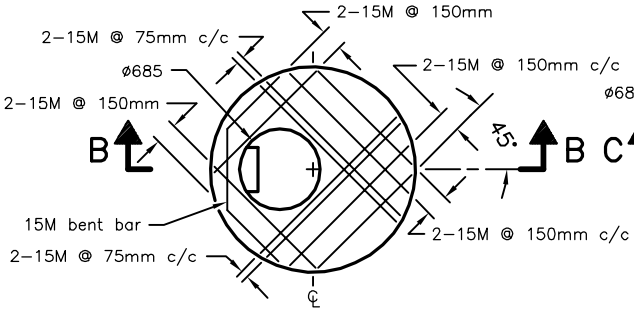
OPSD 701.021



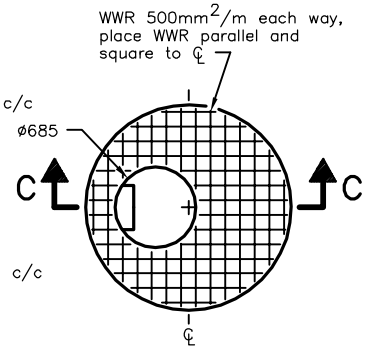
1200mm DIAMETER
MAINTENANCE HOLE



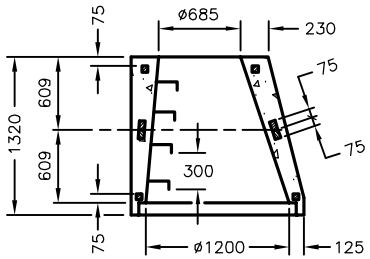
PLAN OF TAPERED TOP



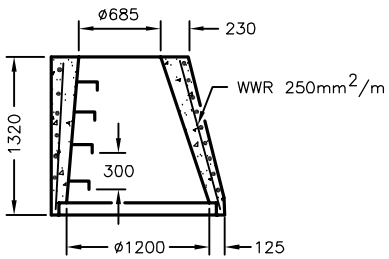
PLAN OF FLAT CAP
WITH REINFORCING STEEL BARS



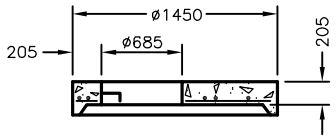
PLAN OF FLAT CAP
WITH WWR



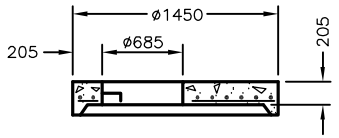
SECTION A–A
TAPERED TOP WITH HOOP STEEL



SECTION A–A
TAPERED TOP WITH WWR



SECTION B–B

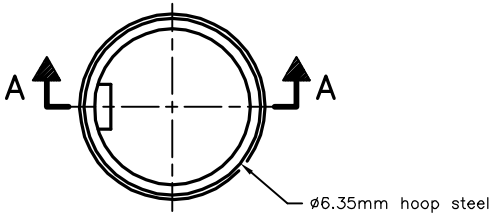


SECTION C–C

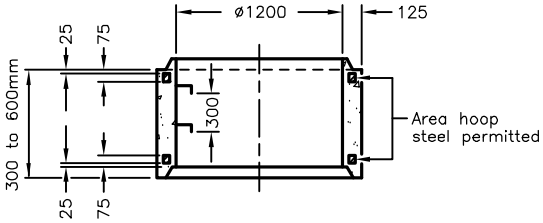
NOTES:

A This drawing shall be read in conjunction with OPSD 701.031 and 701.032.
B Centre reinforcing steel in riser ±20mm. All other reinforcing steel shall have 25mm minimum cover.
C Steps shall be according to OPSD 405.010 or 405.020.
D All dimensions are nominal.
E All dimensions are in millimetres unless otherwise shown.

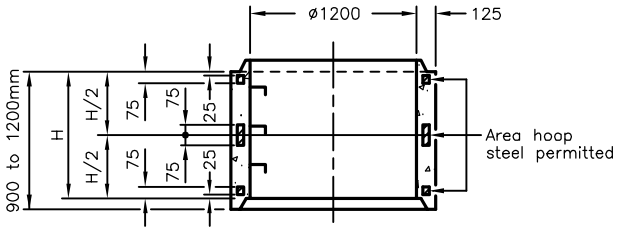
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev	4
PRECAST CONCRETE MAINTENANCE HOLE COMPONENTS 1200mm DIAMETER TAPERED TOP AND FLAT CAP			
			OPSD 701.030



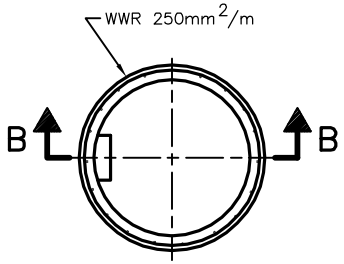
PLAN OF RISER
WITH HOOP STEEL



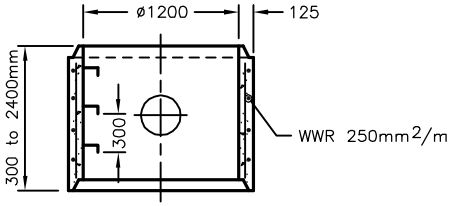
SECTION A–A
RISERS < 900mm HIGH



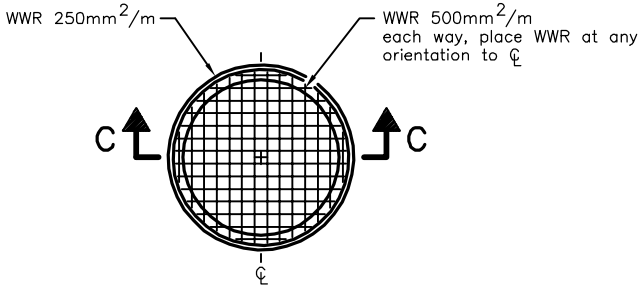
SECTION A–A
RISERS ≥ 900mm



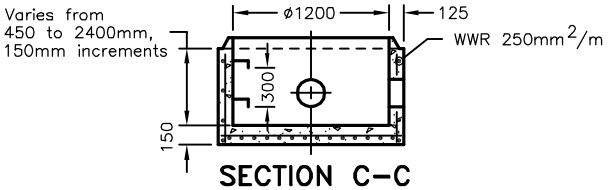
PLAN OF RISER
WITH WWR



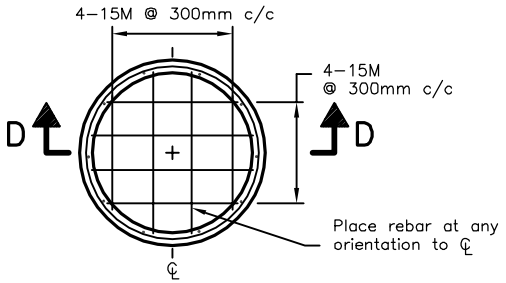
SECTION B–B



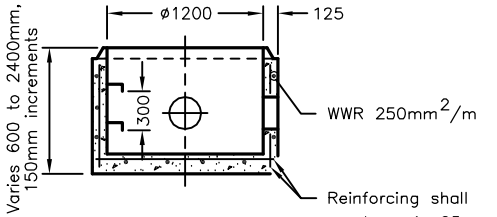
PLAN OF MONOLITHIC BASE WITH WWR



SECTION C–C



PLAN OF MONOLITHIC BASE
WITH REINFORCING STEEL BARS
AND WWR



SECTION D–D

NOTES:

A This drawing shall be read in conjunction with OPSD 701.030 and 701.032.
B Centre reinforcing steel in riser ±20mm. All other reinforcing steel shall have 25mm minimum cover.
C Steps shall be according to OPSD 405.010 or 405.020.
D All dimensions are nominal.
E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

PRECAST CONCRETE MAINTENANCE HOLE COMPONENTS

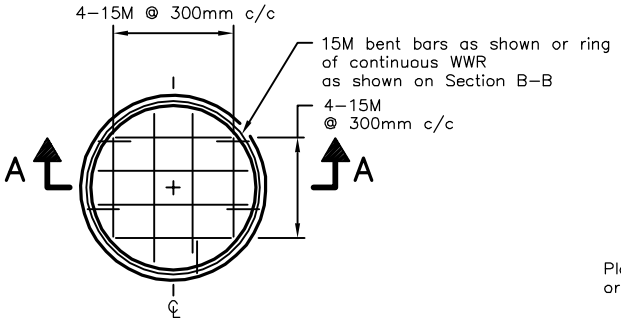
1200mm DIAMETER

RISER AND MONOLITHIC BASE

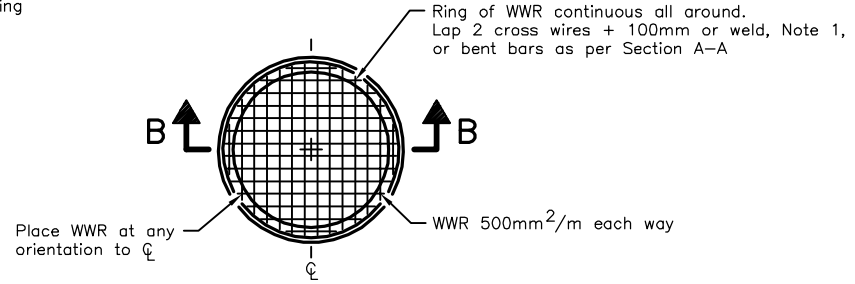
Nov 2014 | Rev 2

ONTARIO STANDARD · MUNICIPAL – PROVINCIAL · O P S

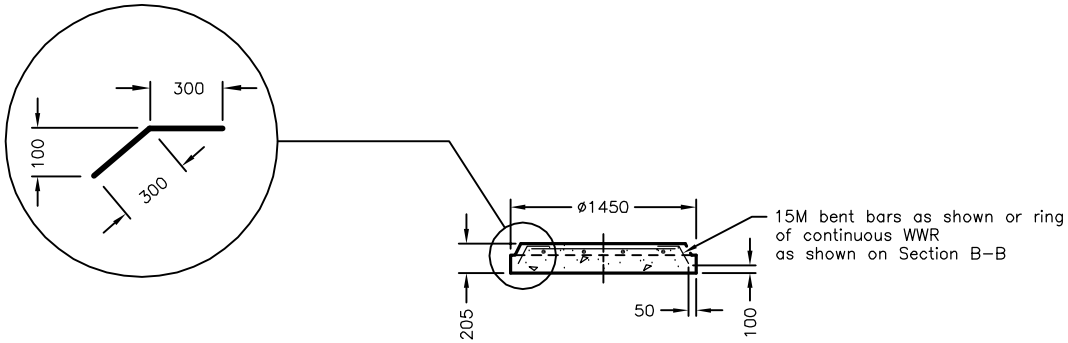
OPSD 701.031



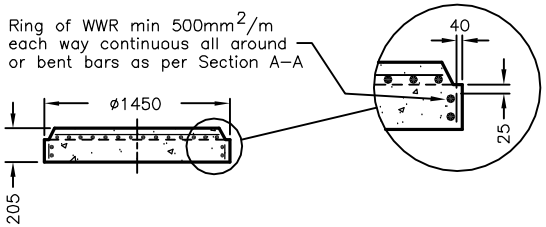
PLAN OF BASE SLAB
WITH REINFORCING STEEL BARS



PLAN OF BASE SLAB
WITH WWF



SECTION A–A



SECTION B–B

NOTES:

1 Welded splice shall develop minimum 50% yield strength of bar or wire, as applicable.

A This drawing shall be read in conjunction with OPSD 701.030 and 701.031.
B Centre reinforcing steel in riser ±20mm. All other reinforcing steel shall have 25mm minimum cover.
C All dimensions are nominal.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

PRECAST CONCRETE MAINTENANCE HOLE COMPONENTS

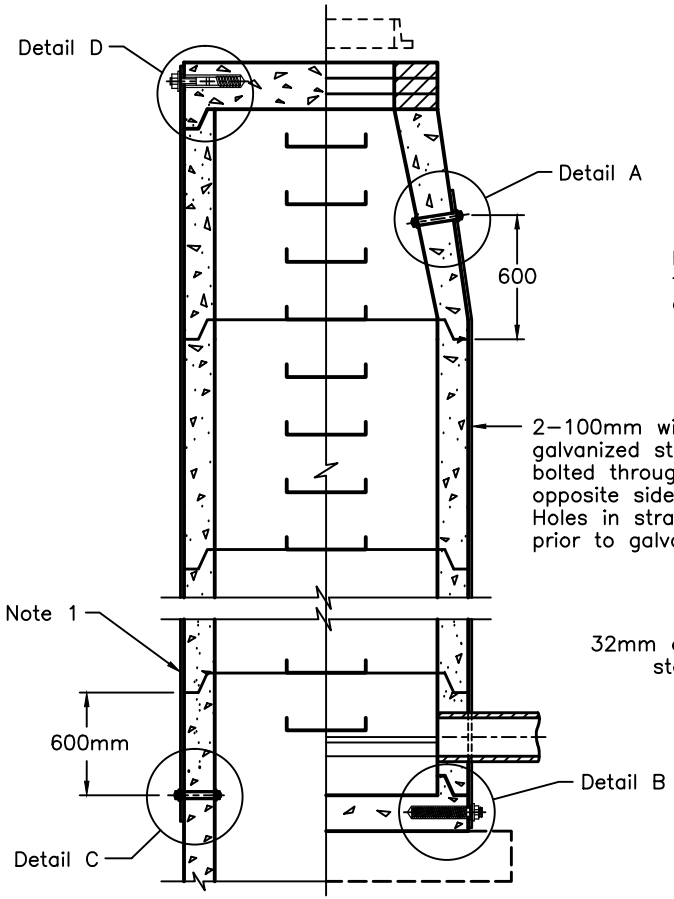
1200mm DIAMETER

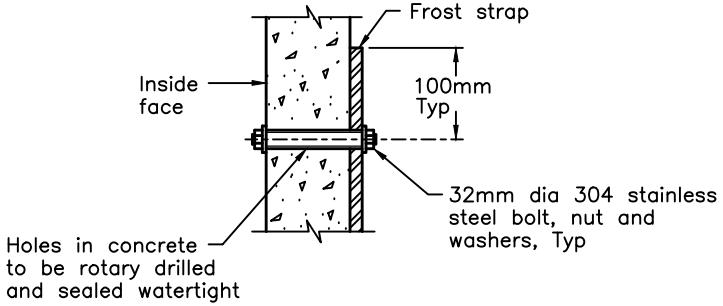
BASE SLAB

Nov 2014 | Rev 2

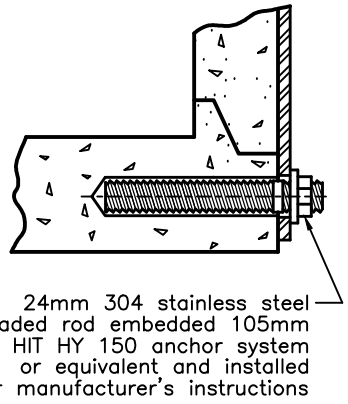
ONTARIO STANDARD · MUNICIPAL – PROVINCIAL · OPS

OPSD 701.032

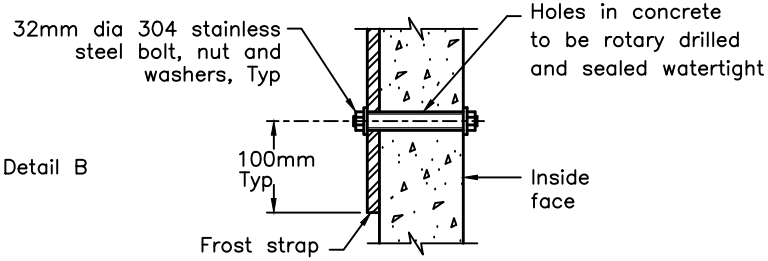




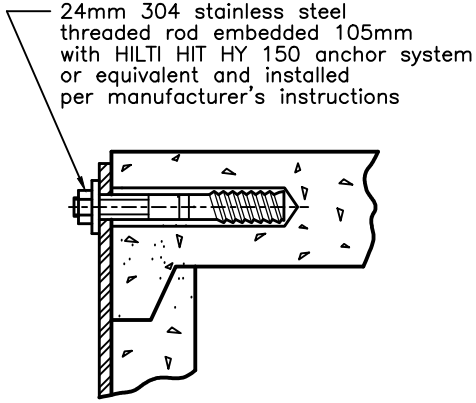
DETAIL A



DETAIL B



DETAIL C



DETAIL D

NOTES:

1 Depth of frost strap shall be as specified.

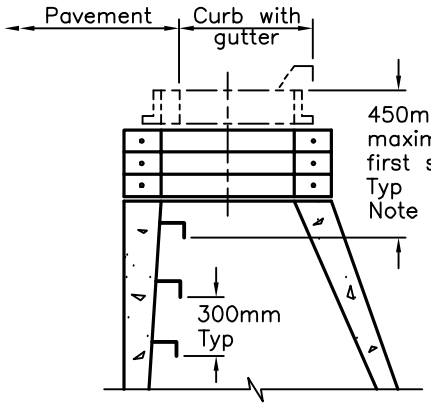
A Frost straps shall be placed so they do not interfere with sewer pipe openings and the steps.

B Frost straps shall be placed when specified.

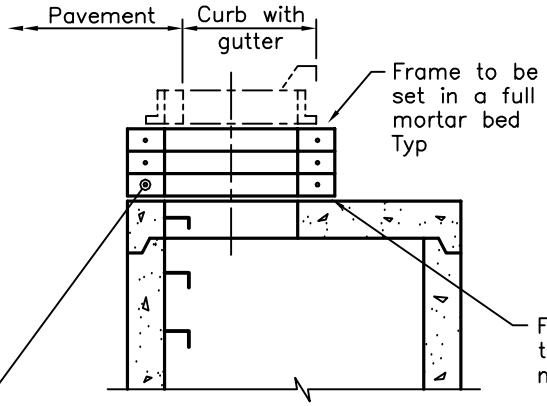
C Galvanizing shall be according to CAN/CSA G164.

D All dimensions are in millimetres unless otherwise shown.

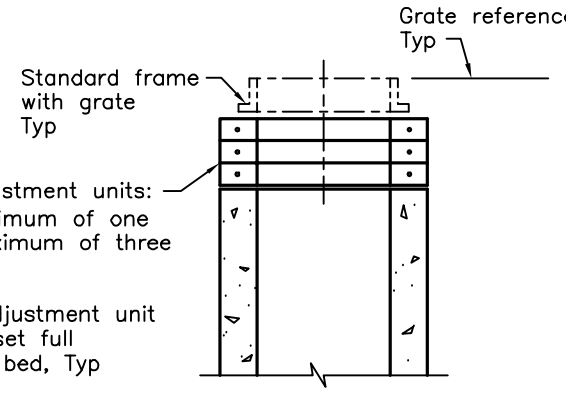
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	3
FROST STRAP INSTALLATION			
	OPSD 701.100		



SECTION THROUGH TAPER TOP

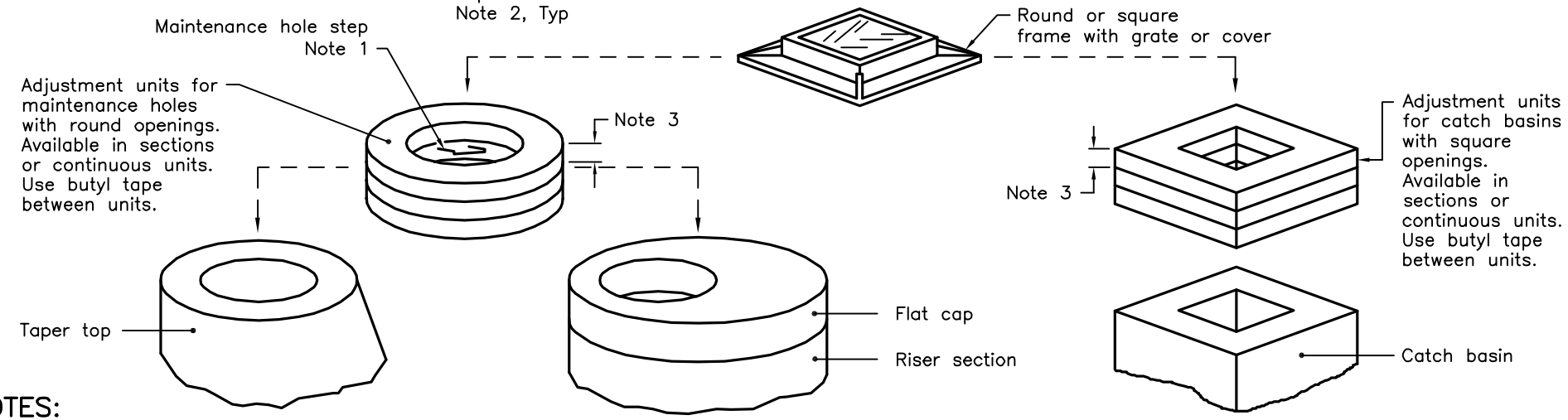


SECTION THROUGH FLAT CAP



SECTION THROUGH CATCH BASIN

Reinforce each adjustment unit with a minimum of 1 wire with an end area of at least $15mm^2$. Lap wire 150mm or butt weld. Note 2, Typ



NOTES:

1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.

2 Centre reinforcing in adjustment unit ±10mm.

3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.

A Adjustment units shall not extend beyond the outside edge of the structure.

B All dimensions are in millimetres unless otherwise shown.

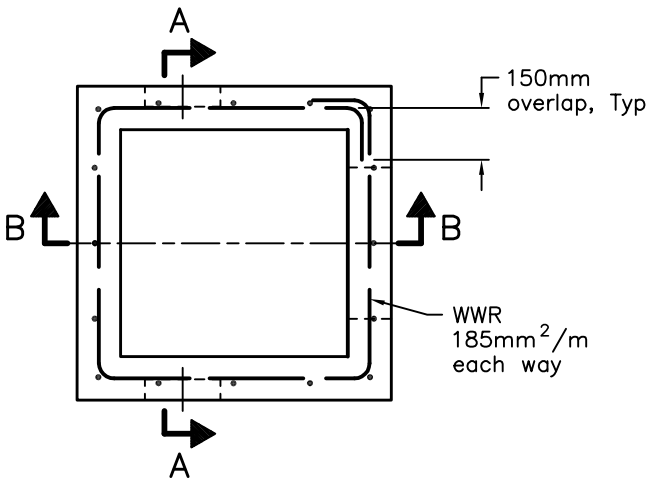
ONTARIO PROVINCIAL STANDARD DRAWING

PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS

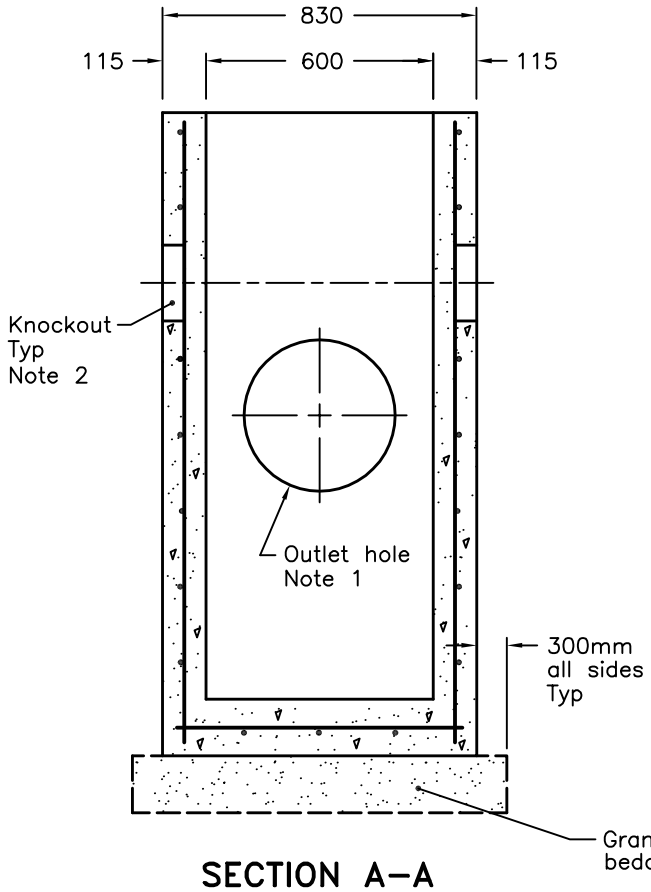
Nov 2014 | Rev 3

OPSD 704.010

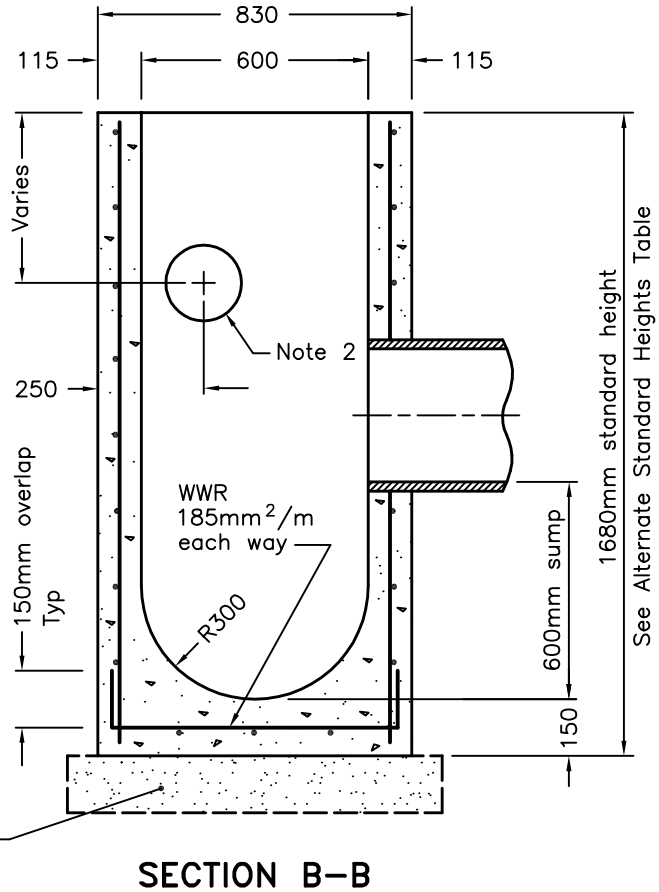
ALTERNATE STANDARD HEIGHTS	
ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1520
D	1380



PLAN



SECTION A–A



SECTION B–B

NOTES:

1 Outlet hole size 525mm diameter maximum, location as required.

2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.

A Centre reinforcing in base slab and walls ±20mm.

B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.

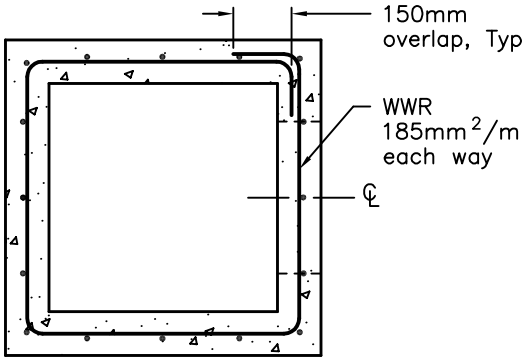
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.

D Pipe support shall be according to OPSD 708.020.

E All dimensions are nominal.

F All dimensions are in millimetres unless otherwise shown.

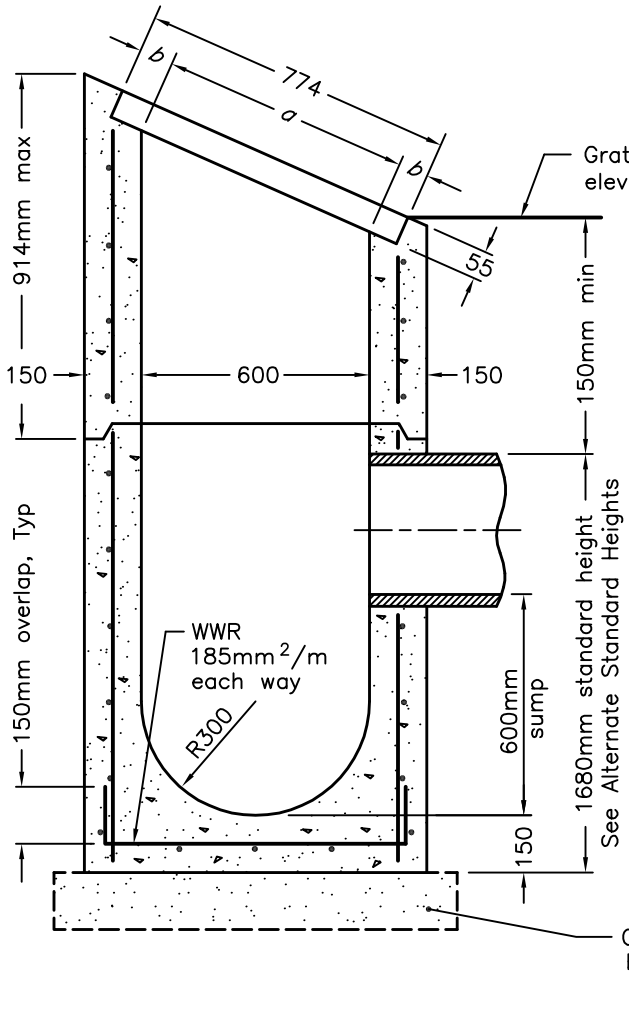
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE CATCH BASIN 600x600mm		
		OPSD 705.010



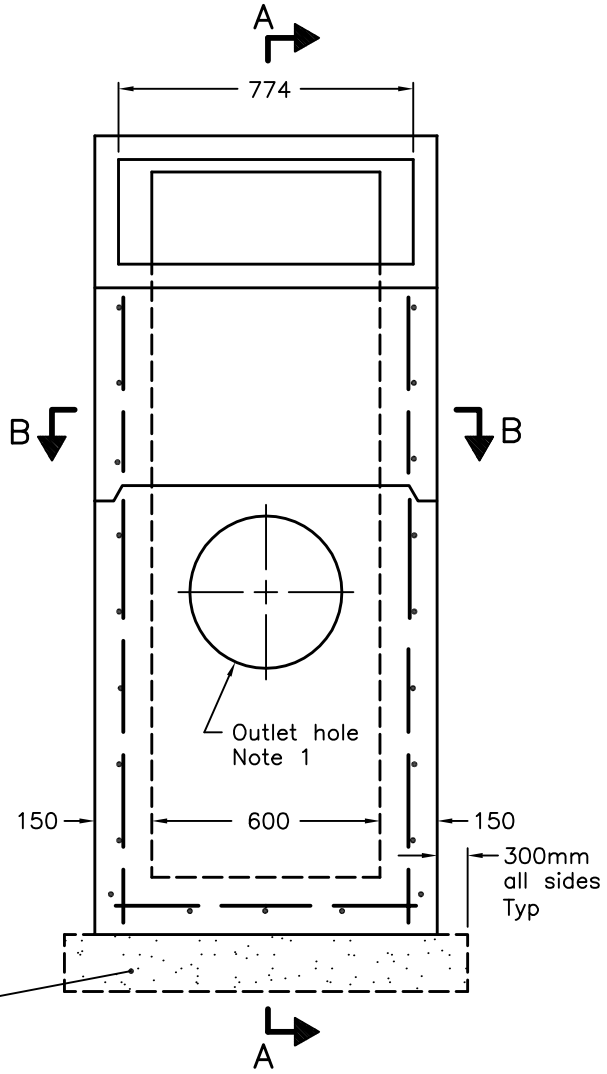
SECTION B–B

Alternate Standard Heights	
Alternate	Dimension
A	1980
B	1520
C	1380

Opening Dimensions			
Grate		*a*	*b*
Type	Slope		
A	2H:1V	670	52
	3H:1V	632	71
	4H:1V	618	78
	6H:1V	608	83
	HOR	600	87



SECTION A–A



FRONT VIEW

NOTES:

1 Outlet hole size 525mm maximum diameter, location as required.

A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope shall be 6H:1V or flatter.

B Center reinforcing in wall and slab ±25mm.

C Granular backfill shall be placed to a minimum thickness of 300mm all around the ditch inlet.

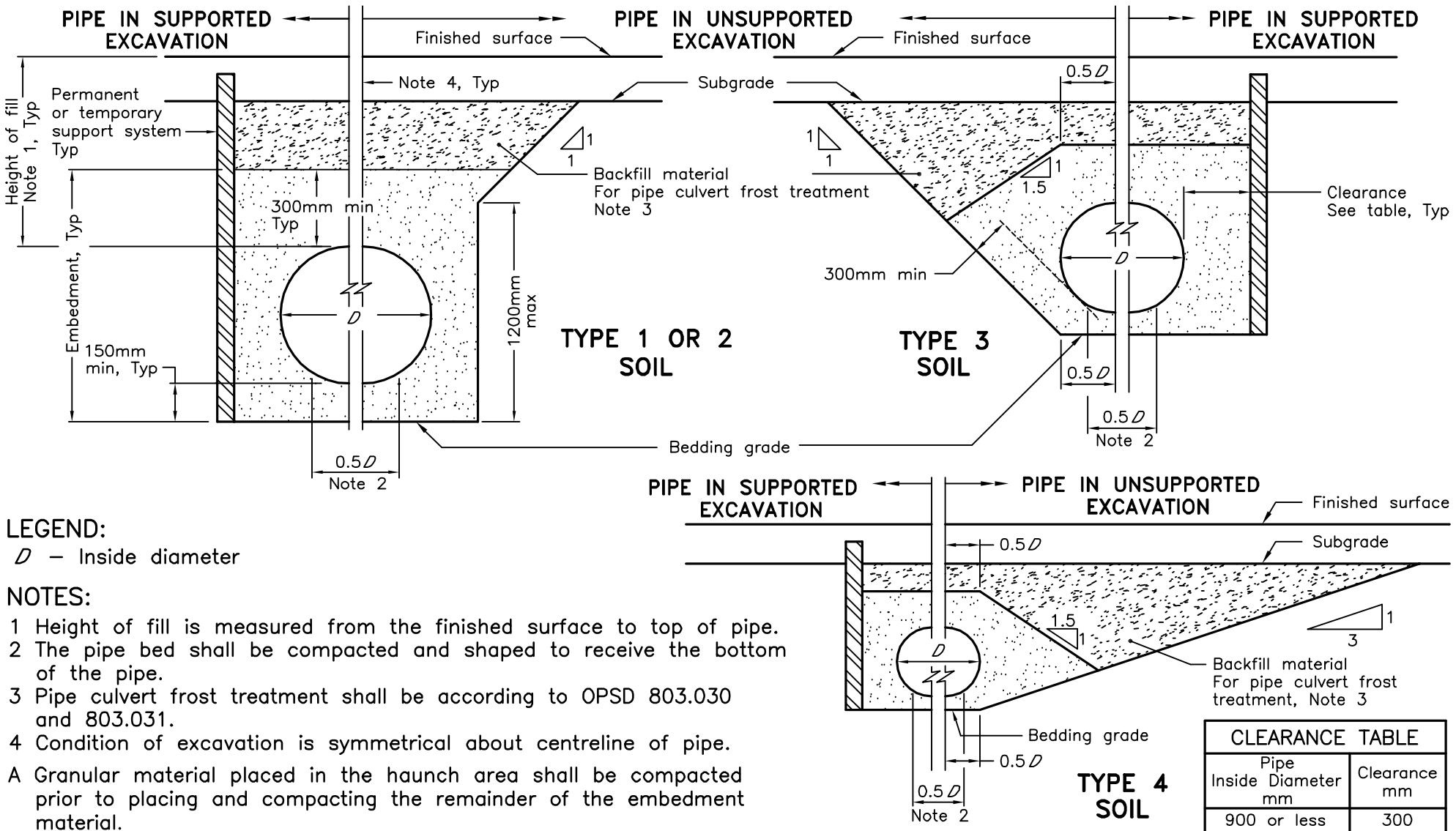
D Grating shall be according to OPSD 403.010.

E Pipe support shall be according to OPSD 708.020.

F All dimensions are nominal.

G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev	4
PRECAST CONCRETE DITCH INLET 600 x 600mm			
		OPSD 705.030	



LEGEND:

D – Inside diameter

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.

A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.

B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.

C All dimensions are in metres unless otherwise shown.

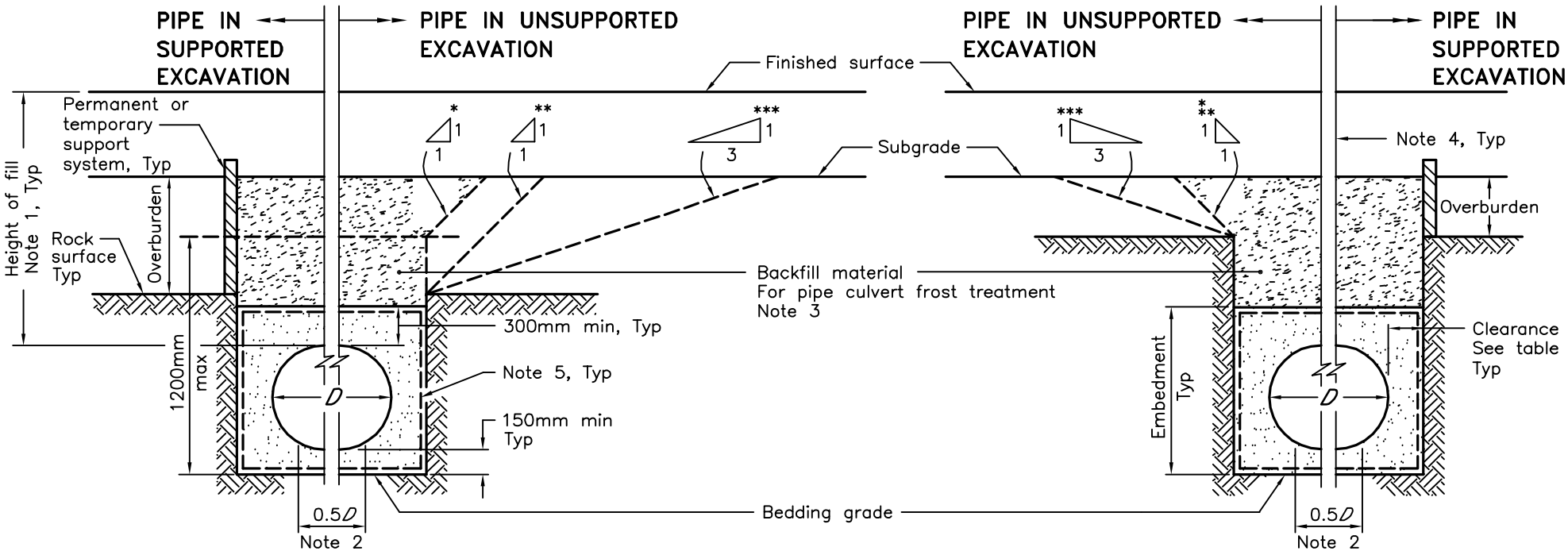
CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014 | Rev 3

FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION

OPSD 802.010



ORIGINAL ROCK < 1200mm ABOVE TRENCH BOTTOM

ORIGINAL ROCK ≥ 1200mm ABOVE TRENCH BOTTOM

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
5 Embedment material shall be wrapped in non–woven geotextile when specified.

A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C Fractured rock shall be treated as Type 1 soil.
D All dimensions are in metres unless otherwise shown.

LEGEND:

D – Inside diameter
* – Type 1 or 2 soil
** – Type 3 soil
*** – Type 4 soil

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

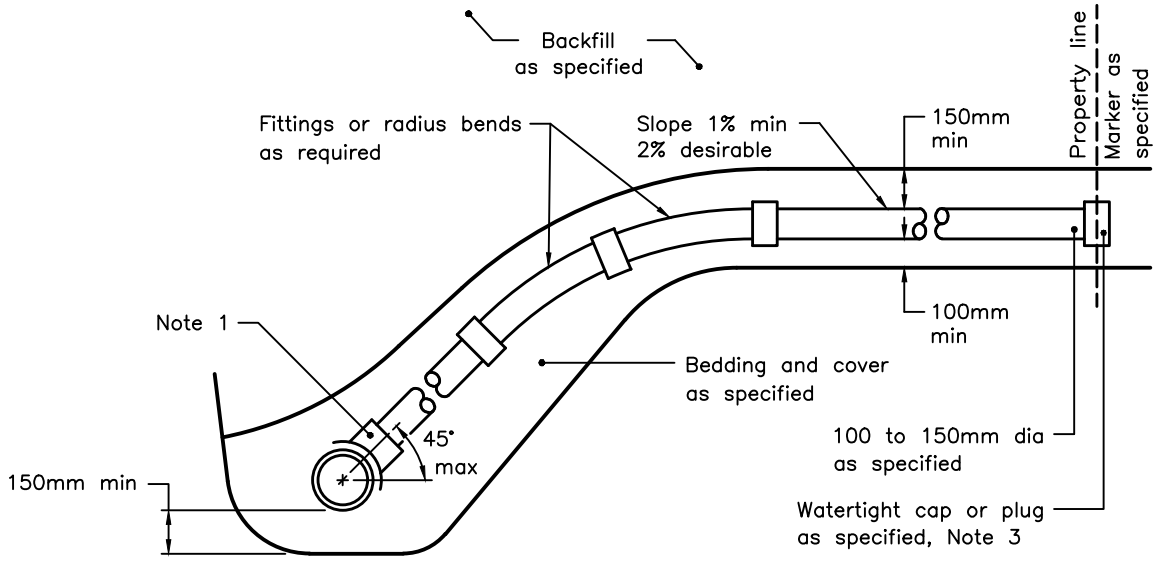
ONTARIO PROVINCIAL STANDARD DRAWING

FLEXIBLE PIPE EMBEDMENT AND BACKFILL ROCK EXCAVATION

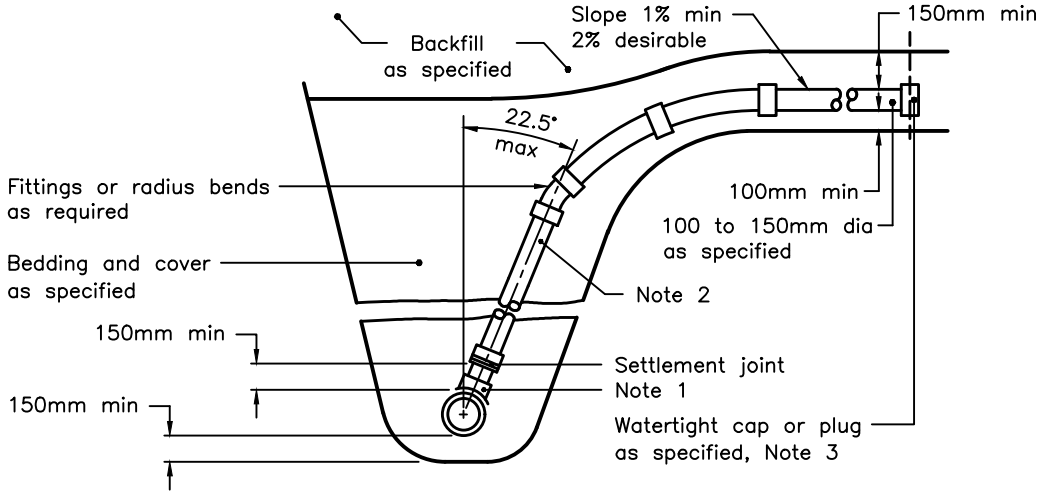
Nov 2014 | Rev 3

ONTARIO STANDARDS · MUNICIPAL – PROVINCIAL · OPS

OPSD 802.013



CONNECTION WITHOUT VERTICAL RISER



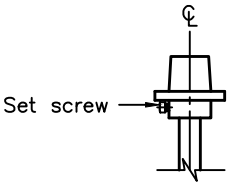
CONNECTION WITH VERTICAL RISER

NOTES:

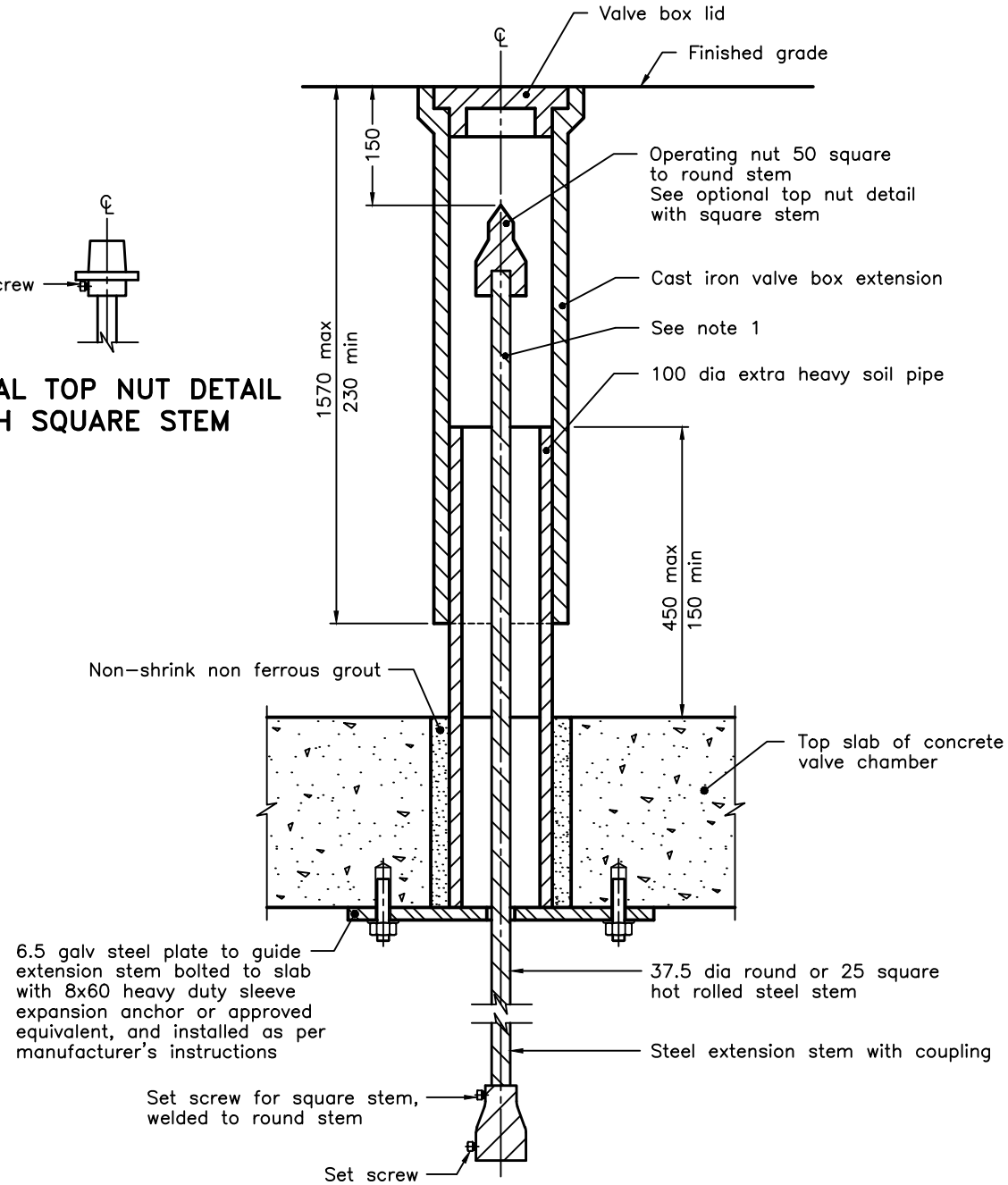
1 Sewer service connections to the main pipe sewer shall be made using factory made tees, strap–on–saddles, or other approved saddles.
2 Vertical risers shall be as specified.
3 Cap or plug at property line shall be adequately braced.

A Maintenance holes shall be used at the main sewer to connect service connections greater than 200mm.
B For new construction, saddles shall be installed on the main pipe before that pipe is laid.
C Approved cut–in tool shall be used for field made connections.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev	4
SEWER SERVICE CONNECTIONS FOR MAIN PIPE SEWER			
	OPSD 1006.010		



OPTIONAL TOP NUT DETAIL WITH SQUARE STEM



CROSS SECTION

NOTES:

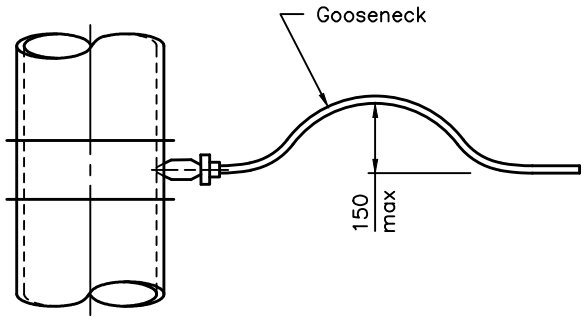
1 Either the square or round stem shall be used with specified connections.

A Valve stem and valve shall be placed plumb.

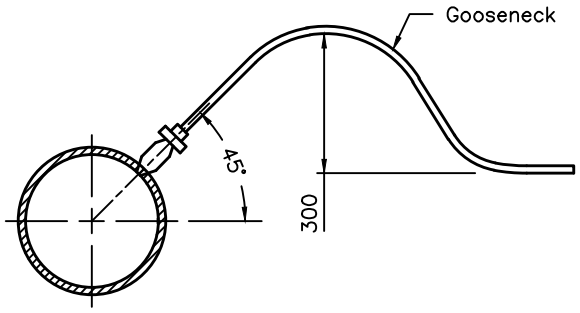
B Stem guide is required if the unsupported length exceeds 2.0m.

C All dimensions are in millimetres unless otherwise shown.

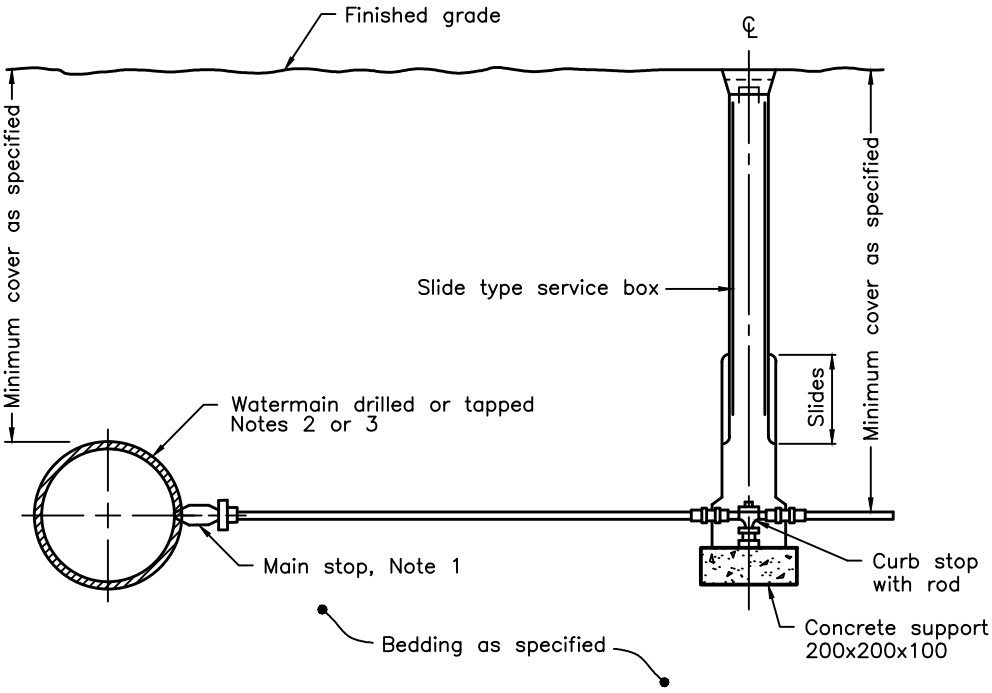
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	4
VALVE OPERATOR			
			OPSD 1101.020



HORIZONTAL GOOSENECK



VERTICAL GOOSENECK OPTION



VERTICAL SECTION

NOTES:

1 For plastic service pipes, install main stop at 15° above horizontal with a minimum 1.2m long gooseneck.

2 Direct tap ductile iron pipe with approved tool with standard AWWA inlet thread.

3 Service connections to plastic watermains shall be made using service saddles or factory made tees.

A When specified, the vertical gooseneck option shall be used.

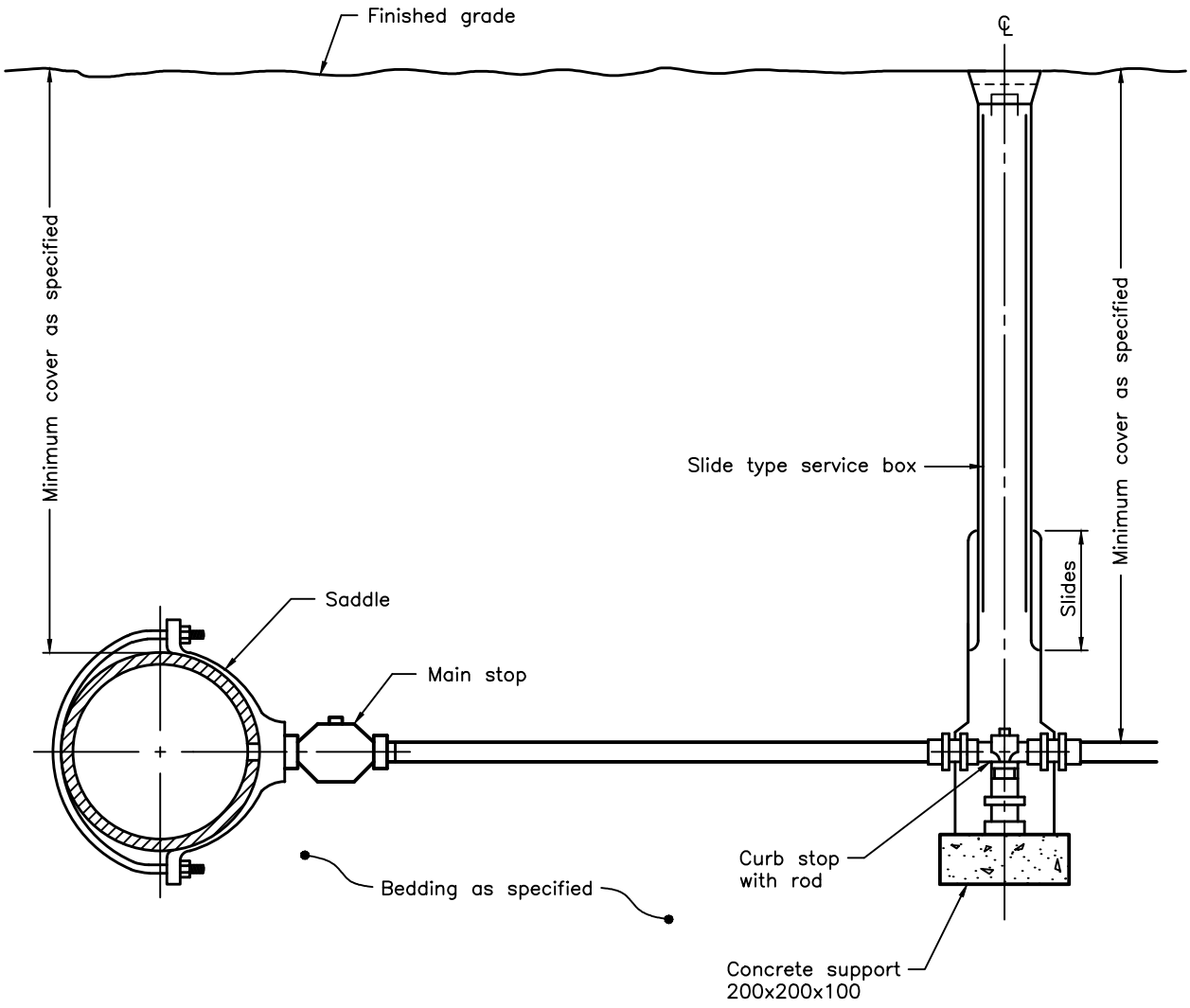
B Couplings shall not be permitted unless the service length exceeds 20m between the main stop and curb stop.

C All water services shall be installed 90° to the longitudinal axis of the watermain.

D Backfill material within 500mm of service box shall be native or imported, as specified.

E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	4
WATER SERVICE CONNECTION 19 and 25mm DIAMETER SIZES			
	OPSD 1104.010		



NOTES:

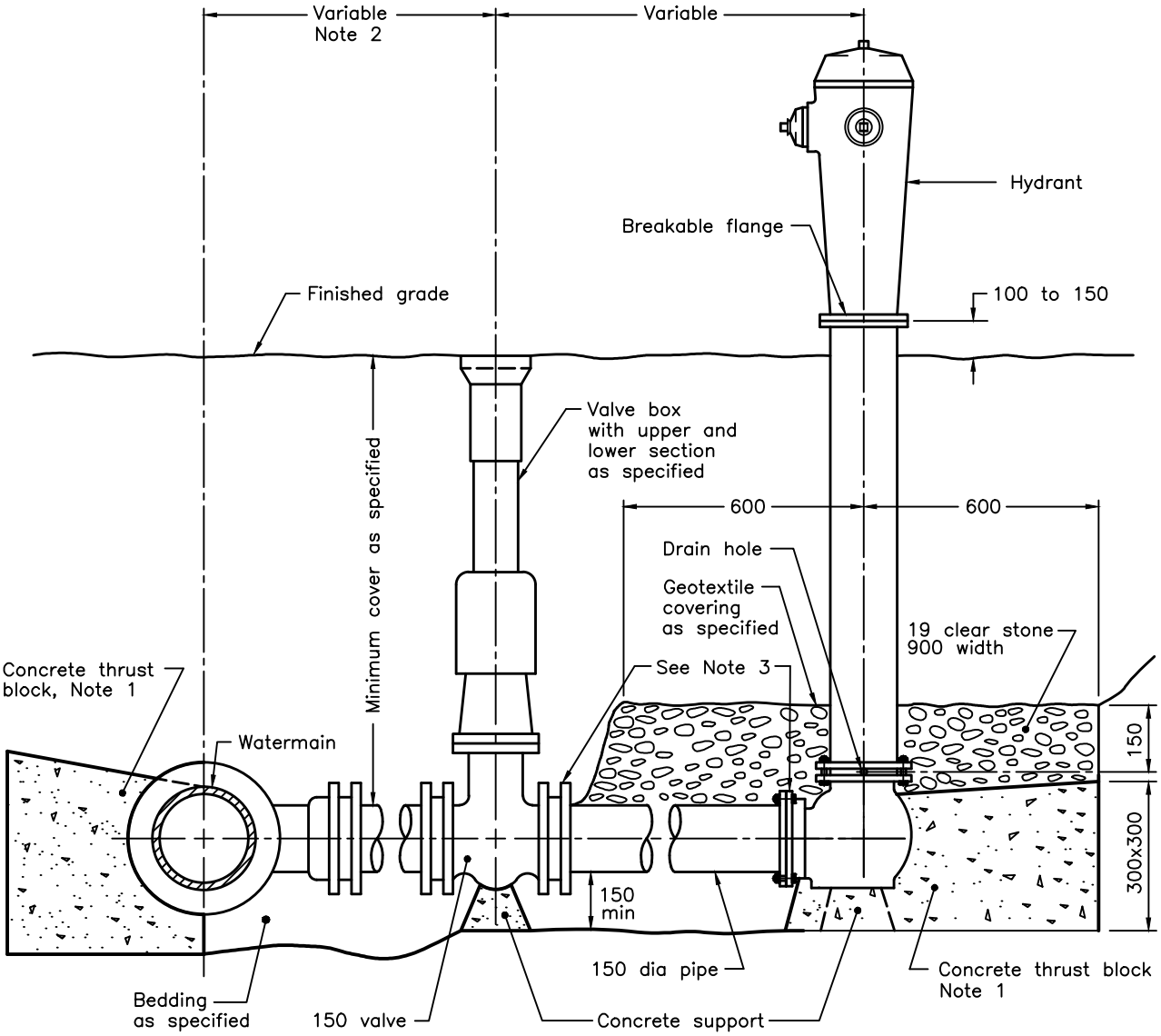
A Couplings shall not be permitted unless the service length exceeds 20m between the main stop and curb stop.

B All water services shall be installed 90° to the longitudinal axis of the watermain.

C Backfill material within 500mm of service box shall be native or imported, as specified.

D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	3
WATER SERVICE CONNECTION 32, 38, and 50mm DIAMETER SIZES	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _		
	OPSD 1104.020		



NOTES:

1 All concrete thrust blocks shall be poured against undisturbed ground.

2 When specified, for watermains 400mm and less, locate valve within 1.0m of centreline of watermain. Retaining and restraining devices shall be utilized. For watermains 600mm and over, bolt valve with flanged end directly to flanged tee.

3 Retaining and restraining devices shall be as specified.

A Bond breaker shall be used between the concrete and the fittings and appurtenances.

B Bolts and nuts for buried flange to flange connections shall be stainless steel.

C When required, flange of standpipe extensions shall not be in frost zone.

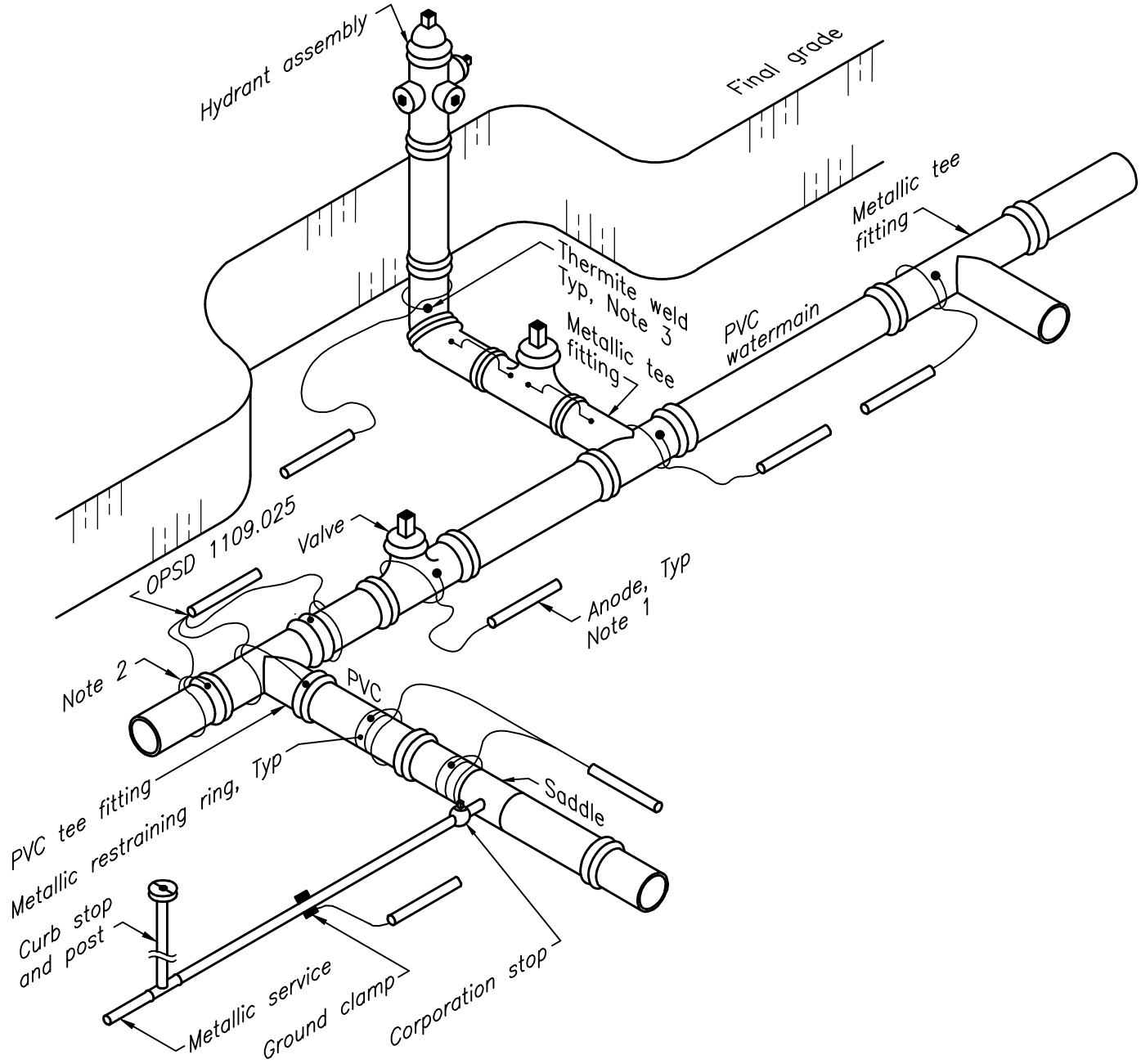
D This OPSD shall be read in conjunction with OPSD 1103.010 and 1103.020.

E Backfill material within 500mm of service box shall be native or imported, as specified.

F Tracer wire shall be installed as specified.

G All dimensions are in millimetres unless otherwise shown.

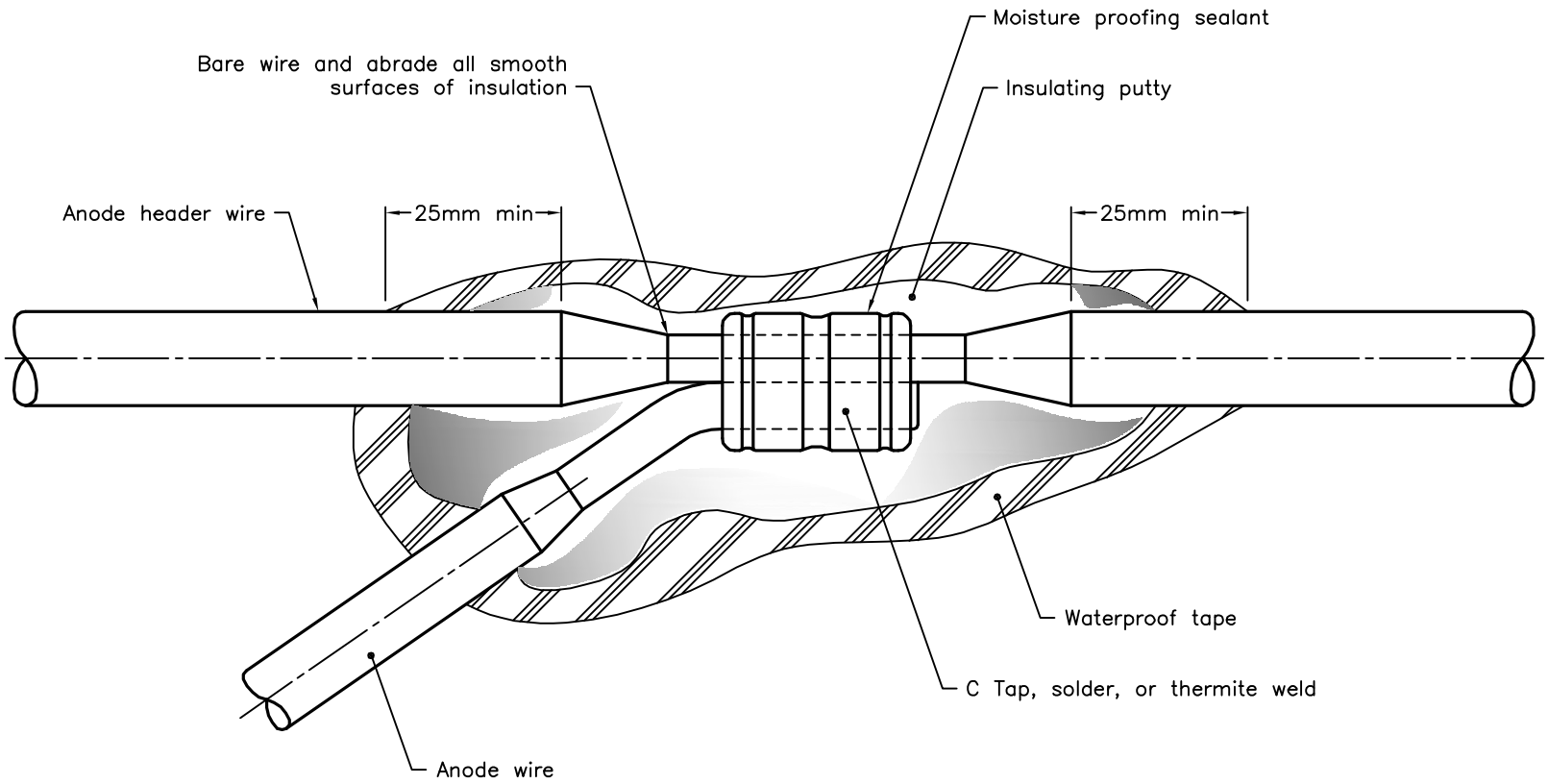
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	3
HYDRANT INSTALLATION			
	OPSD 1105.010		



NOTES:

1 Anode shall be placed at least 1.0m away from the water system pipe and appurtenances and as deep as the bottom of the pipe and appurtenances or as specified in Contract Documents.
2 Anode connecting wire shall be loosely wrapped around pipes and fittings and knotted.
3 Protective coating shall be applied to all thermite welds.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2020	Rev	3
CATHODIC PROTECTION FOR PVC WATERMAIN SYSTEMS			
	OPSD 1109.011		



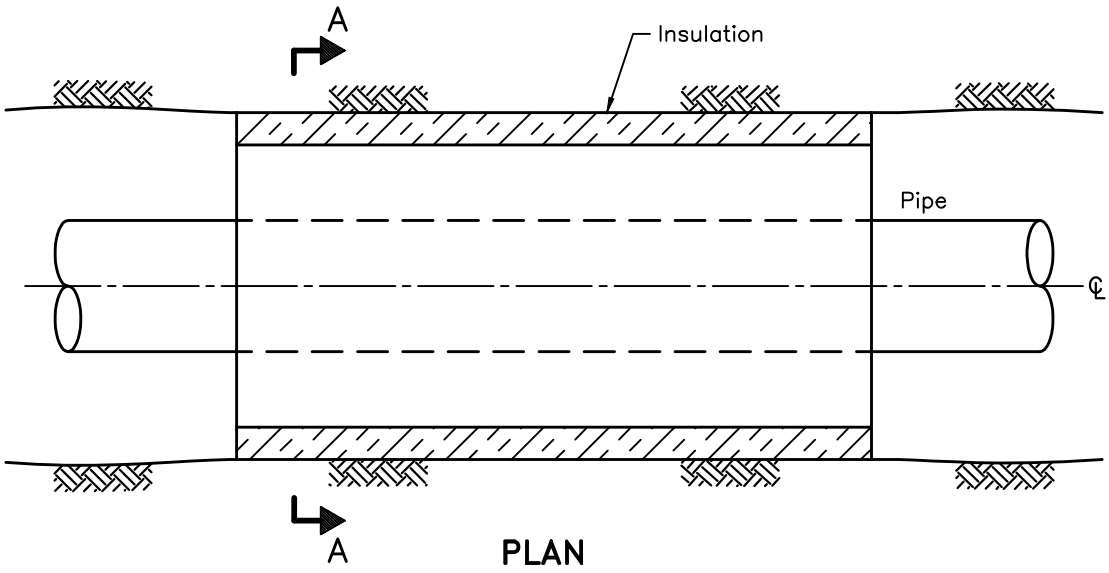
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

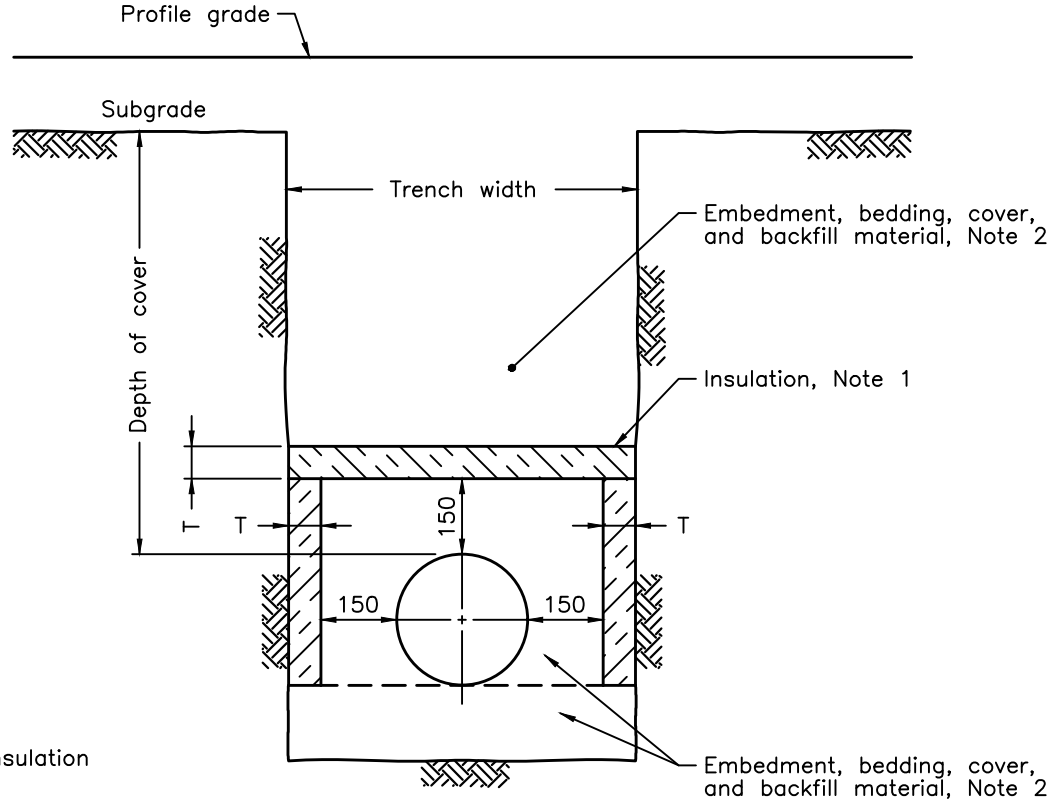
WATERPROOFING OF SPLICES

Nov 2015 | Rev 1

OPSD 1109.025



PLAN



T = thickness of insulation

SECTION A–A
TYPICAL PIPE INSULATION DETAIL

NOTES:

1 The insulation material shall be extruded polystyrene according to OPSS 1605 with a minimum compressive strength of 275 kPa.

2 Pipe embedment or bedding, cover, and backfill shall be according to:
a) Flexible OPSD 802.010, 802.013, 802.020, and 802.023.
b) Rigid – OPSD 802.030, 802.031, 802.032, 802.033, 802.050, 802.051, 802.052, and 802.053.

A Minimum insulation thickness shall be 50mm.

B Joints shall be staggered for multiple insulation sheets.

C This OPSD is to be read in conjunction with OPSD 3090.100 and 3090.101.

D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2020	Rev	1
INSULATION FOR SEWERS AND WATERMAINS IN SHALLOW TRENCHES			
	OPSD 1109.030		

SPECIAL PROVISIONS - GENERAL

1.0 GENERAL

Please read this section carefully.

These general conditions and specifications forming a part of this tender, shall constitute a valid and binding contract between the successful Tenderer and the Corporation of the Town of Blind River and it shall ensure to the benefit of, and be binding upon both their successors, executors, administrators and assigns.

2.0 DEFINITIONS

The word "Corporation" or "Owner" means the Corporation of the Town of Blind River.

The word "Engineer" shall be understood as referring to TULLOCH Engineering Inc.

The word "Contract" means the agreement to do the work entered into with the Corporation, the general conditions, the specifications, the drawings, and other documents referred to or connected with the said contract.

The word "Contractor" means the person or persons who have undertaken to carry out this contract.

The word "Work" shall mean the execution of the whole work, and things required to be done, mentioned, or referred to, in the contract documents and including all extra or additional work that may be ordered by the Engineer.

The words "Working Day" mean any weekday,

A. except Saturdays, Sundays, and statutory holidays;

B. except a Day as determined by the Contract Administrator, on which the Contractor is prevented by inclement weather or conditions resulting immediately there from, from proceeding with a Controlling Operation. For the purpose of this definition, this will be a Day during which the Contractor cannot proceed with at least 60% of the normal labour and equipment force effectively engaged on the Controlling Operation for a least 5 hours;

C. except a Day on which the Contractor is prevented from proceeding with a Controlling Operation, as determined by the Contract Administrator by reason of,
   i) any breach of the Contract by the Owner or if such prevention is due to the Owner, another contractor hired by the Owner, or an employee of any one of them, or by anyone else acting on behalf of the Owner.
   ii) on-delivery of Owner supplied materials,
   iii) any cause beyond the reasonable control of the Contractor, which can be substantiated by the Contractor to the satisfaction of the Contract Administrator.

An exception will not be made to the Contractor for the Contractor's inability to provide the normal labour and equipment force for at least 8 hours per day, 5 days per week,

Monday through Friday on a Controlling Operation, as a result of other contracts, projects or activities the Contractor may be completing.

The words "Controlling Operation" mean any component of the Work, which, if delayed, will delay the completion of the work.

3.0 EQUIPMENT INVENTORY

The successful bidder on this contract will be required, before commencement of the work, to submit a complete inventory of all their and any Sub-contractors' equipment that is proposed to be used on the project. This information must comply with OPSS.PROV Form 127, latest version, for the Identification of Equipment and will be submitted on the form provided in these documents. Force account payments will not be processed until this form is completed to the Engineer's satisfaction.

4.0 COMMENCEMENT & COMPLETION

After award of contract, the Contractor shall commence work on-site as soon as possible, and no later than July 22nd, 2024. The Contractor shall work expeditiously to complete all constructions works, including paving, from Woodward Avenue to Murray Street prior to winter shutdown and restart no later than June 1st, 2025 to complete the remaining works by no later than August 16th, 2025.

5.0 INCLEMENT WEATHER

There will be no compensation for inclement weather. At the discretion of the Engineer, an extension of time may be granted for any day in which inclement weather conditions prevent the Contractor from proceeding with a controlling operation, in accordance with the Ontario Provincial Standards Municipal General Conditions GC 3.06 of Contract, November 2019.

6.0 SCHEDULE AND WORK METHODOLOGY

Time is of the Essence on this Project with all works to be completed by August 16th, 2025, over a total combined construction period of 28 weeks. Prior to the commencement of construction, the Contractor will complete and submit to the Engineer, a detailed construction schedule and a work methodology for review by the Engineer.

The schedule and description of work methods shall be submitted one week prior to the start of construction and shall include, but not necessarily be limited to, the following requirements:

a) Work a minimum of 5 days per week, 8 hours per day on controlling operations except for Statutory Holidays.
b) Work on the project to be completed withing 28 working weeks.
c) If paving cannot be completed by the no-pave deadline, November 15th, 2024, the existing asphalt surface shall be ramped, and all roadways must be reconstructed to design elevations with granulars prior to winter shutdown to allow proper functioning of the roadway for winter maintenance and spring runoff.

The Contractor will not be allowed to commence construction unless this plan has been submitted to the Engineer for review. It will be the Contractors responsibility to update the schedule at regular intervals as required to ensure that it is current with construction operations.

7.0 CONTRACTOR'S REPRESENTATIVE ON SITE

The Contractor shall, during the whole of the contract, provide an on-site Project Superintendent, (the individual of which is to be mutually agreed upon by the Contractor and Contract Administrator), who shall be responsible for and have authority over all work performed under this Contract, or extension to this Contract. The Project Superintendent shall be fully conversant in the terms and requirements of the Contract Documents, all Provincial and Municipal Health and Safety Regulations, OPSS, and OPSD, and any other specification referred to in the Contract Documents. The Project Superintendent shall remain on site at all times that work is being performed whether by the Contractor or Subcontractor. Replacement of the Project Superintendent is strictly forbidden unless prior written approval is obtained from the Contract Administrator.

8.0 LABOUR & MATERIALS

The contractor shall provide and furnish all manner of labour, materials, apparatus, utensils, and cartage of every description needful for the due performance of the work, and render all due and sufficient facilities to the Engineer for the proper inspection of the work. The Engineer may require the contractor to dismiss any workers who may be incompetent, uncivil, or abusive: the workers and contractor only being admitted to the grounds for the purpose of proper execution of the work.

The Contractor will be required to use local labour as much as possible for the work under this contract.

9.0 GUARANTEE PERIOD

(a) The Contractor shall guarantee that the material and work shall for a period of twelve (12) months from the acceptance date remain in such condition as will meet the Engineer's approval, and that he/she will make good in a permanent manner, satisfactory to the Engineer, any imperfections due to materials or workmanship used in the construction and any damage caused by such imperfections. The decision of the Engineer shall be final as to the nature and cause of such imperfections and the necessity for remedying them.

Should the Contractor fail to comply with the directions of the Engineer, the Engineer may, after giving the Contractor forty-eight (48) hours written notice, perform the necessary work, and the cost may be deducted, or collected by the owner as provided in the contract.

(b) Notwithstanding the provision of the subsection (a) of this clause, the Engineer may, in cases of danger or public safety, make such immediate arrangements for repair as he/she sees fit, and the Engineer will inform the Contractor of such action. The cost of such emergency work shall be borne by the Contractor.

(c) If the Engineer notifies the Contractor, in writing, of imperfections prior to the termination of the guarantee period, the Contractor shall make good the imperfections as required in subsection (a) above, notwithstanding that such work of making good may commence after or extend beyond the end of the guarantee period.

(d) The contractor shall pay for all additional contract administration, inspection, and material testing costs incurred by the Owner resulting from warranty repair works. Such payments shall be deducted from the warranty holdback amount prior to its release.

10.0 GUARANTEE PERIOD HOLDBACK

To cover the rectification costs during the guarantee period, the Corporation shall retain 3% of the value of work done completed monthly. This holdback will be retained for a period of twelve (12) months after project completion.

11.0 PROGRESS PAYMENT AND MONTHLY REPORT

The Engineer shall supply the monthly progress payment report. Statutory Holdback will be in the amount of 10% and Warranty Holdback of 3% of the value of work complete.

12.0 SUBSTANTIAL PERFORMANCE

The project will be considered substantially performed when all parts of the contract are completed in accordance with the Construction Act.

13.0 STATUTORY DECLARATION OF PAYMENTS, LIENS & LIABILITIES

Prior to the release of the Construction Act Holdback, the Contractor shall be required to complete a "Statutory Declaration of Payments, Liens and Liabilities" form.

14.0 EXTRA WORK

(a) Extra work shall be undertaken as described in subsection GC3.10.02 of the General Conditions.

(b) If applicable tender items are provided in other parts of the contract, extra work shall be performed using the appropriate unit prices from these parts.

(c) Extra work shall be paid under the contingency allowance.

15.0 QUANTITY OVER RUNS AND UNDER RUNS

Compensation for quantity over runs and under runs shall be as described in GC 8.01.02 of the General Conditions, as may be modified by item specific provisions.

16.0 REJECTED MATERIAL

All material that does not meet specifications, as determined by the Engineer, will be rejected and must be removed and replaced. This shall be done at the Contractor's expense.

17.0 UTILITIES, FENCES, AND PRIVATE PROPERTY

The Contractor shall be responsible for the protection of all utilities, fences and private property at the job site during the time of construction.

The Corporation and Engineer do not guarantee the location of any underground utility, nor will they pay any penalty if the Contractor accidentally damages any utility. The Contractor is solely responsible for the preservation of all utilities. The Contractor shall locate and preserve all utilities and all damages are solely the Contractor's responsibility.

The Contractor shall be responsible for the temporary support of all existing underground or aerial utility plant during construction of the Works. Any costs associated with the support of such utilities will be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

The Contractor shall, at all times, provide the respective utility companies with access to the work site as may be required. On direction of the Utility the Contractor will be required to have the Utility provide support to utility poles during excavation operations adjacent to the poles.

The Contractor shall, at all times, follow the requirements outlined in Enbridge's Third-Party Requirements in Vicinity of Natural Gas Facilities Standard, 2024.01.31.

18.0 LAYOUT

The Contractor will be responsible for the layout of all lines and grades from plans. The benchmark to be utilized on this project is identified on the contract drawings and shall be verified by the Contractor prior to completing layout. From this benchmarks and points of reference, the Contractor will do their own setting out. The setting out by the Contractor shall include but shall not be limited to the preparation of grade sheets, the installation of centre line stakes, grade stakes, offsets, site rails and screeds to the satisfaction of the Engineer and shall be included in the unit prices bid in the Form of Tender.

The Contractor shall also be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments and labour in connection therewith. The Contractor shall not be responsible for the correctness of the information supplied by the Engineer as herein provided for. If at any time during the progress of the works any error shall appear or arise in the position, levels, dimensions, or alignment of any part of the works, the Contractor shall, at their own expense, rectify such error to the satisfaction of the Engineer, unless such error is based on incorrect data supplied in writing by the Engineer. The checking of the setting out of any line or level by the Engineer shall not in any way relieve the Contractor of their responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all benchmarks, stakes and other things used in setting out the works.

Establish control lines and levels for construction of work providing a minimum of three (3) consecutive reference points not exceeding 15 metres apart, or at closer spacing as required or directed by the Engineer, for each section of work. Control lines and grades by use of lasers or other methods may be used if approved by the Engineer.

The Contractor shall not proceed with any work unless all reference points and levels are in place along a section of work under construction.

19.0 CLEANING UP

After all work is completed, the site of the work shall be cleared of all remaining materials, waste, etc., and left in a neat and tidy condition to the satisfaction of the Owner and Engineer.

20.0 DRAWINGS & SPECIFICATIONS

The drawings and specifications form a part of the official contract. One complete copy of all contract documents in good order shall be kept by the contractor at the site of work.

The Engineer may furnish additional drawings to clarify the work; such drawings shall become part of the contract documents.

21.0 CONDUCT OF CONTRACT

During the course of the execution of the contract, should any discrepancies appear, or differences of opinion or misunderstanding arise as to the meaning of the contract, or of the

specifications, or as to the due and proper execution of the work, or as to any other questions or matters arising out of the contract, the same shall be determined by the Engineer, whose decision shall be final and binding upon all parties concerned, and from it there shall be no appeal.

22.0 ENGINEER'S AUTHORITY

The Engineer may supervise all the work to the extent of ensuring the fulfillment of the contract and the completion of the work in accordance with the plans and specifications.

The Engineer shall determine the quantities of the several kinds of work which are to be paid for under contract, and determine all questions relating to said work and construction thereof. The Engineer shall in all cases decide every question which may arise relative to the performance of the contract, and their estimate and findings shall be final.

The Engineer shall, within a reasonable time, render a decision on all claims by the contractor and all questions which may arise relative to the performance of the work, or the interpretation of the contract. The contractor shall at all times, and at their own expense, furnish all reasonable aid and assistance required by the Engineer or any Inspector for the proper inspection and examination of the work or part thereof.

The contractor shall furnish, at their own expense, samples for testing when required and shall furnish all reasonable facilities for the inspection of the material and workmanship. The contractor shall obey the directions and instructions of any Inspector and they shall be made in writing at the request of the Contractor.

Notwithstanding any inspection that the Corporation might carry out, the failure of the Engineer or the Inspector to condemn or object to any defective work or material shall not constitute a waiver of any specifications of the approval or acceptance of such defective work or material and, except as otherwise provided herein, the contractor shall be and remain liable for such defective work or material and any loss, costs, charges, or expenses in connection therewith.

23.0 POWER OF OWNER TO COMPLETE WORK

Should the contractor become insolvent or at any time refuse to or neglect to supply sufficient properly skilled workers or materials of the proper quality, or fail in any respect at any time to prosecute the work with promptness or diligence, or fail in the performance of any agreements herein contained, such refusal, neglect, or failure being certified by the Engineer, the Owner shall be at liberty after three days written notice to the contractor to provide any such labour or materials, and to deduct the cost thereof from any money then due under the contract or thereafter to become due under the contract to the contractor. If the Engineer should notify the Owner that such refusal, neglect, or failure is sufficient grounds for such actions, the Owner shall also be at liberty to terminate the employment of the contractor for said work and to enter upon the premises and take possession for the purpose of completing the work under the contract, all materials, tools, and appliances thereof and employ any other persons to furnish the work.

In case of any discontinuance of the employment of the contractor, he/she shall not be entitled to receive further payments under the contract until the said work will be wholly finished, at which time, if the unpaid balance of the amount to be paid under the contract shall exceed such unpaid balance the contractor shall pay the difference to the Owner. The expense incurred by the Owners as hereinafter provided either for furnishing materials or for finishing work, and any

damage incurred through such default shall be audited and certified by the Engineer whose certificate shall be conclusive upon all parties.

24.0 ROAD CLOSURES

The Contractor must comply with the requirements of the Town of Blind River in regards to Traffic Flow on Municipal Streets. Temporary, short term full road closures between intersecting roads may be permitted for the construction of the works, provided notification to affected residents and alternate access is provided. Pedestrian access must be maintained at all times. Multiple closure areas at the same time will not be permitted.

The Contractor shall prepare a Traffic Plan for review by the Engineer and the Town of Blind River in advance of construction based on discussions to be held at the prestart meeting. The Contractor will be responsible for all notification and signage relating to the closures, detours and site conditions.

25.0 ENVIRONMENTAL CONTROLS

The Contractor shall ensure that no detrimental environmental effects occur as a result of the work. The Contractor shall follow all Municipal, Provincial and Federal Acts and Regulations during the performance of the work. The Contractor shall monitor the project to ensure compliance with environmental conditions of construction. The Contractor shall ensure that sediment and other deleterious material do not gain entry to watercourses by means of cofferdams, turbidity curtains and any other means acceptable to the Engineer.

All activities, including equipment maintenance and refueling, shall be controlled to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble or concrete material, into a water body or storm sewer system. Any such material, which inadvertently enters a water body or storm sewer system, shall be removed by the Contractor, at their own expense, in a manner satisfactory to the Contract Administrator.

Construction material, excess material, construction debris and empty containers shall be stored away from water bodies and banks of water bodies.

Sediment laden or turbid water generated from activities such as excavation dewatering shall be discharged into a proper sediment containment system for settling and filtration.

In the event that the Contract Administrator determines that controls are unacceptable, the Contractor shall cease such operations as identified by the Contract Administrator, which are determined to be causing the entry of deleterious material into water bodies. Such operations shall remain suspended until otherwise directed by the Contract Administrator in writing. This will not require the cessation of work for such essential operations as continuous concrete pours for structures, unless otherwise directed by the Contract Administrator.

All erosion and sediment control measures shall be integrated with a construction operation schedule as determined by the Contractor. Operations in any sensitive area shall not be commenced until temporary erosion and sediment control measures have been installed.

Erosion and sediment control measures shall accommodate other aspects of the work including, but not restricted to, the following:

a) Work area requirements, including equipment access, operation and storage, and material supply utilization and storage.

b) Surface drainage from outside, through and around the work.
c) Areas of disturbed soil and soil stockpiles.
d) Means of access to erosion and sediment control measures requiring maintenance.
e) Constraints that may be specified elsewhere in the contract.
f) Protection of completed portions of the work.

All vegetated cover not specified for removal shall be preserved in order to minimize erosion and sedimentation.

The Contractor shall monitor the erosion and sediment control measures and if the measures are found to be ineffective, the Contractor shall immediately make changes to the measures to control erosion and sediment.

Temporary erosion and sediment control measures shall be kept in place and maintained until all work within a sensitive area has been completed and stabilized. Temporary control measures shall be removed at the completion of the work but not until permanent erosion control measures, as specified in the contract have been established.

26.0 IDENTIFICATION OF LOCAL REGULATORY AUTHORITIES

The following is provided for information only, to facilitate contact with and notification to regulatory authorities as specified in the Contract Documents:

Regulatory Authority	**Notification Requirement**
MOECP: Spills Action Centre (SAC) 1-800-268-6060	For notification of a spill to the environment under the Environmental Protection Act
Municipality: Town of Blind River (705) 356-2251	For notification of a spill to the environment under the Environmental Protection Act
MOECP: Sault Ste. Marie District Office (705) 942-6354 1-800-263-1035	For Waste Management Approval under the Environmental Protection Act
MNRF: Blind River Area Office (705) 949-1231	For notification of the release of a deleterious substance to a watercourse under the Fisheries Act
DFO: Environmental Response 1-800-265-0237	For notification of the release of a deleterious substance to a watercourse under the Fisheries Act
Local Police: OPP – Blind River (705) 356-2244	For notification of a Dangerous Occurrence involving dangerous goods under the Transportation of Dangerous Goods Act

27.0 EMERGENCY SERVICES DAILY NOTIFICATIONS

The Contractor shall be responsible for daily notification to the Town's Emergency Services regarding the roadworks and associated closures during construction of the Works. Any costs associated with the notifications shall be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

28.0 CANADA POST

The Contractor shall be responsible for arranging with Canada Post to ensure uninterrupted service for residents. Any costs associated with ensuring Canada Post's delivery shall be

considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

29.0 REFUSE & RECYCLING COLLECTION

The Contractor shall be responsible for arranging with the Town's Refuse & Recycling Collection Provider to ensure uninterrupted service for residents. The Town currently provides curbside pickup for refuse and recycling and during construction the Contractor may be required to provide an alternate pickup location to which the Contractor shall collect and deliver the refuse and recycling. Any costs associated with ensuring refuse and recycling collection is uninterrupted shall be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

30.0 SCHOOL BOARDS & TRANSPORTATION

The Contractor shall be responsible for notifying the School Boards and associated transportation companies of the work. Any costs associated with notifications shall be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

31.0 GEOTECHNICAL INFORMATION

A geotechnical program has been undertaken for the project with the full geotechnical report provided as additional information to the contract. The report provided is for information only to indicate the anticipated ground conditions, however no reliance shall be made upon it by the Contractor. The Contractor shall make their own determination and interpretation of the ground conditions across the site and base their bids accordingly.

32.0 EXCESS SOILS

"O.Reg. 406/19, On-Site and Excess Soil Management" is applicable to this project. As reflected on the form of tender, there is a minimum of 3,000m³ of roadway excavation material, which does not include excavations for sidewalks, boulevards, subdrains and other excavation works.

The Contractor shall be responsible for the management and disposal of all excess excavated materials from the works. Existing granulars shall be removed separate from the native materials. Granular and rock excavation materials shall be delivered to the Town's Boom Camp Road Pit. Suitable native materials shall be stockpiled onsite for reuse as backfill as required, with excess native materials delivered to the Town of Blind River Municipal Landfill located at 1182 Highway 17, and left in a neat and uniform manner.

The Contractor must discuss with the Town Foreman in advance to identify the locations for disposal at the respective sites, and materials shall be levelled and left in a neat and uniform manner acceptable to the Town Foreman. Upon completion of the hauling, or at any time deemed necessary by the Owner or Contract Administrator, the delivered materials shall be piled-up with a front-end loader or equivalent to minimize occupied space. End dumped piles will not be considered as satisfactory permanent stockpiles.

At a minimum, the Contractor will be responsible for tracking all truck loads of material with time, date, stationing and receiving location information, based on truck box measurements. Other tracking measures may be required to ensure compliance with the regulations and will be the responsibility of the Contractor. The Contractor will also be responsible for securing the applicable property release forms in accordance with the regulations and OPSS.MUNI 180.

33.0 AS-CONSTRUCTED DATA

The Contractor shall record as-constructed data of all installations, both above and below grade to 3cm combined horizontal & vertical accuracy and provide to the Contract Administrator at the end of construction. Data collection shall be in the same Horizontal and Vertical Datum as the project control. Control points outside of the project limits, used for preparation of the design plans will be provided to the Contractor. Any transferring of control information to site benchmarks will be the responsibility of the Contractor. Any costs associated with establishing site control as well as collection and delivery of data shall be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

34.0 NO NIGHT WORK

No work shall occur between sunset and sunrise for the entire duration of the Contract, unless otherwise approved by the Owner.

35.0 MIGRATORY BIRD PROTECTION - GENERAL

The Contractor shall not destroy active nests (nests with eggs or young birds), or wound or kill birds, of species protected under the Migratory Birds Convention Act, 1994 and/or Regulations under that Act. When active nests are encountered the Owner's Engineer must be contacted.

36.0 DEWATERING

The Contractor shall be responsible for any dewatering that may be required to complete the works. Any costs associated with dewatering shall be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

37.0 DUST CONTROL

The Contractor shall be responsible for any dust control that may be required to complete the works. Any costs associated with dust control shall be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

38.0 SANITARY SEWER & STORM SEWER CCTV INSPECTION

Sewer flushing and CCTV inspections of the installed sanitary and storm sewer lines shall be completed by the Contractor in accordance with OPSS.MUNI 409. All costs associated with the flushing and CCTV inspections shall be included in the unit price for the respective item and no additional compensation will be considered.

39.0 EXISTING SIGNAGE

It shall be the Contractor's responsibility to remove and keep in good condition all signs within the limits of the project. If so directed by the Contract Administrator, any existing sign removed by the Contractor to accommodate construction shall be kept operational by placement on a temporary support. Stop signs, road name signs, municipal address signs (911) and address ranges signs (911) **must** be kept operational at all times.

All signs shall be reinstalled by the Contractor in accordance with the OTM after the work operation is complete. Any costs associated with managing existing signage shall be considered to be included in the unit prices for the various items of work and no additional compensation will be considered.

40.0 MATERIAL TESTING

TULLOCH will provide QA Material Testing, on behalf of the Owner, however the Contractor will be responsible for coordinating all required testing with TULLOCH's site inspector or TULLOCH's

Materials Testing Lab in Sault Ste. Marie. In addition, any inefficiencies on the part of the Contractor, ie. cancelled testing, excessive delays or standbys, small test batches, or failed testing which will require retesting, will be the responsibility of the Contractor and the associated costs will be retained by the Owner from monies owed to the Contractor.

The Contractor shall prepare significant lengths of work requiring concrete testing so to not be incurring testing costs for small concrete pours. Testing costs for small pours that are avoidable will be retained by the Owner from monies owed to the Contractor. The Contractor shall also be responsible for completing their own QC testing per OPSS.

SPECIAL PROVISIONS
SUPPLEMENTARY SPECIFICATIONS
TO ONTARIO PROVINCIAL STANDARD SPECIFICATIONS

ITEM 1 MOBILIZATION/DEMOBILIZATION

SCOPE

The item is for the mobilization and demobilization to the work for all contract related works.

CONSTRUCTION

The Contractor will mobilize the equipment and materials to the site to allow the completion of the works. At the completion of the project the Contractor will demobilize from the site removing all excess materials and repairing all disturbed areas.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum. A payment of 60% will be made for mobilization and 40% for demobilization.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, and material to do the work.

ITEM 2 BONDING

SCOPE

This special provision describes the provision of bonding required for the Contract.

DESCRIPTION

The Contractor shall provide bonding from a company lawfully doing business in the Province of Ontario according to the following requirements:

- Labour and Material Payment Bond for 50% of the Total Tender Price
- Performance Bond for 100% of the Total Tender Price.

Proof of bonding shall be provided to the Engineer prior to entering into the Contract.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum. Full payment for this item will be made with the first progress payment.

BASIS OF PAYMENT

Payment at the Contract Price shall include full compensation for all requirements to provide the bonding as stipulated.

ITEM 3 TRAFFIC CONTROL

SCOPE

This item is for the completion of Traffic Control during construction.

REFERENCES

The requirements outlined in OPSS.MUNI 706 shall apply to this item.

CONSTRUCTION

The Contractor must comply with the requirements of the Town of Blind River in regards to Traffic Flow on Municipal Streets. Temporary, short term full road closures between intersecting roads may be permitted for the construction of the works, provided notification to affected residents and alternate access is provided. Pedestrian access must be maintained at all times. The road must be reopened to local traffic each night.

The Contractor shall prepare a Traffic Plan for review by the Engineer and Town of Blind River in advance of construction.

Traffic Control Signage shall include all work to fulfil requirements of Book 7 – Temporary Conditions of the Ontario Traffic Manual.

The Contractor shall in addition to the requirements outlined in OPSS.MUNI 706 provide “Road Closed – Local Traffic Only” signs and barricades where necessary based on road closure staging. The Contractor shall also provide continuous notification to residents and businesses within the project site outlining the location, time and duration of the closures.

Notification in accordance with section GC7.07 of the General Conditions of the Contract shall be made to all applicable agencies by the Contractor.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment for traffic control. Payment will be by lump sum. Where payment for work is split over multiple certificates, payment will be prorated over the length of the contract as decided by the Engineer.

BASIS OF PAYMENT

Payment at the contract price for the above referenced tender item shall be full compensation for all labour, equipment and material to do the work.

ITEM 5 SUBSURFACE UTILITY INVESTIGATIONS

SCOPE

The Contractor shall conduct subsurface utility investigations to locate Enbridge and Bell infrastructure for areas anticipated to be impacted by the installations. This work shall be completed in advance of construction so any impacts can be mitigated as soon as possible.

CONSTRUCTION

Utilization of a Vac-Truck is required to complete investigative excavations. Excavations are to be backfilled with granular materials and asphaltic cold patch materials utilized where investigations are completed in existing paved areas. Excess soils shall be managed in accordance with OPSS.MUNI 180.

MEASUREMENT FOR PAYMENT

Payment shall be made based on Time and Materials to complete the work, based on unit rates negotiated in advance of the work. A cash allowance has been allocated to cover this work, however the amount payable to the contractor will be based on actual work completed. The contractor is not guaranteed the full amount of this allowance.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work.

ITEM 6 SOILS INVESTIGATIONS & REMEDIATION

SCOPE

Prior to any construction activities, the Contractor shall conduct soils investigations and remediation for the five areas identified in the Excess Soil Quality Testing Report, further defined by BH23-03, BH23-04, BH23-05, BH23-07 and BH23-09 as shown in Figures S1 & S2 as enclosed. A copy of the final report will be provided to the contactor.

CONSTRUCTION

The contractor shall coordinate the investigations with the Contract Administrator, who will attend site and oversee the remediation works. The contractor, at the direction of the Contract Administrator, shall sawcut and remove the existing asphalt, and subsequently remove the impacted soils to the limits determined by the Contract Administrator during investigations. Excavations are to be backfilled with granular materials and asphaltic cold patch materials utilized where investigations are completed in existing paved areas. Excavated soils shall be delivered to the Town's Landfill and disposed of in accordance with SP 32.

MEASUREMENT FOR PAYMENT

Payment shall be made based on Time and Materials to complete the work, based on unit rates provided in the form of tender for corresponding items, ie. asphalt removal, excavation, granulars. A cash allowance has been allocated to cover this work, however the amount payable to the contractor will be based on actual work completed. The contractor is not guaranteed the full amount of this allowance.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work.

ITEM 7 ASPHALT PAVEMENT REMOVAL, FULL DEPTH
ITEM 8 ASPHALT PAVEMENT REMOVAL, PARTIAL DEPTH (MILLING)
ITEM 9 CONCRETE CURB & GUTTER REMOVAL
ITEM 10 CONCRETE SIDEWALK REMOVAL
ITEM 11 PAVING STONE SIDEWALK REMOVAL

SCOPE

These items are for the removal of existing asphalt pavement for roadway and entrances, as well as removal of concrete curb & gutter, concrete sidewalk and paving stone sidewalk.

REFERENCES

The requirements outlined in OPSS.MUNI 180 and OPSS.MUNI 510 shall apply to these items.

CONSTRUCTION

All removal limits shall be sawcut. Concrete and asphalt materials shall be removed separately from the underlying granulars resulting in a clean product. Partial depth removal shall be milled.

Asphalt shall remain the property of the Town and shall be delivered to the Town's Boom Camp Road Pit and stockpiled where indicated by the Town's Foreman. Concrete and paving stones will also be accepted at the Town's Boom Camp Road Pit. Concrete, paving stones and asphalt will not be accepted at the Town's landfill.

The Contractor shall be responsible for the management and disposal of excess material in accordance with OPSS.MUNI 180.

No reliance upon the asphalt depths indicated shall be made by the Contractor in determining associated removal volumes for bid preparation. The Contractor shall estimate for themselves prior to submitting their bids. No compensation will be made based on actual asphalt depths encountered.

MEASUREMENT FOR PAYMENT

Measurement for the Items 7, 8, 10 & 11 shall be by square metre of each removed and measurement for the Item 9 shall be by linear metre removed, including all sawcuts. No separate measurement for sawcutting of asphalt or concrete will be made.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work.

ITEM 12 STREET LIGHT AND OVERHEAD WIRE REMOVAL

SCOPE

This item is for the removal of existing overhead flashing amber light at the intersection of Murray Street and Huron Street, including associated cables and appurtenances.

REFERENCES

The requirements outlined in OPSS.MUNI 510 shall apply to this item.

CONSTRUCTION

The Contractor shall be responsible for all regulatory permitting required to facilitate the removal, as well as the management and disposal of all removed materials.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum.

BASIS OF PAYMENT

Payment at the Contract Price shall include full compensation for all requirements to complete the work.

ITEM 13 EXISTING WATERMAIN & APPERTENANCE REMOVAL
ITEM 14 EXISTING SANITARY SEWER & APPERTENANCE REMOVAL
ITEM 15 EXISTING STORM SEWER & APPERTENANCE REMOVAL

SCOPE

This item is for the work to remove the existing watermain, sanitary sewer, storm sewer and associated components including but not limited to valves, service saddles, fittings, maintenance holes and catch basins.

REFERENCES

The requirements of OPSS.MUNI 510 shall apply to this item.

CONSTRUCTION

The Contractor is required to remove the existing watermain, sanitary sewer, storm sewer and associated components. Existing salvageable materials as determined by the Contract Administrator, including but not limited to hydrants, valves, frames, grates, concrete structures and pipes will remain the property of the Town and shall be delivered to the Town's Public Works garage. All non-salvageable steel materials shall be delivered to the scrap steel pile at the Town's landfill. All other non-salvageable materials shall become the property of the Contractor for disposal in accordance with OPSS.MUNI 180.

Native soils excavated to facilitate removals shall be salvaged for reuse. Excess soils shall be managed in accordance with SP 32. Removal areas shall be backfilled with suitable salvaged native materials to subgrade elevation and compacted to minimum 98% standard proctor density.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment for Items 13, 14 & 15. Payment will be by lump sum. Where payment for work is split over multiple certificates, payment will be prorated over the percentage of removals completed as decided by the Engineer.

BASIS OF PAYMENT

Payment at the contract price for the above referenced tender item shall be full compensation for all labour, equipment and material to do the work.

ITEMS 16-26 PRECAST CATCH BASIN, 600mmx600mm

SCOPE

These items are for the supply and installation of precast catch basin structures including rock excavation and dewatering as may be required.

REFERENCES

The requirements outlined in OPSS.MUNI 402, OPSS.MUNI 403, OPSS.MUNI 407, OPSS.MUNI 501, OPSS.MUNI 517, OPSS.MUNI 1351, OPSS.MUNI 1850, OPSD. 400.020, OPSD. 705.010 shall apply to these items.

MATERIALS

Catch basin structures to be constructed in accordance with OPSS.MUNI 407. Catch basins shall be 600mm x 600mm as per OPSD 705.010 with 600mm sumps. Frames and Grates to be in accordance with OPSD 400.020.

Structure joints and pipe connections shall be watertight.

Bedding and backfill shall be Granular "A" per OPSS.MUNI 314.

CONSTRUCTION

The Contractor shall complete the works required to facilitate the catch basin structures to be installed in accordance with OPSS.MUNI 402, OPSS.MUNI 403 and OPSS.MUNI 407. Backfill material shall extend to the underside of the roadway granulars. Precast catch basin structures supplied in two or more pieces shall be installed with frost straps in accordance with OPSD 701.100, at the Contractor's expense.

Excavation required for structure installation shall be to the roadway subgrade limits. Suitable native materials shall be salvaged and reused as backfill to subgrade elevation, compacted to minimum 98% standard proctor density. No stones larger than 25mm shall be placed within 300mm of the structure. The Contractor shall be responsible for the management and disposal of excess material in accordance with OPSS.MUNI 180 and SP 32.

Filter Fabric to be placed under grates on all storm sewer catch basins to trap sediment. Silt traps are to be cleaned regularly and are not to be removed until all construction activity is complete. Filter fabric for silt control to be Terrafix 270R or approved equivalent.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum. Where payment is split over multiple certificates, 90% will be paid for installation of the structure with 10% paid for setting of the final grade of the grate.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work including rock excavation to subgrade elevation, installation of structures, frames, and grates.

ITEMS 27-28 PRECAST CATCH BASIN MAINTENANCE HOLE, 1200mmØ

SCOPE

These items are for the installation of 1200mmØ storm sewer maintenance hole structures, including rock excavation and dewatering as may be required.

REFERENCES

The requirements outlined in OPSS.MUNI 180, OPSS.MUNI 402, OPSS.MUNI 403, OPSS.MUNI 407, OPSS.MUNI 501, OPSS.MUNI 517, OPSS.MUNI 1351, OPSS.MUNI 1850, OPSD 400.020, OPSD 405.020, OPSD 701.010, OPSD 701.100 and OPSD 704.010 shall apply to the items precast maintenance hole catch basin.

MATERIALS

Catch Basin Maintenance Holes shall be constructed according to OPSD 701.010, minimum sump of 300mm and shall have Frames and Grates to be in accordance with OPSD 400.020.

Structure joints and pipe connections shall be watertight.

Bedding and backfill shall be Granular "A" per OPSS.MUNI 314.

CONSTRUCTION

Supply and installation of precast maintenance hole structure shall be completed in accordance with OPSS.MUNI 402, OPSS.MUNI 403, OPSS.MUNI 407, OPSS.MUNI 501 and OPSD 701.010. Backfill material shall extend to the underside of the roadway granulars. The Contractor is responsible for the supply and installation of frost straps in accordance with OPSD 701.100, steps in accordance with OPSD 405.020 and frames and grates in accordance with OPSD 400.020.

Excavation required for structure installation shall be to the roadway subgrade limits. Suitable native materials shall be salvaged and reused as backfill to subgrade elevation, compacted to minimum 98% standard proctor density. No stones larger than 25mm shall be placed within 300mm of the structure. The Contractor shall be responsible for the management and disposal of excess material in accordance with OPSS.MUNI 180 and SP 32.

Filter Fabric to be placed under grates on all storm sewer catch basins to trap sediment. Silt traps are to be cleaned regularly and are not to be removed until all construction activity is complete. Filter fabric for silt control to be Terrafix 270R or approved equivalent.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum. Where payment is split over multiple certificates, 90% will be paid for installation of the structure with 10% paid for setting of the final grade of the grate.

BASIS OF PAYMENT

Payment for the Items Precast Maintenance Hole shall be full compensation for all labour, equipment and material to do the work including rock excavation to subgrade elevation, installation of structures, frames and grates.

ITEM 29-30 PRECAST DITCH INLET CATCH BASIN, 600mmx600mm

SCOPE

This item is for the supply and installation of precast ditch inlet catch basin structure, including rock excavation and dewatering as may be required.

REFERENCES

The requirements outlined in OPSS.MUNI 402, OPSS.MUNI 403, OPSS.MUNI 407, OPSS.MUNI 501, OPSS.MUNI 517, OPSS.MUNI 1351, OPSS.MUNI 1850, OPSD. 403.010, OPSD. 705.030 shall apply to these items.

MATERIALS

Ditch inlet catch basin structure to be constructed in accordance with OPSS.MUNI 407, 600mm x 600mm as per OPSD 705.030 with 3:1 top and 600mm sump. Frames and Grates to be in accordance with OPSD 403.010.

Structure joints and pipe connections shall be watertight.

Bedding and backfill shall be Granular A per OPSS.MUNI 314.

CONSTRUCTION

The Contractor shall complete the works required to facilitate the ditch inlet catch basin structure to be installed in accordance with OPSS.MUNI 402 and OPSS.MUNI 407. Backfill material shall extend to the finished grade elevation. Precast ditch inlet catch basin structures supplied in two or more pieces shall be installed with frost straps in accordance with OPSD 701.100, at the Contractor's expense.

Excavation required for structure installation shall be to the finished elevation, less topsoil and sod. Suitable native materials shall be salvaged and reused as backfill to finished grade elevation, shaped to ensure positive drainage and compacted to minimum 98% standard proctor density. No stones larger than 25mm shall be placed within 300mm of the structure. The Contractor shall be responsible for the management and disposal of excess material in accordance with OPSS.MUNI 180 and SP 32.

Connection of existing storm sewer pipe and residential sump for Item 29 will also be required.

Filter Fabric to be placed under grates on all ditch inlets to trap sediment. Silt traps are to be cleaned regularly and are not to be removed until all construction activity is complete. Filter fabric for silt control to be Terrafix 270R or approved equivalent.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum. Where payment is split over multiple certificates, 90% will be paid for installation of the structure with 10% paid for setting of the final grade of the grate.

Items 29 shall include connection to the existing storm sewer piping and residential sump drain.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work including rock excavation to subgrade elevation, installation of structures, frames, and grates.

ITEM 31 SALVAGE AND RELOCATE CATCH BASIN

SCOPE

This item is for the salvage and relocation of existing precast catch basin structure CB17 and dewatering as may be required.

REFERENCES

The requirements outlined in OPSS.MUNI 402, OPSS.MUNI 407, OPSS.MUNI 501, OPSS.MUNI 517, OPSS.MUNI 1351, OPSS.MUNI 1850, OPSD. 400.020, OPSD. 705.010 shall apply to these items.

MATERIALS

Existing catch basin structures to be reinstalled in accordance with OPSS.MUNI 407.

Structure joints and pipe connections shall be watertight.

Bedding and backfill shall be Granular “A” per OPSS.MUNI 314.

CONSTRUCTION

The Contractor shall remove, and keep in good condition, the existing catch basin and associated frames or grates for reinstallation. The contractor shall also remove the existing storm sewer piping to facilitate the reinstallation.

The Contractor shall complete the works required to facilitate the catch basin structure to be reinstalled in accordance with OPSS.MUNI 402 and OPSS.MUNI 407. Backfill material shall extend to the underside of the roadway granulars.

Excavation required for structure salvage and reinstallation shall be to the roadway subgrade limits. Suitable native materials shall be salvaged and reused as backfill to subgrade elevation, compacted to minimum 98% standard proctor density. No stones larger than 25mm shall be placed within 300mm of the structure. The Contractor shall be responsible for the management and disposal of excess material in accordance with OPSS.MUNI 180 and SP 32.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work including installation of structures, connection to existing storm sewer and resetting frame and grate.

ITEMS 32-36	**300mmØ HDPE STORM SEWER**
ITEMS 37-42 & 44	**300mmØ PVC STORM SEWER**
ITEMS 43, 45	**450mmØ PVC STORM SEWER**
ITEM 46	**600mmØ PVC STORM SEWER**

SCOPE

These items are for the supply and installation of HDPE and PVC storm sewer pipes and associated granulars, connection to structures and existing pipe, as well as dewatering as required. PVC pipes have been specified due to proximity of proposed watermain and need for watermain equivalent seals. Additional costs for rock trenching, as may be required for installation, shall be tracked and paid for separately under Items 48 or 49.

REFERENCES

The requirements outlined in OPSS.MUNI 180, OPSS.MUNI 314, OPSS.MUNI 410, OPSS.MUNI 501, OPSS.MUNI 510, OPSS.MUNI 517, OPSS.MUNI 1840, OPSS.MUNI 1841, OPSD 802.010 and OPSD 802.013 shall apply to these items.

MATERIALS

High Density Polyethylene Pipe (HDPE) shall be smooth wall interior, corrugated exterior with a minimum stiffness of 320 kPa as per OPSS.MUNI 1840. HDPE storm sewer pipe, fittings and tees shall be equivalent to ADS N-12 WT pipe.

Polyvinyl Chloride (PVC) pipes shall be AWWA C900 PVC DR25 Class 165 or equivalent, per OPSS.MUNI 1841.

Alternate storm sewer pipe equivalent will be considered provided it is a true equivalent in terms of stiffness, joint performance and flow rates. Joints and structure connections shall be watertight. The Contractor will be responsible for providing supporting documentation.

The granular material required in OPSS.MUNI 410 for the bedding, embedment, and cover shall be Granular “A” and shall be included in these items.

CONSTRUCTION

Supply and installation of HDPE and PVC Pipes shall be completed in accordance with OPSS.MUNI 410, OPSD 802.010 and OPSD 802.013. Backfill material shall extend to the underside of the roadway granulars.

Storm Sewer pipe shall be laid within 10mm ± of the design grade. Excavation for pipe installation shall be to the roadway subgrade limits. Suitable native materials shall be salvaged and reused as backfill to subgrade elevation, compacted to minimum 98% standard proctor density. The Contractor shall be responsible for the management and disposal of excess excavated materials. Excess material shall be managed in accordance with SP 32.

The Contractor shall locate and verify the existing inlet pipe elevations, diameters and materials required for connection to proposed storm sewer. Connections to existing piping shall be completed with factory approved fittings.

Light duty silt fence barriers to be installed at the bottom of all fill slopes and down gradient of any stockpiled material when there is the possibility of sediment migrating to adjacent properties.

Filter Fabric to be placed under grates on all storm sewer catch basins to trap sediment. Silt traps are to be cleaned regularly and are not to be removed until all construction activity is complete. Filter fabric for silt control to be Terrafix 270R or approved equivalent.

MEASUREMENT FOR PAYMENT

Measurement for payment for the Items Storm Sewer shall be by length in metres installed, excluding rock excavation as may be required. There will be no measurement of payment for the granular bedding, embedment, cover and backfill material required for the installation of the storm sewer.

Items 32 and 46 shall include connection to the existing storm sewer structures.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work, including trenching and supply and placement of granulars for bedding, embedment, cover and placement of suitable native backfill to subgrade elevation.

ITEM 47 ADJUST CATCH BASIN MAINTENANCE HOLE – STMH11

SCOPE

This item is for the adjustment of the frame and grate on existing catch basin maintenance hole, STMH11. A new frame and grate is required.

REFERENCES

The requirements outlined in OPSS.MUNI 408 shall apply for this item.

MATERIALS

Adjustment units shall be precast concrete according to OPSS.MUNI 1351.

New frames and grates shall be per OPSD 401.010 Type 'A' Closed Cover, in accordance with OPSS.MUNI 1850.

CONSTRUCTION

The Contractor shall complete the vertical adjustment of catch basin maintenance hole, STMH11, as outline in the Contract Drawing, setting the new grate to match sidewalk elevation and orientating the grate to be on the back side of sidewalk.

The existing frame and grate shall be salvaged and delivered to the Town of Blind River Public Works yard.

MEASUREMENT FOR PAYMENT

There will be no Measurement for Payment for the item – Adjust Existing Catch Basin Maintenance Hole - STMH11. Payment will be by lump sum.

BASIS OF PAYMENT

Payment at the Contract Price for the above tender item shall be full compensation for all labour, equipment and material to do the work, including supply and installation of new frame and cover.

ITEM 48 SUMP & WEEPING TILE CONNECTIONS

SCOPE

This item is for the connection of existing private sump and weeping tile drains to the storm sewer system.

REFERENCES

The requirements outlined in OPSS.MUNI 180, OPSS.MUNI 314, OPSS.MUNI 405, OPSS.MUNI 501, OPSS.MUNI 510, OPSS.MUNI 517 and OPSD 216.021 shall apply to these items.

MATERIALS

Subdrain pipe for roof and/or sump drains shall be 100mm diameter non-perforated corrugated polyethylene pipe with minimum stiffness of 320 kPa. Pipe shall have bedding and cover of Granular "A".

CONSTRUCTION

The Contractor shall confirm with each property owner the locations of any sump or roof drain outlets from their property. Where outlets are below grade, the contractor shall locate and connect into storm sewer structures in accordance with OPSS 410 via coring and parge connections accordingly.

For roof and/or sump drains, the subdrain tile shall extend to nearest downgradient structure and connect with sufficient depth and grade to ensure positive drainage while minimizing the potential for freezing.

No more than four connections shall be made to each individual subdrain line connecting to a catch basin or maintenance hole catch basin. Where more than four connections are required for an area, a second subdrain line shall be installed at the shortest length possible and paid for separately at the tendered unit rate for the length of the second subdrain.

MEASUREMENT FOR PAYMENT

The unit price for the connection of existing roof drains and/or sump drains shall include the connection of all drains as encountered with factory approved fittings. The number of connections to be made is not known and payment will be based on the linear metre unit rate provided for the subdrain.

BASIS OF PAYMENT

Payment for the item shall be full compensation for all labour, equipment and material to do the work including, but not limited to excavations, Granular "A" and connection to storm sewer structures

ITEMS 49, 61, 90 ROCK TRENCHING – STORM, SANITARY, OR WATER SERVICES (≥ 5m From Gas Line)

ITEMS 50, 62, 91 ROCK TRENCHING – STORM, SANITARY, OR WATER SERVICES (< 5m From Gas Line)

SCOPE

These items are for the removal of trench rock to facilitate storm sewer or sanitary sewer lines, as well as water services and sanitary services, where bedrock is encountered. These items are to account for any additional costs associated with rock trenching, over and above the installation costs assigned to the respective tender item.

Separate pricing is requested for any trench blasting required that is greater than or equal to ($\geq$) 5m, or less than (<) 5m, from the gas line.

REFERENCES

The requirements outlined in OPSS.MUNI 120, OPSS.MUNI 206, OPSS.MUNI 403 and OPSS.MUNI 510 shall apply to these items.

Enbridge's Third-Party Requirements in Vicinity of Natural Gas Facilities Standard – 2024.01.31, shall apply.

CONSTRUCTION

The excavation of trench rock shall be completed by hoe ram or by blasting. Pre-drilling may be required for hoe ram operations to minimize hammering time. Drilling and

blasting will require the use of blasting mats. Rock blasting with be conducted in accordance with OPSS.MUNI 120. Trench rock shall be minimum 0.15m below invert elevation with minimum 0.3m sidewall clearance, and extend to roadway subgrade elevation, or finished grade elevation outside the back of curbs.

If blasting is selected as the rock removal method a pre-blast survey shall be conducted in accordance with OPSS 120.07.03. Monitoring shall be conducted in accordance with OPSS 120.07.05 only when blasting is completed within 250m of a residence. In accordance with OPSS 120.07.06 blasting mats shall be used to limit all potential fly rock.

All Enbridge requirements including, but not limited to monitoring, blasting plans and leak testing shall be adhered to by the contractor. Any blast monitoring or site presence by Enbridge representatives shall be arranged and paid for by the contractor.

MEASUREMENT FOR PAYMENT

Measurement for payment for the rock trenching item shall be by linear metres of trench rock excavated. There will be no compensation for quantity over runs and under runs for these items. The tender quantities are an estimated value used to establish unit rate regardless of quantity required to construct the works.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, materials to do the work, including all reporting or methods required to ensure Enbridge compliance.

ITEM 51 SANITARY SEWER BYPASS SYSTEM

SCOPE

This specification covers the requirements related to sewer bypass flow pumping required for the temporary conveyance of sanitary sewage flows. The Work shall include the following: design of a fully operational temporary sewer bypass system; obtaining regulatory approvals for the bypass installation (if required), commissioning, operation and maintenance, monitoring, decommissioning and removal; spill prevention and cleanup; protection of traffic, road, rail, and water body or crossings as required.

The estimated design flow of the sanitary sewer within the pipe replacement area varies due to the connecting streets. The Town's Water Treatment Plant backwash is discharged to Huron Street which delivers a significant amount of flow during backwash cycles. The Contractor shall verify sanitary sewer flow rates to ensure their Sewer Bypass System satisfies the requirements.

The Town's Water & Sewer System Operator (PUC) shall be contacted by the Contractor to discuss options for managing flow rates.

DEFINITIONS

Temporary Sewer Bypass System means temporary piping, plugs, pumping and standby equipment installed and operated for the purpose of intercepting the incoming sewage flow, conveying the flow around the work area, and discharging the flow into the existing sewer system downstream of the work area

DESIGN AND SUBMISSION REQUIREMENTS

The Contractor shall prepare and submit the following:

a) Temporary Sewer Bypass Plan ensuring there is capacity and size to handle the existing peak flows and surcharge flow rates at all times during the bypass operation; and,

b) Spill Response Plan. The Contractor shall not procure or install temporary bypass system until the Temporary Sewer Bypass Plan and the Spill Response Plan are approved by the Contract Administrator.

The Temporary Sewer Bypass Plan and Spill Response Plan shall be submitted four weeks prior to the start of construction to the Contract Administrator.

The Temporary Sewer Bypass Plan shall include all of the following:

- Flow rates and other hydraulic considerations,
- Size of the sewer to be bypassed,
- Bypass connection proposed,
- Site and equipment monitoring,
- Staging areas for pumps,
- Duration of each phase of the work,
- Sewer plugging method, type and size of plugs,
- Location of maintenance holes or access points for suction and discharge piping, including a suitable site map,
- Size, material, location and method of installation of suction and discharge piping,
- Characteristics of bypass pump such as size, capacity and power requirements,
- Calculations of static lift, friction losses and flow velocity,
- Pump curves showing pump operating range, Characteristics of standby pump(s) such as size, capacity and power requirements,
- Standby power generator(s) size and location, and refueling requirements and restrictions,
- Method of protecting discharge maintenance holes or structures from erosion and damage,
- Method of noise control for each pump and generator,
- Details of bypass pipe crossings, for example, driveways and sidewalks,
- Any plans and procedures to mitigate issues related to night work, e.g. light, noise, odour and protection of environmental features specific to work,
- Schedules for installation and demobilization, and
- All provisions and precautions that will be taken during the bypass operations to prevent sewage backups, overflows and spills.

The site-specific Spill Response Plan shall include the following:

- Procedures for notification to the Town of Blind River and the Ministry of the Environment, Conservation and Parks (MECP) Spill Action Centre,
- Mandatory regulatory reporting requirements,
- Plan for investigating the cause of the spill,
- Plan for containing the spill and addressing the source of the spill,
- Determine if any service connections, storm drains, watercourses or other infrastructure that could be negatively affected by a spill,
- Plan for preventing public exposure to the spill, including procedures for redirecting pedestrians and traffic away from the impacted area,
- Measures to be taken to avoid or mitigate the adverse effects of the spill on the environment, and
- Name of responsible person and their responsibilities to document and liaise with all agencies during a spill.

Acceptance of the Plans

The Temporary Sewer Bypass Plan and Spill Response Plan should allow the Contract Administrator to understand the manner in which construction on the sewer is to take place, the flow rates accommodated by the bypass and evacuation and contingency plans in case of a spill including cleanup. The plans shall be submitted in PDF format.

The construction shall start only after the Contract Administrator reviews and accepts the Temporary Sewer Bypass Plan and Spill Response Plan. The Contract Administrator will then issue the acceptance letter to the Contractor.

Both plans shall be posted at the site office or site trailer during the sewer bypass operations.

EQUIPMENT

Pumps

Provide electric or diesel powered fully automatic self-priming low noise pumps and low noise generators. The pumps shall be equipped with all necessary stop and start controls.

Temporary Sewer Bypass Piping

The temporary sewer bypass piping shall be able to withstand pressures that are greater than the peak bypass pressure and the traffic load at road crossing ramps. Under no circumstances shall aluminum irrigation type piping or glued PVC pipe be used. The Contract Administrator shall approve discharge hose material type.

CONSTRUCTION

The Contractor shall cease bypass pumping operations when no longer required and return flows to the new or existing sewer or both. During bypassing, no wastewater

shall be leaked, dumped, or spilled in or onto any area outside the existing wastewater system.

The Contractor shall immediately put the Spill Response Plan in action and notify the supervisor in the Contract Administrator should a sanitary sewer overflow occur and take the necessary action to clean up and disinfect the spillage to the satisfaction of the Contract Administrator and the MECP and other governmental agencies. If sewage is spilled onto public or private property, the Contractor shall wash down, clean up, and disinfect the spillage to the satisfaction of the property owner at no extra cost to the Town of Blind River.

Sufficient power supply and hoses must be on site in order to allow the pump to discharge into the downstream sewer section. The standby bypass pump and power supply shall be of an equal or better capability than the primary bypass pump and power supply. No bypass pumps or related equipment shall be disconnected or removed from the sewer or job site until after all service connections have been reinstated and the Contractor has recorded the post-installation video.

Protect the environment, public, and private property from any damage during the construction and operation of the bypass system.

Minimize the interruption of existing services to the public, residents, and all facilities connected to the bypassed sewer.

The temporary sewer bypass system shall be monitored at all times by the Contractor. The Contractor's employees must have the knowledge, experience and skill to maintain and operate all equipment and to switch to standby equipment if the need arises. The bypass system shall not be in operation unless it is monitored constantly by the Contractor's employee(s).

The Contractor’s must request approval for any changes to the bypass system after the initial set up such as adding a pump to the bypass system due to spike in flows, removal of a pump, changing discharge point and so on. Changes are to be witnessed by the Contract Administrator.

Bypass Equipment and Piping

Place pumps in temporary containments/berms to contain any fuel or sewage that may spill during the bypass operations.

Prior to pumping, flush and clean the sewer section, or maintenance hole, where the suction pumping is located.

When requested by the Contract Administrator, submit the pump maintenance records, pump operation records and fuel monitoring records for review.

Provide and connect standby equipment which can be operational for immediate use in the event of emergency or equipment breakdown.

Perform leakage tests of the bypass system using clean water prior to the actual operation. The sewer bypass pumping system shall be tested prior to installation using clean water. Provide Contract Administrator with 48 hours' notice.

Noise from Operations

Minimize the emission of sound by using low noise pumps and generators and implement additional sound attenuation measures, such as soundproof canopy, acoustic foam insulation and anti-vibration devices in the sound sensitive areas.
All bypass pumps and related equipment must be silenced equipment or contained within an acceptable sound reduction structure below 65 dB(A) at 7 m. The site inspector shall ask the Contractor to operate one pump at a time and measure noise at 7 m radius for each pump. If the noise does not meet the requirement, the Contractor shall have to install additional noise control barrier or replace the pump at no cost to the Town of Blind River.

Plugging

Select sewer plugs based on the flow characteristics, size of the sewer and the location of the flow diversion point. Always provide a secondary plug, in the event the primary plug fails. Plug a sewer system by means and methods that will not cause any damage or blockage to the sewer pipes and maintenance holes.

Inspect all plugs for defects prior to every use.

When a plug is no longer needed, remove it gradually to allow flow to return gradually to the normal flow condition.

Crossings

At all times keep the bypass piping within the limits of the Working Area and away from paved roadways and sidewalks.

When the bypass piping is crossing roadways, either construct traffic ramps or place the bypass pipelines in trenches and temporarily restore utility cuts.

Removal, Cleanup and Restoration

Ensure all sewage from the bypass pipes, pumps and fittings is discharged to the specified sanitary. Flush the bypass system with potable water before removal.

Restore bypass pump areas to pre-bypass condition including any cleanup measures necessary due to fuel, oil or sewage leaks. All cleanup measures taken shall be documented.

The disposal or discharge shall be according to MOE Regulations.

MEASUREMENT FOR PAYMENT

Measurement shall be by lump sum and payment shall be when the Work is completed:

1) Temporary Sewer Bypass Plan and Spill Response Plan upon approval of these plans – 5%
2) Installation of the temporary bypass upon successful testing – 50%
3) Operation and maintenance of temporary bypass system – 40%
4) Successful disassembly and removal of the temporary bypass system – 5%

BASIS OF PAYMENT

Payment at the Contract Price shall be full compensation for all labour, Equipment and Material to do the Work.

ITEMS 52-54 PRECAST MAINTENANCE HOLE, 1200mmØ

SCOPE

This item is for the installation of 1200mmØ sanitary sewer maintenance hole structures, including rock excavation and dewatering as may be required.

REFERENCES

The requirements outlined in OPSS.MUNI 180, OPSS.MUNI 402, OPSS.MUNI 403, OPSS.MUNI 407, OPSS.MUNI 501, OPSS.MUNI 517, OPSS.MUNI 1351, OPSS.MUNI 1850, OPSD 401.010, OPSD 405.020, OPSD 701.010, OPSD 701.100 and OPSD 704.010 shall apply to the items precast maintenance hole catch basin.

MATERIALS

Maintenance holes shall be constructed according to OPSD 701.010 and shall have Type A Closed Circular Cover per OPSD 401.010.

Structure joints and pipe connections shall be watertight with appropriate seals, gaskets or boots

Bedding and backfill shall be Granular A per OPSS.MUNI 314.

CONSTRUCTION

Supply and installation of precast maintenance hole structure shall be completed in accordance with OPSS.MUNI 402, OPSS.MUNI 407, OPSS.MUNI 501, and OPSD 701.010, with benching in accordance with OPSD 701.021. Backfill material shall extend to the underside of the roadway granulars. The Contractor is responsible for the supply and installation of frost straps in accordance with OPSD 701.100, steps in accordance with OPSD 405.020 and frames and grates in accordance with OPSD 401.010.

Excavation required for structure installation shall be to the roadway subgrade limits. Suitable native materials shall be salvaged and reused as backfill to subgrade elevation, compacted to minimum 98% standard proctor density. No stones larger than 25mm shall be placed within 300mm of the structure. The Contractor shall be responsible for the management and disposal of excess material in accordance with OPSS.MUNI 180 and SP32.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum. Where payment is split over multiple certificates, 90% will be paid for installation of the structure with 10% paid for setting of the final grade of the grate.

BASIS OF PAYMENT

Payment for the Items Precast Maintenance Hole shall be full compensation for all labour, equipment and material to do the work including installation of structures, frames and grates.

ITEM 55 ADJUST SANITARY MAINTENANCE HOLE - SAMH19

SCOPE

This item is for the adjustment of the Sanitary Sewer Maintenance Hole Frame & Grate.

REFERENCES

The requirements outlined in OPSS.MUNI 408 shall apply for this item.

MATERIALS

Adjustment units shall be precast concrete according to OPSS.MUNI 1351.

New frame and grate shall be per OPSD 401.010, Type 'A' Closed Cover, in accordance with OPSS.MUNI 1850.

CONSTRUCTION

The Contractor shall complete the vertical adjustment of the existing sanitary maintenance hole SAMH19 at the locations indicated in the Contract Drawing, resetting a new grate to be set even with finished road surface elevation.

The existing frame and grate shall be salvaged and delivered to the Town of Blind River Public Works yard.

MEASUREMENT FOR PAYMENT

There will be no Measurement for Payment for the item – Adjust Sanitary Maintenance Hole - SAMH19. Payment will be by lump sum.

BASIS OF PAYMENT

Payment at the Contract Price for the above tender item shall be full compensation for all labour, equipment and material to do the work, including supply and installation of new frames and covers for sanitary sewer structures.

ITEMS 56-59 200mmØ PVC DR35 SANITARY SEWER
ITEM 60 SANITARY SERVICE CONNECTION & APPURTENANCES

SCOPE

The item is for the installation of PVC Sanitary Sewer Pipe and Service Laterals, including removal of existing laterals and dewatering as may be required. The existing sanitary sewer shall be camera inspected in advance of construction to determine the lateral locations. Lateral locations identified on the contract drawings are approximate and may be incomplete.

REFERENCES

The requirements outlined in OPSS.MUNI 180, OPSS.MUNI 401, OPSS.MUNI 409, OPSS.MUNI 410, OPSS.MUNI 501, OPSS.MUNI 510, OPSS.MUNI 805, OPSS.MUNI 1841, OPSD 802.010 and OPSD 1006.010 shall apply to these items.

MATERIALS

Sanitary sewer and sanitary service, pipe and fittings shall be PVC DR35 pipe material in accordance with OPSS.MUNI 1841. Sanitary services shall be 150mmØ to property line. Joints and structure connections shall be watertight with appropriate seals, gaskets or boots. The Contractor will be responsible for providing supporting documentation.

The granular material required in OPSS.MUNI 410 for the bedding, embedment, and cover shall be Granular “A” and shall be included in these items.

Connections to existing sanitary sewer lines shall be made with factory approved fittings.

CONSTRUCTION

The Contractor shall complete a CCTV inspection of the existing sanitary sewer in accordance with OPSS.MUNI 409, in advance of construction to determine the existing sanitary sewer lateral locations.

The Contractor must maintain sanitary sewer services to all buildings at all times for the duration of construction. The Contractor will prepare a Sewage Bypass Plan to ensure the mainline sewer is in operation at all times during construction. The Contractor must provide appropriate notice to the Town and the Engineer in advance of any scheduled connections or any potential service disruptions.

Sanitary sewer pipes shall be installed at the elevations and grades as shown on the Contract Drawings, which shall be no higher than existing elevations, such that service laterals do not become any flatter than existing. Service laterals shall be 150mmØ installed per OPSD 1006.010 with factory approved tees, extending from the main sewer to the property line, and connected to the existing service material. Crossing of watermain shall be complete with maximum separation available and one full pipe length centred over the watermain.

The Contractor shall connect the new sanitary sewer to the existing maintenance holes as shown on the contract drawings.

Excavation for pipe installation shall be to the roadway subgrade limits. Suitable native materials shall be salvaged and reused as backfill to subgrade elevation, compacted to minimum 98% standard proctor density. Sanitary sewer installation shall include restoration of street to existing elevation prior to winter shutdown. Existing road base granulars shall be salvaged for reuse and compacted to 98% standard proctor density.

The Contractor shall be responsible for the management and disposal of excess excavated materials. Excess material shall be managed in accordance with SP 32.

The Contractor shall locate existing sewer pipes on intersecting streets prior to connection to the nearest maintenance hole. The Contractor shall determine elevations and materials of the existing sewer and connect to the new sewer lines ensuring positive flows. Adjustment of proposed connecting sewer line elevations may be required.

MEASUREMENT FOR PAYMENT

Measurement for Items 56-59 inclusive, shall be by length by linear metre of pipe installed, including connection to existing sanitary maintenance holes as required.

Measurement for Item 60 shall be by each service lateral installed, exclusive of any rock trenching as may be required.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, and materials to do the work, including CCTV inspection (pre and post), earth trenching, removal of existing pipes, bedding, embedment, cover and backfill to roadway subgrade elevation or finished grade elevation outside the roadway.

ITEM 63 TEMPORARY POTABLE WATER SUPPLY SERVICES

SCOPE

The item is for the supply and installation of the temporary water supply and services.

REFERENCES

The requirements of OPSS.MUNI 493 shall apply to this item.

MATERIALS

Backflow preventing spigots shall be equivalent to the existing materials encountered.

The temporary main diameter shall be as specified below.

Service connections shall be equal size to existing.

CONSTRUCTION

The Contractor shall design, supply and install a 200mmØ temporary watermain connecting Wooward Avenue to Berthelot Street, including 200mmØ temporary watermain on Berthelot Street. South of Berthelot Street the contractor shall design, supply and install a 150mmØ temporary watermain, terminating at Murray Street. Between Causley Street and Murray Street, the contractor shall design, supply and install a 50mmØ temporary watermain.

The existing watermain on Huron Street being replaced between Berthelot Street and Woodward Avenue is a main supply line from the water treatment plan and there are no alternative routes to maintain adequate supply. The temporary watermain shall be connected to the main lines. Fire hydrant connections for supply are not permitted. No two consecutive fire hydrants may be taken out of service and the Contractor shall design for temporary fire hydrants as may be required.

In advance of submission to the Contract Administrator, the Contractor shall meet with the Town's Director of Public Services, Foreman, Director of Fire Services and Water System Operator (PUC) to discuss the proposed temporary water supply services plan. The plan shall address how the works will progress and minimize the length of temporary mains required at any given time.

As part of the temporary system costs, the Contractor will be required to supply and install a backflow preventing flushing valve and associated piping at the downstream end of the temporary system. This flushing valve shall be operated by the Contractor to provide a continual flow within the temporary system to eliminate "hot spots" or excessive chlorine residual loss within the temporary system. The flow shall be discharged to an acceptable location within the rear yard of the downstream residence or other approved location.

The Contractor shall, as necessary, replace backflow preventing spigots to allow proper functioning of the temporary water system. Upon removal of the temporary system, the Contractor shall reinstall the existing backflow preventing spigots if requested by the homeowner.

The Town's Water System Operator must be onsite for any work on the Town's water system including commissioning of the temporary system. They must also be notified immediately should there be any breaks or changes required in the temporary system. Repairs to the temporary system shall not be completed by unqualified persons.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment for Item 63. Payment will be by lump sum. Payment of 60% will be made upon commissioning of the temporary system, 35% split over the duration of operation and 5% upon removal of the system.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, and materials to do the work including design, supply and installation, locating, isolating and connection to the existing watermains, as well as decommissioning of connections and removal of the temporary system.

ITEM 64	**CONNECTION TO TOWN WATERMAIN SYSTEM**
ITEMS 65, 74, 80	**PVC DR18 WATERMAIN**
ITEM 66	**PVC REDUCER**
ITEM 67	**PVC COUPLER**
ITEMS 68, 75	**PVC CAPS**
ITEMS 69, 76, 82	**GATE VALVES**
ITEMS 70-71, 77, 81	**PVC TEES**
ITEMS 72-73, 78-79	**PVC ELBOWS**
ITEM 83	**FIRE HYDRANT & VALVE INSTALLATION**
ITEMS 84, 85	**AIR RELEASE VALVES**
ITEM 86	**19mmØ WATER SERVICE CONNECTION & APPURTENANCES**
ITEM 87	**50mmØ WATER SERVICE CONNECTION & APPURTENANCES**

SCOPE

The item is for the supply and installation of PVC DR18 watermain pipe, fittings, valves, air release valves, services, fire hydrants, connections to the Town watermain, and dewatering as may be required.

REFERENCES

The requirements of OPSS.MUNI 180, OPSS.MUNI 314, OPSS.MUNI 401, OPSS.MUNI 441, OPSS.MUNI 442, OPSS.MUNI 501, OPSS.MUNI 517, OPSS.MUNI 1842, OPSD 802.010, 802.013, OPSD 1101.020, OPSD 1104.010, OPSD 1104.020, OPSD 1105.010, OPSD 1109.011, OPSD 1109.025 and OPSD 1109.030 shall apply to this item.

Air release valves may be sourced from Devine Flow Solutions, by contacting Mr. Peter Sucharda, psucharda@devineassoc.com or 416-617-1479.

MATERIALS

Watermain pipes shall be AWWA C900 PVC DR18 Class 235 and be certified to CSA 137.3, or equivalent. Watermain fittings shall be PVC conforming to AWWA C907. M.J. Ductile Iron Fittings will be accepted as an equivalent.

Tracer wire shall be Solid Copper 12GA with Blue HMWPE insulating cover designed for direct burial.

Joint restraints shall be Uni-Flange Series 1390 or equivalent for PVC and NSF Certified clamps for Cast Iron.

Vales shall be Mueller Resilient Wedge Gate Valve for PVC with Valve Boxes and Operators.

Main stops and curb stops shall be Mueller or Cambridge Brass.

Hydrant shall be new, Mueller Super Centurion with Hymax Grip Restraint Coupling, or M67 McAcity Brigadier, complete with Resilient Wedge Gate Valve. Fire hydrants shall be capable of receiving Storz couplers for fire hoses.

Air release valves shall be International Valve, Vent-Tech Direct Burry Valve, 02DBV25TC, complete with main stop, curb stop and 50mmØ copper service.

Anodes shall be Z-24-48 for fire hydrants and cast-iron pipes.

Anodes shall be Z-12-24 for new watermain components, service lines and tracer wires.

Service lines shall be 19mmØ or 50mmØ Type K Copper, complete with main stop and curb stop.

The Contractor shall provide the Engineer with a copy of all NSF/ANSI 61, NSF 372 and AWWA certificates and/or reports to prove material compliance with the corresponding regulations.

CONSTRUCTION

The Contractor shall ensure that *"F-6-1 Procedures to Govern Separation of Sewers and Watermains, Ministry of Environment, Conservation and Parks",* is accommodated during installation of the watermain. Where site conditions require major adjustments from the tendered plans to maintain the required separation, such adjustments shall be accounted for under the contingency amount based on the conditions within the specification relating to the item being adjusted.

Watermain shall be laid with a minimum cover depth 1.8m and insulated where a depth of 2.1m is not achieved. The 250mmØ distribution watermain shall be installed above the twin 300mmØ raw watermain lines, within the same trench, as detailed in the contract drawings.

Rock removal for installation is anticipated for most of the site, however rock trenching will be paid for under separate tender item for the associated components. All watermains, appurtenances and tracer wire shall be installed with cathodic protection per OPSS 442. Water services shall be installed with horizontal goosenecks.

Anode spacing for cathodic protection shall be as specified in Tables 4 and 5 of OPSS.MUNI 442.

Excavation for watermain installation including services shall be to the roadway subgrade limits or finished grade beyond the roadway. Suitable native materials shall be salvaged and reused as backfill to subgrade elevation or finished grade beyond roadway, compacted to minimum 98% standard proctor density. Installation shall include all materials required, including but not limited to valves, tees, couplers, reducers and elbows as well as associated joint restraints and cathodic protection.

Connection to the Town's Watermain System shall be completed with PVC couplers and joint restraints. The Contractor shall locate the existing watermain identified for connection and determine the appropriate coupler required to make the connection. The Town's operator (PUC) must be onsite when there is work on a commissioned watermain. All operation of Town valves and curb stops must be carried out by PUC Staff and will require a minimum 48hrs advanced notice to the Town and PUC to do so.

Construction shall proceed in such a manner as to isolate areas of work to minimize the amount of disruption within the project site as well as minimize the number of residents requiring temporary water supply at any given time.

The contractor shall locate each existing service line and new service lines shall be installed up to the lot line, to the existing curb stop if beyond the lot line, or the limits identified on the plans. New curb stops shall be installed at the property line, or limits identified.

Hydrants shall be installed per OPSD 1105.010 with final elevation 100mm to 150mm above finished grade. All joints between watermain and hydrants to be mechanically restrained.

Air release valves shall be installed per the contract drawings, complete with a 50mmØ copper service supply.

MEASUREMENT FOR PAYMENT

Measurement for payment for the Items "Connection to Town's Watermain System" and "Couplers" shall be for each coupler installed and connection completed.

Measurement for payment for items "Reducer", "Valve", "Tee", "Elbow", "Hydrant", "Cap" and "Services" shall be by each item installed. Hydrant valves are included in the hydrant item and will not be measured as a valve item.

Measurement for payment for items "Watermain" shall be by length by linear metre of watermain pipe installed.

Measurement for payment for the items "Air Release Valves" shall be by each valve installed, including the valve, main stop, service line, curb stop and tracer wire.

There will be no measurement for payment of tracer wire, joint restraints and cathodic protection. Payment for tracer wire, joint restraints and cathodic protection shall be included in the bid item for the corresponding item requiring restraints and/or cathodic protection.

BASIS OF PAYMENT

Payment for the Items "Connection to Town's Watermain System" and "Couplers" and shall be full compensation for all labour, equipment and material to make the connection as well as excavation (excluding rock trenching), bedding, cover and backfill to subgrade elevation within the roadway or to finished grade beyond the roadway, as well as the supply and installation all associated joint restraints and cathodic protection.

Payment for items “Watermain”, “Reducer”, “Valve”, “Tee”, “Elbow”, “Cap”, “Hydrant”, “Air Release Valve” and “Services” shall be by each item installed and shall be full compensation for all labour, equipment and material to do the work, including excavation (excluding rock trenching), installation, bedding, embedment, cover and backfill to subgrade elevation within the roadway or to finished grade beyond the roadway, as well as the supply and installation all associated joint restraints and cathodic protection.

ITEM 88 EXTRUDED EXPANDED POLYSTYRENE INSULATION

SCOPE

This specification is applicable to the installation of insulation for watermain or water service protection, in areas with less than 2.2m of cover, or in areas where water services cross sewers or sewer laterals.

REFERENCES

The requirements of OPSS.MUNI 316 and OPSD 1109 shall apply to this item.

CONSTRUCTION

Insulation shall be placed horizontally spanning the line being protected, or alternatively in a trench configuration in accordance with OPSD 1109.030. Insulation shall be placed between crossing of sewers and watermain or water services.

MEASUREMENT FOR PAYMENT

Measurement for payment shall be by square metres of actual insulation placed, per 25mm thickness. There will be no compensation for quantity over runs and under runs for this item. The tender quantity is an estimated value used to establish unit rate regardless of quantity required to construct the works.

BASIS OF PAYMENT

Payment at the Contract Price shall be full compensation for all labour, equipment, and material to do the work.

ITEMS 89 ROCK TRENCHING - WATERMAIN

SCOPE

This item is for the removal of trench rock to facilitate the triple watermain installation, including air release valves. This item is to account for any additional costs associated with rock trenching, over and above the installation costs assigned to the respective tender item.

REFERENCES

The requirements outlined in OPSS.MUNI 120, OPSS.MUNI 206, OPSS.MUNI 403 and OPSS.MUNI 510 shall apply to these items.

Enbridge's Third-Party Requirements in Vicinity of Natural Gas Facilities Standard – 2024.01.31, shall apply.

CONSTRUCTION

The excavation of trench rock shall be completed by hoe ram or by blasting. Pre-drilling may be required for hoe ram operations to minimize hammering time. Drilling and blasting will require the use of blasting mats. Rock blasting with be conducted in accordance with OPSS.MUNI 120. Trench rock shall be minimum 0.15m below invert elevation with minimum 0.3m sidewall clearance, and extend to roadway subgrade elevation, or finished grade elevation outside the back of curbs. Trenching shall be of sufficient width and depth to receive the three waterlines within the singular trench.

If blasting is selected as the rock removal method a pre-blast survey shall be conducted in accordance with OPSS 120.07.03. Monitoring shall be conducted in accordance with OPSS 120.07.05 only when blasting is completed within 250m of a residence. In accordance with OPSS 120.07.06 blasting mats shall be used to limit all potential fly rock.

All Enbridge requirements including, but not limited to monitoring, blasting plans and leak testing shall be adhered to by the contractor. Any blast monitoring or site presence by Enbridge representatives shall be arranged and paid for by the contractor.

MEASUREMENT FOR PAYMENT

Measurement for payment for the rock trenching item shall be by linear metres of trench rock excavated. There will be no compensation for quantity over runs and under runs for this item. The tender quantity is an estimated value used to establish unit rate regardless of quantity required to construct the works.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, materials to do the work, including all reporting or methods required to ensure Enbridge compliance.

ITEM 92 EARTH EXCAVATION – GRADING, ROADWAY

SCOPE

This item is for the completion of earth excavation related to road construction.

REFERENCES

The requirements outlined in OPSS.MUNI 180 and OPSS.MUNI 206 shall apply to the Item Earth Excavation – Grading, Roadway.

Excess material shall be managed in accordance with OPSS.MUNI 180 and SP 32. "O.Reg. 406/19, On-Site and Excess Soil Management" is applicable to this project.

CONSTRUCTION

Earth Excavation shall be completed in accordance with OPSS.MUNI 206. Existing roadway granulars shall be removed separately from native soil materials.

The Contractor shall be responsible for the management and disposal of all excess excavated materials from grading works. Granular materials shall be delivered to the Town's Boom Camp Road Pit and left in a neat and uniform manner. Native materials shall be delivered to the Town of Blind River Municipal Landfill located at 1182 Highway 17. The Contractor must discuss with the Town Foreman in advance to identify the locations for disposal, and materials shall be leveled and left in a neat and uniform manner acceptable to the Town Foreman.

MEASUREMENT FOR PAYMENT

Measurement for payment for the Items Earth Excavation – Grading, shall be plan quantity in cubic metres by in-place method as calculated from the topographic survey completed preconstruction, updated with stripped rock surface data, and the design subgrade surface for the roadway extending to back of curb. Payment will be based on earth excavation to subgrade for road construction, beyond the rock excavation limits. There will be no compensation for quantity over runs and under runs for this item. The tender quantity is an estimated value used to establish unit rate regardless of quantity required to construct the works.

BASIS OF PAYMENT

Payment at the Contract Price shall be full compensation for all labour, equipment, and material to do the work.

ITEM 93 ROCK EXCAVATION – GRADING, ROADWAY

SCOPE

This item is for the completion of rock excavation related to roadway construction.

REFERENCES

The requirements outlined in SP 32, OPSS.MUNI 120, OPSS.MUNI 180, OPSS.MUNI 206, OPSD 205.020, OPSD 205.030, OPSD 205.040, and OPSD 205.050 shall apply to these items.

CONSTRUCTION

Rock Excavation shall be completed in accordance with OPSS.MUNI 206. The excavation of rock will be completed by hoe ram or by blasting. Rock blasting shall be conducted in accordance with OPSS.MUNI 120.

If blasting is selected as the rock removal method, a pre-blast survey shall be conducted in accordance with OPSS 120.07.03. Monitoring shall be conducted in accordance with OPSS 120.07.05 only when blasting is completed within 250m of a residence. In accordance with OPSS 120.07.06 blasting mats shall be used to limit all potential fly rock.

The Contractor shall be responsible for the management and disposal of all excess excavated materials. Excess material shall be managed in accordance with OPSS.MUNI 180.

The Contractor shall notify the Contract Administrator sufficiently in advance of any rock excavation, such that the Contractor Administrator can arrange for a topographic survey, at the Owner's expense, of the stripped rock prior to blasting.

All Enbridge requirements including, but not limited to monitoring, blasting plans and leak testing shall be adhered to by the contractor. Any blast monitoring or site presence by Enbridge representatives shall be arranged and paid for by the contractor.

MEASUREMENT FOR PAYMENT

Measurement for payment for the Item Rock Excavation – Grading, shall be plan quantity in cubic metres by in-place method as calculated from the topographic survey completed of the stripped rock surface and the design subgrade surface for the roadway extending to back of curb. Measurement shall include a 300mm deep allowance for rock shatter, over the area to be removed. There will be no compensation for quantity over runs and under runs for this item. The tender quantity is an estimated value used to establish unit rate regardless of quantity required to construct the works.

BASIS OF PAYMENT

Payment at the contract price shall be full compensation for all labour, equipment, and material to do the work, including all reporting or methods required to ensure Enbridge compliance.

ITEM 94 PIPE SUBDRAIN – 150mmØ

SCOPE

The item Pipe Subdrain – 150mmØ is for the supply and placement of the socked pipe subdrain with associated geotextile and clearstone trench.

REFERENCES

The requirements outlined in OPSS.MUNI 180 and OPSS.MUNI 405, OPSS.MUNI 1004, OPSS.MUNI 1860, and OPSD 216.021 shall apply to these items.

MATERIALS

Subdrain pipe shall be 150mm diameter perforated corrugated polyethylene pipe with minimum stiffness of 320kPa and wrapped with knitted polyester sock.

Geotextile shall be Terrafix non-woven 270R or equivalent.

Clearstone shall be 19mmØ according to OPSS.MUNI 1004.

CONSTRUCTION

The Contractor shall supply and install 150mmØ socked subdrain pipe in accordance with OPSS.MUNI 405 and the Contract Drawings. The subdrain trench shall be excavated and wrapped in geotextile, resting on subgrade covered with clearstone, 150mm thickness on top and sides. The Contractor shall complete subdrain connection to catch basin as per OPSD 216.021.

MEASUREMENT FOR PAYMENT

Measurement for payment for the Item Pipe Subdrain will be by actual length measured in metres, including trench excavation, geotextile, clearstone and socked subdrain pipe.

BASIS OF PAYMENT

Payment at the contract price for the above referenced tender item shall be full compensation for all labour, equipment, and material to do the work.

ITEM 95 GEOTEXTILE
ITEM 96 GEOGRID

SCOPE

These items are for the supply and placement of Geotextile and Geogrid, identified as face of curb to face of curb. Geotextile and geogrid placed below the curbs and sidewalks shall be accounted for in the respective tender item.

REFERENCES

The requirements outlined in OPSS.MUNI 206 and OPSS.MUNI 1860 shall apply to the items – Geotextile and Geogrid.

MATERIALS

Geotextile shall be Layfield non-woven LP8 or equivalent, with grab tensile strength not less than 911N and AOS no larger than 0.3mm.

Geogrid shall be Terrafix TBX2500, or equivalent.

CONSTRUCTION

Geogrid and geotextile shall be placed in areas as specified on the Contract Drawings. The Terrafix TBX2500 geogrid shall be placed directly on top of the Geotextile, spanning the subdrain trenches. Adjacent sections of geogrid and geotextile shall be overlapped a minimum of 1.0 metre. At structure and valve locations the geogrid shall be cut-out circular or square to suit the structure size. Square ending of materials against the structures will not be permitted.

Should the geogrid or geotextile become damaged it shall be repaired by placing a piece of geogrid large enough to cover the damaged section with a minimum 1.0 metre overlap.

MEASUREMENT FOR PAYMENT

Measurement for payment shall be by area, in place based on plan quantity, in square metres with no allowance for overlaps.

BASIS OF PAYMENT

Payment at the Contract price for the above tender items shall be full compensation for all labour, equipment, and material to do the work.

ITEM 97 GRANULAR "B", ROADWAY (IN-PLACE)
ITEM 98 GRANULAR "A", ROADWAY (IN-PLACE)

SCOPE

The item is for the supply and placement of granulars for road construction, identified as the proposed face of curb to face of curb. Granulars placed below the curbs, sidewalks, boulevards and entrances shall be accounted for in the respective tender item.

REFERENCES

The requirements outlined in OPSS.MUNI 314, OPSS.MUNI 501, and OPSS.MUNI 1010 shall apply to these items – Granular "B" and Granular "A".

MATERIALS

Granular "A" shall be Type I according to OPSS.MUNI 1010. Granular "B" shall be according to OPSS.MUNI 1010.

CONSTRUCTION

Supply and placement of Granular "A" and Granular "B" shall be completed in accordance with OPSS.MUNI 314 and OPSS.MUNI 501.

MEASUREMENT FOR PAYMENT

Measurement for payment for the Items Granular “A” and Granular “B” will be by volume “in-place” in cubic metres. The volume will be calculated by the Engineer by utilizing design cross sections and the method of average end areas for an “in-place” compacted volume, per OPSS.MUNI 314.09.01.01.02(aii).

BASIS OF PAYMENT

Payment at the contract price for the above referenced tender items shall be full compensation for all labour, equipment, and material to do the work.

ITEM 99 HL8 HOT MIX ASPHALT – BASE COURSE
ITEM 100 HL3 HOT MIX ASPHALT – SURFACE COURSE
ITEM 101 HL3 HOT MIX ASPHALT – TEMPORARY SURFACE COURSE
ITEM 102 HL3 HOT MIX ASPHALT – DRIVEWAY & BOULEVARDS
ITEM 103 TACK COAT

SCOPE

The item is for the supply and placement of HL8 asphalt, HL3 asphalt and tack coat between binder and surface courses.

REFERENCES

The requirements outlined in OPSS.MUNI 308, OPSS.MUNI 310, OPSS.MUNI 311, OPSS.MUNI 710, OPSS.MUNI 1103, and OPSS.MUNI 1150 shall apply to these items.

SUBMISSION AND DESIGN REQUIREMENTS

The Mix Design shall be Contractor Mix Design as specified in OPSS.MUNI 1150.04.01.02.

MATERIALS

Asphalt Cement shall be PGAC 58-34.

Granular “A” shall be Type I according to OPSS.MUNI 1010. Granular “B” shall be according to OPSS.MUNI 1010.

Geotextile shall be Layfield non-woven LP8 or equivalent, with grab tensile strength not less than 911N and AOS no larger than 0.3mm.

Geogrid shall be Terrafix TBX2500, or equivalent.

CONSTRUCTION

Supply and placement of HL8 Asphalt and HL3 Asphalt shall be completed in accordance with OPSS.MUNI 310 including tack coating of joints and all concrete surfaces. Tack coat shall be applied between binder and surface courses.

Included under the Item HL3 Asphalt – Driveway & Boulevards is the preparation of the subgrade per OPSS.MUNI 206 and OPSS.MUNI 180, as well as supply and placement of geotextile, geogrid, Granular "B" as needed and 150mm Granular "A" base material, per OPSS 1010. Subgrade and base materials shall be compacted in accordance with OPSS.MUNI 501. Excess soils shall be managed in accordance with SP 32.

The contractor shall place temporary surface course asphalt at the intersection of Causley Street and Huron Street, between stations 10+180 and 10+200. Included in the cost of the temporary asphalt is the restoration of the road base with salvaged native and granular materials excavated during sanitary sewer and storm sewer installations. The contractor shall shape and pack the existing granulars and place 50mm thickness of HL3 temporary asphalt.

The contractor shall include the cost of temporary pavement markings in the bid price for the associated tender items requiring temporary pavement markings. There will be no separate payment for temporary pavement markings.

MEASUREMENT FOR PAYMENT

Measurement for payment for the Items HL8 and HL3 Asphalt for Items 99 and 100 shall be by mass in Tonnes as detailed in OPSS.MUNI 310.09.01.01.01. The Contractor will be required to supply tickets in duplicate that will be signed by the Owner's representative on delivery.

Measurement for payment for the Item HL3 Asphalt – Driveway & Boulevards shall be by square metres of asphalt placed. There will be no measurement for excavation, geotextile, geogrid and granulars associated with Item 102.

Measurement for payment for the Item HL3 Asphalt – Temporary Surface Course shall be by square metres of asphalt placed. There will be no measurement for granular restoration.

Measurement for payment for the Item Tack Coat shall be by as detailed in OPSS.MUNI 308.09.01.01.

BASIS OF PAYMENT

Payment at the Contract Price for the above tender items shall be full compensation for all labour, equipment, and materials to do the work, including temporary pavement markings, as well as the excavation, geotextile, geogrid and base granulars for Item 102. In addition, Appendix 310-B is invoked for adjustment on Items 99 and 100, based on changes to the MTO's PGAC Price Index, only when the AC Prices are Rising or Falling by more than $15/tonne.

ITEM 104 CONCRETE CURB & GUTTER

SCOPE

This item is for the installation of concrete curbs and gutters, including excavation, geotextile, geogrid and granulars beneath the curb and gutter.

REFERENCES

The requirements outlined in OPSS.MUNI 180, OPSS.MUNI 206, OPSS.MUNI 353, OPSS.MUNI 501, OPSS.MUNI 919, OPSS.MUNI 1010, OPSS.MUNI 1350, OPSD 600.100 and OPSD 608.010 shall apply to this item.

MATERIALS

Concrete shall be according to OPSS.MUNI 1350, with a minimum specified 28-day compressive strength of 32 MPa, Class C-2 Exposure.

Granular "A" shall be Type I according to OPSS.MUNI 1010. Granular "B" shall be according to OPSS.MUNI 1010.

Geotextile shall be Layfield non-woven LP8 or equivalent, with grab tensile strength not less than 911N and AOS no larger than 0.3mm.

Geogrid shall be Terrafix TBX2500, or equivalent.

CONSTRUCTION

Contractor shall construct concrete curb and gutter with a curb machine, in accordance with OPSS.MUNI 353, OPSD 600.100 and OPSD 608.010. Hand placing of curbs will only be permitted in transition areas. Excess material shall be managed in accordance with OPSS.MUNI 180 and SP 32.

Included under the Item Concrete Curb & Gutter is the preparation of the subgrade per OPSS.MUNI 206 as well as supply and placement of the required geotextile, geogrid, granular base material and supporting material, specifically the granulars between the top of subgrade or subdrains to the bottom of gutter, as well as granulars along the back of curb, per OPSS.MUNI 1010. Subgrade and base materials shall be compacted in accordance with OPSS.MUNI 501.

Formwork shall be according to OPSS.MUNI 919 and shall be set true to the lines and grades specified in the Contract Documents and in direct contact with the subgrade or granular course.

The Contractor shall be responsible for the management and disposal of excess excavated materials. Excess material shall be managed in accordance with OPSS.MUNI 180 and SP 32.

MEASUREMENT FOR PAYMENT

Measurement for payment for the item shall be linear metre of curb and gutter installed.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, and materials to do the work, including subgrade excavation, geotextile, geogrid and granulars.

ITEM 105 REINFORCED CONCRETE CURB & GUTTER

SCOPE

This item is for the installation of reinforced concrete curb and gutters at commercial entrances, including excavation, geotextile, geogrid and granulars beneath the curb and gutter.

REFERENCES

The requirements outlined in Item 105 and OPSS.MUNI 1440 shall apply to this item.

MATERIALS

Reinforcing steel shall conform to OPSS.MUNI 1440.05, No. 20M.

CONSTRUCTION

Where indicated, concrete curb and gutter shall be constructed in accordance with item 105 and additionally the contractor shall install a single 20M reinforcing steel bar in the curb section from 50mm inside the expansion joint on either side of the entrance, as shown on the Contract Drawings or determined in the field by the Contract Administrator.

MEASUREMENT FOR PAYMENT

Measurement for payment for the item shall be linear metre of reinforced curb installed.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, and materials to do the work, including subgrade excavation, geotextile, geogrid, granulars and reinforcing steel.

ITEM 106 CONCRETE SIDEWALK
ITEM 107 REINFORCED CONCRETE SIDEWALK (200mm Thickness)
ITEM 108 CONCRETE WALKWAYS

SCOPE

This item is for the construction of concrete sidewalks and concrete walkways to residences as required.

REFERENCES

The requirements outlined in OPSS.MUNI 180, OPSS.MUNI 206, OPSS.MUNI 314, OPSS.MUNI 351, OPSS.MUNI 501, OPSS.MUNI 919, OPSS.MUNI 1308, OPSS.MUNI 1350, OPSS.MUNI 1440, and OPSD 310.010 shall apply to this item.

MATERIALS

Concrete shall be according to OPSS.MUNI 1350, with a minimum specified 28-day compressive strength of 32 MPa, Class C-2 Exposure. Coarse aggregate for the concrete shall have a nominal maximum size of 19 mm.

Expansion joint filler material shall be asphalt impregnated fibreboard having a minimum of 12mm thickness and shall be according to OPSS.MUNI 1308, Type A.

Granular "A" shall be Type I according to OPSS.MUNI 1010. Granular "B" shall be according to OPSS.MUNI 1010.

Geotextile shall be Layfield non-woven LP8 or equivalent, with grab tensile strength not less than 911N and AOS no larger than 0.3mm.

Geogrid shall be Terrafix TBX2500, or equivalent.

Reinforcing steel shall conform to OPSS.MUNI 1440, welded wire mesh MW9.1 x MW9 x 152.

CONSTRUCTION

The Contractor shall construct concrete sidewalks at the locations, widths and thicknesses specified in the Contract Documents in accordance with OPSS.MUNI 351 and OPSD 310.010, including drop curbs for pedestrian crossings. The Contractor shall excavate as necessary per OPSS.MUNI 206 to install geotextile, geogrid and the supporting Granular "A" & "B" base material. Excess material shall be managed in accordance with OPSS.MUNI 180 and SP 32.

Formwork shall be according to OPSS.MUNI 919 and shall be set true to the lines and grades specified in the Contract Documents and in direct contact with the subgrade or granular course.

Sections of concrete sidewalk at the commercial entrances shall have a thickness of 200mm as identified per OPSD 310.010. Reinforcing shall be included in concrete sidewalks constructed at commercial entrances as indicated on the contract drawings. Reinforcing shall be welded mesh MW9.1 x MW9 x 152.

Concrete sidewalk placed abutting concrete curb and gutter or existing concrete sidewalk shall be separated utilizing an expansion joint of bituminous impregnated softboard, 12mm thick.

Included under the Item Concrete Sidewalk (200mm Thickness) is the preparation of the subgrade per OPSS.MUNI 206 as well as supply and placement of geotextile and geogrid below the sidewalk, supply and placement of the required granular base material and supporting material, specifically the granulars between the top of subgrade or to the bottom of sidewalk per OPSS.MUNI 1010. Subgrade and base materials shall be compacted in accordance with OPSS.MUNI 501.

The Contractor will be required to supply computer generated tickets of the concrete loads, in duplicate that will be signed by the Owner's representative on delivery.

MEASUREMENT FOR PAYMENT

Measurement for payment for the item shall be by area in square metre of concrete sidewalk installed. There will be no measurement for excavation, geotextile, geogrid, granulars or reinforcing mesh.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work, including excavation, geotextile, geogrid, base granulars, and supply and installation of sidewalk reinforcing.

ITEM 109 TACTILE INDICATORS

SCOPE

This item is for the supply and installation of tactile walking surface indicators at all pedestrian crossing locations. The Contract Administrator shall review the locations with the Contractor prior to installation.

REFERENCES

The requirements outlined in OPSS.MUNI 351 and OPSD 310.039 shall apply to this item.

MATERIALS

Tactile walking surface indicators shall be cast iron, 0.61m in length.

CONSTRUCTION

Tactile walking surface indicators shall be a minimum of 1.22m in length and be centred within the sidewalk width, constructed in accordance with OPSS.MUNI 351. Adjacent panels shall be permanently connected using a locking mechanism with hot dipped galvanized hardware.

Tolerances shall be set in accordance with the Accessibility for Ontarians with Disabilities Act (AODA).

MEASUREMENT FOR PAYMENT

Measurement for payment shall be made for each full width tactile walking surface indicator plate installed.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work.

ITEM 110 PEDESTRIAN CROSSOVER SYSTEM

SCOPE

This item is for the supply and installation of a Level 2 Type B Pedestrian Crossover System, sourced from Stinson ITS, including all materials, pole bases, electrical components, signage and Electrical Safety Authority (ESA) approvals as may be required. The Contract Administrator shall review the locations with the Contractor prior to installation.

REFERENCES

The contractor shall contact Mr. Harrison McDonald, at Ramudden Digital, harrison.mcdonald@ramuddendigital.ca and reference Town of Blind River quote number QT0001957.

The requirements outlined in the supplier specifications and applicable OPSS.MUNI specifications shall apply.

MATERIALS

The following materials are part of the quotation provided to the Town by Ramudden Digital, as attached. Poles, arms and anchors may be sourced locally, provided they meet specifications, or may also be provided by the system supplier.

The Rectangular Rapid Flashing Beacon complete system includes:

- (2) Audible PB
- (2) 60W/50Ah solar systems
- (4) RRFB light bars
- (2) Aluminum Control Cabinets
- (2) Wireless Radios
- Cabling, accessories, mounting hardware

Type B sign pack and mounting hardware includes:

- RA-5L: Pedestrian Crossing Left x2 (walking right)
- RA-5R: Pedestrian Crossing Right x4 (walking left)
- RA-4T: Pedestrian Crossing x4
- RA-10: No Passing x2
- WC-27: Crosswalk Ahead x2

Steel Octagonal poles, 19ft

- (2) 19ft Steel Octagonal poles
- (2) Anchor assemblies

Aluminum Mast Arms

- (2) 6.07 meter aluminum mast arms
- (2) poles plates

CONSTRUCTION

The Contractor shall supply and install the Level 2 Type B Pedestrian Crossover System at the locations identified in the contract documents, including all signs and electrical as may be required.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender items shall be full compensation for all labour, equipment, and materials to do the work.

ITEM 111 PAVEMENT MARKINGS, PEDESTRIAN CROSSOVER SYSTEM
ITEM 112 PAVEMENT MARKINGS, 10cm YELLOW SOLID
ITEM 113 PAVEMENT MARKINGS, 10cm WHITE SOLID
ITEM 114 PAVEMENT MARKINGS, 10cm WHITE DASHED
ITEM 115 PAVEMENT MARKINGS, 25cm WHITE SOLID
ITEM 116 PAVEMENT MARKINGS, STOP BLOCKS 60cm
ITEM 117 PAVEMENT MARKINGS, DIRECTIONAL ARROWS

SCOPE

These items are for the installation of pavement markings.

REFERENCES

The requirements outlined in OPSS.MUNI 710 and MTO Book 15 shall apply to this item.

MATERIALS

Pavement markings and symbols shall be applied with Traffic Paint with Glass beads in accordance with OPSS 1750.

CONSTRUCTION

The Contractor shall install temporary markings of the centreline of streets after placement of binder and surface courses and maintain until placement of permanent pavement marking. Minimum temporary markings are 0.3m long at 4m spacing.

Permanent pavement markings shall be placed in accordance with the Contract Drawings.

MEASUREMENT FOR PAYMENT

Measurement for Payment for item 111 shall be lump sum, for marking of the pedestrian crosswalk and yield to pedestrian lines.

Measurement for Payment for the shall be in linear metres for Items 112, 113, 114 and 115, and by each for Items 116 and 117, in accordance with OPSS.MUIN 710.

There will be no separate payment for temporary pavement markings. The contractor shall include the cost of temporary pavement markings in the bid price for the associated tender items requiring temporary pavement markings.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, and materials to do the work.

ITEM 118 RESTORE RETAINING WALLS & GARDENS

SCOPE

This item is for the salvage and restoration of existing retaining walls and landscaping gardens to preconstruction or better conditions.

CONSTRUCTION

Existing retaining walls and garden materials shall be salvaged for reinstallation once construction of the associated works is completed, including pressure testing of watermain where impacted.

Retaining walls and gardens shall be reinstalled at the original locations to a minimum preconstruction condition and satisfactory to the Engineer, Town and Resident. Any damage to existing materials will be the Contractor's responsibility to replace at their cost.

MEASUREMENT FOR PAYMENT

There will be no measurement for payment. Payment will be by lump sum upon completion of the reinstallation works.

BASIS OF PAYMENT

Payment at the Contract Price for the above tender item shall be full compensation for all labour, equipment and material to do the work.

ITEM 119 TOPSOIL AND SOD

SCOPE

This item is for the installation of imported topsoil and sod.

REFERENCES

The requirements outlined in OPSS.MUNI 802 and OPSS.MUNI 803 shall apply to this item.

MATERIALS

Topsoil shall be imported.

CONSTRUCTION

Topsoil shall be placed to a compacted uniform depth of 100mm on areas specified in the Contract Drawings and as directed by the Engineer. The Contractor shall excavate or fill to grades and elevations required for placement of the topsoil and sod to final elevations.

Sodding shall not commence until the surface preparation has been approved in writing by the Contract Administrator.

MEASUREMENT FOR PAYMENT

Measurement for payment for the item shall be by the square metre coverage of topsoil and sod placed to a minimum 100mm depth.

BASIS OF PAYMENT

Payment at the Contract Price for the above referenced tender item shall be full compensation for all labour, equipment, and materials to do the work.

SUPPLEMENTAL GENERAL CONDITIONS OF CONTRACT

SECTION GC1 INTERPRETATION

GC1.04 Definitions

Subsection GC1.04 is amended by the addition of the following:

"Aggregate" means gravel, sand, clay, earth, shale, stone, limestone, dolostone, sandstone, marble, granite or rock other than metallic ores; slag and clinkers.

"Road Authority" means the body authorized to exercise authority over a road, highway, street or alley.

SECTION GC2 CONTRACT DOCUMENTS

GC 2.01 Reliance on Contract Documents

Notwithstanding the provisions of GC2.01 in the General Conditions the Contractor shall be totally responsible for the location and protection of all existing sewer and watermains, individual services and utility lines regardless if they are shown on the Contract Drawings or not. The existing services and utilities which are shown on the drawings are derived from existing records or surface locates and therefore their location can only be considered to be approximate. Obtain surface locates from all applicable utilities before commencing construction.

SECTION GC4 OWNER'S RESPONSIBILITIES AND RIGHTS

GC4.04 Construction Affecting Railway Property

Paragraph .01 of Subsection GC4.04 is deleted and replaced by the following:

.01 The Contractor shall pay the costs of all flagging and other traffic control measures required and provided by the railway company.

SECTION GC6 INSURANCE, PROTECTION & DAMAGE

GC6.04 Bonding

Pursuant to Subsection GC6.04 Bonding the Contractor shall provide to the Owner a **50% Labour & Material Payment Bond** and **100 % Performance Bond** for performance security. The performance security shall remain in effect until the project has attained Final Completion.

SECTION GC7 CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF THE WORK

GC7.04 Damage by Vehicles or Other Equipment

Paragraph .01 of Subsection GC7.04 is deleted and replaced with the following:

.01 If at any time, in the opinion of the Contract Administrator or the Road Authority, damage is being done or likely to be done to any Roadway or any improvement thereon, outside the Working Area, by the Contractor's vehicles or other Equipment, whether licensed or unlicensed Equipment, the Contractor shall, at no extra cost to the Owner, make changes or substitutions for such vehicles or Equipment, and shall alter loadings , or in some other manner, remove the cause of such damage to the satisfaction of the Contract Administrator and the Road Authority. The Contractor shall, at no extra cost to the Owner, be responsible to rectify the damage done to the Roadway to the satisfaction of the Road Authority.

GC7.06 Maintaining Roadways and Detours

Subsection GC7.06 is amended by the addition of the following:

.12 When roads and/or bridges are to be closed or traffic restricted notify the appropriate fire, police, ambulance, postal and bus authorities giving at least 7 days notice of the closing or restriction. Re-notify the authorities when road or bridges are re-opened or restrictions are lifted.

GC7.11 Notices by the Contractor

Subsection GC7.11 is amended by the addition of the following:

.03 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Contract Administrator. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1990, Chapter E.19. All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Contract Administrator. This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

GC7.16 Warranty

Subsection GC7.16 is amended by the addition of the following:

.04 To cover rectification costs during the warranty period, the Owner will retain 3**% (three percent)** of the value of Work done, such amount being held back in each progress certificate. Additional monies will be held back as required by provincial statutes. Holdbacks held to cover rectification costs will be retained for a period of twelve months after the date of Completion.

.05 The Contractor shall pay for all additional contract administration, inspection, and material testing costs incurred by the Owner resulting from warranty repair works. Such payments shall be deducted from the warranty holdback amount prior to its release.

SECTION GC8 MEASUREMENT AND PAYMENT

GC8.01.02 Variations in Tender Quantities

Paragraph .01 is amended by deleting 60 Days in the last paragraph and inserting 5 Days.

GC8.02.05.04 Payment for Labour

Clause GC8.02.05.04 is amended by the addition of the following:

.04 Payments in respect of Payroll Burden will be made at the following rates:

(a) Road & Site work - 26 percent of the wages and salary portion of the labour costs.

(b) Structure work - 30 percent of the wages and salary portion of the labour costs.

Where the total labour costs on a Time and Material basis exceeds $ 15,000 per contract for road/structure work, and upon a written request by the Contractor for payment of Payroll Burden in excess of that prescribed herein, the Owner will make payment for work on a Time and Materials basis at the Contractor's actual cost of Payroll Burden as defined.

The Contractor's request shall be accompanied by a confirming statement certified by the Contractor's senior financial officer/auditor. At the Owner's discretion an audit may be conducted in which case the actual Payroll Burden so determined shall be applied to all Time and Material work on the Contract.

GC8.02.09 Liquidated Damages

Pursuant to Subsection GC8.02.09 of the General Conditions, should the Contractor fail to complete the Work in accordance with the Contract and to the satisfaction of the Engineer within the time specified in the Form of Tender, or as amended on the written authority of the Engineer, the Contractor shall pay to the Owner the sum of **$1,500.00** for each working day that the Work shall remain unfinished after such time. Such payments are agreed upon and fixed as liquidated damages that the Owner will suffer by reason of delay and default and are not as a penalty. The Owner may deduct and retain the amount of such liquidated damages out of the monies which may be due or become due to the Contractor under the Contract.

OPSS MUNI GENERAL CONDITIONS OF CONTRACT

Table of Contents

SECTION GC 4.0 - OWNER'S RESPONSIBILITIES AND RIGHTS

SECTION GC 5.0 - MATERIAL

SECTION GC 6.0 - INSURANCE, PROTECTION AND DAMAGE

SECTION GC 7.0 - CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF THE WORK

SECTION GC 8.0 - MEASUREMENT AND PAYMENT

SECTION GC 1.0 - INTERPRETATION

GC 1.01 Captions

.01 The captions appearing in these General Conditions have been inserted as a matter of convenience and for ease of reference only and in no way define, limit, or enlarge the scope or meaning of the General Conditions or any provision hereof.

GC 1.02 Abbreviations

.01 The abbreviations on the left below are commonly found in the Contract Documents and represent the organizations and phrases listed on the right:

"AASHTO"	-	American Association of State Highway Transportation Officials
“ACI”	-	American Concrete Institute
"ANSI"	-	American National Standards Institute
"ASTM"	-	ASTM International
"AWG"	-	American Wire Gauge
"AWWA"	-	American Water Works Association
“CCIL”	-	Canadian Council of Independent Laboratories
"CGSB"	-	Canadian General Standards Board
"CSA"	-	CSA Group - formerly Canadian Standards Association
"CWB"	-	Canadian Welding Bureau
"GC"	-	General Conditions
“ISO”	-	International Organization for Standardization
"MECP"	-	Ontario Ministry of the Environment, Conservation and Parks
"MTO"	-	Ontario Ministry of Transportation
"MUTCD"	-	Manual of Uniform Traffic Control Devices, published by MTO
“OHSA”	-	Ontario Occupational Health and Safety Act
“OLS”	-	Ontario Land Surveyor
"OPS"	-	Ontario Provincial Standard
"OPSD"	-	Ontario Provincial Standard Drawing
"OPSS"	-	Ontario Provincial Standard Specification
“OTM”	-	Ontario Traffic Manual
"PEO"	-	Professional Engineers Ontario
"SAE"	-	SAE International
“SCC”	-	Standards Council of Canada
"SSPC"	-	The Society for Protective Coatings
"UL"	-	Underwriters Laboratories
"ULC"	-	Underwriters Laboratories Canada
“WHMIS”	-	Workplace Hazardous Materials Information System
“WSIB”	-	Workplace Safety & Insurance Board

GC 1.03 Gender and Singular References

.01 References to the masculine or singular throughout the Contract Documents shall be considered to include the feminine and the plural and vice versa, as the context requires.

GC 1.04 Definitions

.01 For the purposes of the Contract Documents the following definitions shall apply:

Abnormal Weather means an extreme climatic condition characterized by wind speed, air temperature, precipitation, or snow fall depth, that is less than or greater than 1-1/2 standard deviations from the mean determined from the weather records of the 25-year period immediately preceding the tender opening date.

Actual Measurement means the field measurement of that quantity within the approved limits of the Work.

Addenda means any additions or change in the Tender documents issued by the Owner prior to Tender closing.

Additional Work means work not provided for in the Contract Documents and not considered by the Contract Administrator to be essential to the satisfactory completion of the Contract within its intended scope.

Agreement means the agreement between the Owner and the Contractor for the performance of the Work that is included in the Contract Documents.

Base means a layer of Material of specified type and thickness placed immediately below the pavement, driving surface, finished grade, curb and gutter, or sidewalk.

Business Day means any Day except Saturdays, Sundays, and statutory holidays.

Certificate of Subcontract Completion means the certificate issued by the Contract Administrator in accordance with clause GC 8.02.04.02, Certification of Subcontract Completion.

Certificate of Substantial Performance means the certificate issued by the Contract Administrator at Substantial Performance.

Change Directive means any written instruction signed by the Owner, or by the Contract Administrator where so authorized, directing that a Change in the Work or Extra Work be performed.

Change in the Work means the deletion, extension, increase, decrease, or alteration of lines; grades; dimensions; quantities; methods; drawings; substantial changes in geotechnical, subsurface, surface, or other conditions; changes in the character of the Work to be done; or Materials of the Work or part thereof, within the intended scope of the Contract.

Change Order means a written amendment to the Contract signed by the Contractor and the Owner, or the Contract Administrator where so authorized, covering contingencies, a Change in the Work, Extra Work, Additional Work; and establishing the basis for payment and the time allowed for the adjustment of the Contract Time.

Completion means contract completion as set out in the Construction Act.

Completion Certificate means the certificate issued by the Contract Administrator at Completion.

Completion Payment means the payment described more particularly in clause GC 8.02.04.07.

Construction Act means as set out in the Construction Act, R.S.O. 1990, c. C.30**,** as amended.

Constructor means, for the purposes of, and within the meaning of the Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended and amendments thereto, the Contractor who executes the Contract.

Contract means the undertaking by the Owner and the Contractor to perform their respective duties, responsibilities, and obligations as prescribed in the Contract Documents.

Contract Administrator means the person, partnership, or corporation designated by the Owner to be the Owner's representative for the purposes of the Contract.

Contract Documents mean the executed Agreement between the Owner and the Contractor, Tender, General Conditions of Contract, Supplemental General Conditions of Contract, Standard Specifications, Special Provisions, Contract Drawings, Addenda incorporated in a Contract Document before the execution of the Agreement, such other documents as may be listed in the Agreement, and subsequent amendments to the Contract Documents made pursuant to the provisions of the Agreement.

Contract Drawings or **Contract Plans** mean drawings or plans, any Geotechnical Report, any Subsurface Report, and any other reports and information provided by the Owner for the Work, and without limiting the generality thereof, may include soil profiles, foundation investigation reports, reinforcing steel schedules, aggregate sources list, Quantity Sheets, and cross-sections.

Contract Time means the time stipulated in the Contract Documents for Substantial Performance or Completion of the Work, including any extension of time made pursuant to the Contract Documents.

Contractor means the person, partnership, or corporation undertaking the Work as identified in the Agreement.

Control Monument means any horizontal or vertical (benchmark) monument that is used to lay out the Work.

Controlling Operation means any component of the Work that, if delayed, may delay the completion of the Work.

Cut-Off Date means the date up to which payment shall be made for Work performed.

Daily Work Records mean daily Records detailing the number and categories of workers and hours worked or on standby, types and quantities of Equipment and number of hours in use or on standby, and description and quantities of Material utilized.

Day means a calendar day.

Drawings or **Plans** mean any Contract Drawings or Contract Plans, or any Working Drawings or Working Plans, or any reproductions of drawings or plans pertaining to the Work.

End Result Specification means specifications that require the Contractor to be responsible for supplying a product or part of the Work. The Owner accepts or rejects the final product or applies a price adjustment that is commensurate with the degree of compliance with the specification.

Engineer means a professional engineer licenced by the Professional Engineers of Ontario to practice in the Province of Ontario.

Equipment means all machinery and equipment used for preparing, fabricating, conveying or erecting the Work and normally referred to as construction machinery and equipment.

Estimate means a calculation of the quantity or cost of the Work or part of it depending on the context.

Extra Work means work not provided for in the Contract as awarded but considered by the Contract Administrator to be essential to the satisfactory completion of the Contract within its intended scope, including unanticipated Work required to comply with legislation and regulations that affect the Work.

Final Acceptance means the date on which the Contract Administrator determines that the Work has passed all inspection and testing requirements and the Contract Administrator is satisfied that the Contractor has rectified all imperfect Work and has discharged all of the Contractor's obligations under the Contract Documents.

Final Acceptance Certificate means the certificate issued by the Contract Administrator at Final Acceptance of the Work.

Final Detailed Statement means a complete evaluation prepared by the Contract Administrator showing the quantities, unit prices, and final dollar amounts of all items of Work completed under the Contract, including variations in tender items and Extra Work, all as set out in the same general form as the monthly Estimates.

Geotechnical Report means a report or other information identifying soil, rock, and ground water conditions in the area of any proposed Work.

Grade means the required elevation of that part of the Work.

Hand Tools means tools that are commonly called tools or implements of the trade and include small power tools.

Highway means a common and public highway any part of which is intended for or used by the general public for the passage of vehicles and includes the area between the lateral property lines thereof.

Inclement Weather means weather conditions or conditions resulting directly from weather conditions that prevent the Contractor from proceeding with a Controlling Operation**.**

Lot means a specific quantity of Material or a specific amount of construction normally from a single source and produced by the same process.

Lump Sum Item means a tender item indicating a portion of the Work for which payment will be made at a single tendered price. Payment is not based on a measured quantity, although a quantity may be given in the Contract Documents.

Major Item means any tender item that has a value, calculated based on its actual or estimated tender quantity, whichever is the larger, multiplied by its tender unit price, which is equal to or greater than the lesser of,

a) $100,000, or

b) 5% of the total tender value calculated based on the total of all the estimated tender quantities and the tender unit prices.

Material means Material, machinery, equipment and fixtures forming part of the Work.

Monument means either a Property Monument or a Control Monument.

Owner means the party to the Contract for whom the Work is being performed, as identified in the Agreement, and includes, with the same meaning and import, "Authority."

Pavement means a wearing course or courses placed on the Roadway and consisting of asphaltic concrete, hydraulic cement concrete, Portland cement concrete, or plant or road mixed mulch.

Performance Bond means the type of security furnished to the Owner to guarantee completion of the Work in accordance with the Contract and to the extent provided in the bond.

Plan Quantity means that quantity as computed from within the boundary lines of the Work as shown in the Contract Documents.

Project means the construction of the Work as contemplated by this Contract.

Proper Invoice has the meaning as set out in the Construction Act.

Property Monument means any property bar, concrete pillar, rock post, cut cross or other object that marks the boundary between real property ownership.

Quality Assurance (QA) means a system or series of activities carried out by the Owner to ensure that Work meets the specified requirements.

Quality Control (QC) means a system or series of activities carried out by the Contractor, Subcontractor, supplier, and manufacturer to ensure that Work meets the specified requirements.

Quantity Sheet means a list of the quantities of Work to be done.

Quarried Rock means Material removed from an open excavation made in a solid mass of rock that, prior to removal, was integral with the parent mass.

Quarry means a place where aggregate has been or is being removed from an open excavation made in a solid mass of igneous, sedimentary, or metamorphic rock or any combination of these that, prior to removal, was integral with the parent areas.

Rate of Interest means the prejudgment interest rate determined under subsection 127(2) of the *Courts of Justice Act* or, if the contract or subcontract specifies a different interest rate for the purpose, the greater of the prejudgment interest rate and the interest rate specified in the contract or subcontract.

Records mean any books, payrolls, accounts, or other information that relate to the Work or any Change in the Work, Extra Work, Additional Work or claims arising therefrom.

Roadway means that part of the Highway designed or intended for use by vehicular traffic and includes the Shoulders.

Shoulder means that portion of the Roadway between the edge of the travelled portion of the wearing surface and the top inside edge of the ditch or fill slope.

Special Provisions mean directions containing requirements specific to the Work.

Standard Drawing or Standard Specification means a standard practice required and stipulated by the Owner for performance of the Work.

Statutory Holdback means the holdbacks required under the Construction Act.

Subbase means a layer of Material of specified type and thickness between the Subgrade and the Base.

Subcontractor means a person, partnership or corporation undertaking the execution of a part of the Work by virtue of an agreement with the Contractor.

Subgrade means the earth or rock surface, whether in cut or fill, as prepared to support the pavement structure, consisting of Base, Subbase, and Pavement.

Substantial Performance has the meaning as set out in the Construction Act, R.S.O. 1990, c. C.30**,** as amended.

Subsurface Report means a report or other information identifying the location of Utilities, concealed and adjacent structures, and physical obstructions that fall within the influence of the Work.

Superintendent means the Contractor's authorized representative in charge of the Work and who shall be a “competent person” within the meaning of the definition contained in the Occupational Health and Safety Act, R.S.O. 1990, c. 0.1, as amended.

Surety means the person, partnership or corporation, other than the Contractor, licensed in Ontario to transact business under the Insurance Act, R.S.O. 1990, c.I.8, as amended, executing a bond provided by the Contractor.

Tender means an offer in writing from the Contractor, submitted in the format prescribed by the Owner, to complete the Work.

Time and Material means costs calculated according to clause GC 8.02.05, Payment on a Time and Material Basis.

Utility means an aboveground or underground facility maintained by a municipality, public utility authority or regulated authority and includes services such as sanitary sewer, storm sewer, water, electric, gas, oil, steam, data transmission, telephone, and cable television.

Warranty Period means the applicable time period according to clause GC 7.16.02, Warranty.

Work means the total construction and related services required by the Contract Documents.

Working Area means all the lands and easements owned or acquired by the Owner for the construction of the Work.

Working Day means any Day,

a) except Saturdays, Sundays and statutory holidays;

b) except a Day as determined by the Contract Administrator, on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom, from proceeding with a Controlling Operation. For the purposes of this definition, this shall be a Day during which the Contractor cannot proceed with at least 60% of the normal labour and Equipment force effectively engaged on the Controlling Operation for at least 5 hours;

c) except a Day on which the Contractor is prevented from proceeding with a Controlling Operation, as determined by the Contract Administrator by reason of,

    i. any breach of the Contract by the Owner or if such prevention is due to the Owner, another contractor hired by the Owner, or an employee of any one of them, or by anyone else acting on behalf of the Owner.

    ii. non-delivery of Owner supplied Materials.

    iii. any cause beyond the reasonable control of the Contractor that can be substantiated by the Contractor to the satisfaction of the Contract Administrator.

Working Drawings or **Working Plans** means any Drawings or Plans prepared by the Contractor for the execution of the Work and may, without limiting the generality thereof, include formwork, falsework, and shoring plans; Roadway protection plans; shop drawings; shop plans; or erection diagrams.

GC 1.05 Ontario Traffic Manual

.01 All references in the Contract Documents to the MUTCD, including all Parts and Divisions thereof, or MTO Traffic Control Manual for Roadway Work Operations, or Traffic Control Manual for Roadway Operations Field Edition are hereby deleted and replaced by all currently available books which make up the Ontario Traffic Manual.

GC 1.06 Final Acceptance

.01 For the purposes of determining whether Final Acceptance has occurred, the Contract Administrator shall not take into account, in determining the discharge of the Contractor's obligations, any warranty obligation of the Contractor to the extent that the warranty extends beyond 12 months after Substantial Performance.

GC 1.07 Interpretation of Certain Words

.01 The words "acceptable," "approval," "authorized," "considered necessary," "directed," "required," "satisfactory," or words of like import, shall mean approval of, directed, required, considered necessary, or authorized by and acceptable or satisfactory to the Contract Administrator, unless the context clearly indicates otherwise.

SECTION GC 2.0 - CONTRACT DOCUMENTS

GC 2.01 Reliance on Contract Documents

.01 The Owner warrants that the information furnished in the Contract Documents can be relied upon with the following limitations or exceptions:

a) Based on available information at the time of the contract, the location of all mainline underground Utilities that may affect the Work shall be shown to a tolerance of:

i. 1 m horizontal, and
ii. 0.3 m vertical

.02 The Owner does not warrant or make any representation with respect to:

a) interpretations of data or opinions expressed in any Subsurface Report available for the perusal of the Contractor, that are not included as part of the Contract Documents, and

b) other information specifically excluded from this warranty.

GC 2.02 Order of Precedence

.01 In the event of any inconsistency or conflict in the contents of the following documents, such documents shall take precedence and govern in the following descending order:

a) Agreement

b) Addenda

c) Special Provisions

d) Contract Drawings

e) Standard Specifications

f) Standard Drawings

g) Tender

h) Supplemental General Conditions

i) OPSS.MUNI 100 General Conditions of Contract

j) Working Drawings

Later dates shall govern within each of the above categories of documents.

.02 In the event of any conflict among or inconsistency in the information shown on Drawings, the following rules shall apply:

a) Dimensions shown in figures on a Drawing shall govern where they differ from dimensions scaled from the same Drawing;

b) Drawings of larger scale shall govern over those of smaller scale;

c) Detailed Drawings shall govern over general Drawings; and

d) Drawings of a later date shall govern over those of an earlier date in the same series.

.03 In the event of any inconsistency or conflict in the contents of Standard Specifications the following descending order of precedence shall govern:

a) Owner's Standard Specifications

b) Ontario Provincial Standard Specifications

c) Other standards referenced in OPSSs and OPSDs (e.g., CSA, CGSB, ASTM, and ANSI).

.04 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all.

SECTION GC 3.0 - ADMINISTRATION OF THE CONTRACT

GC 3.01 Contract Administrator's Authority

.01 The Contract Administrator shall be the Owner's representative during construction and until the issuance of the Completion Certificate or the issuance of the Final Acceptance Certificate, whichever is later. All instructions to the Contractor, including instructions from the Owner, shall be issued by the Contract Administrator. The Contract Administrator shall have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

.02 All claims, disputes and other matters in question relating to the performance and the quality of the Work or the interpretation of the Contract Documents shall be referred to the Contract Administrator in writing by the Contractor.

.03 The Contract Administrator may inspect the Work for its conformity with the Contract Documents, and to record the necessary data to establish payment quantities under the schedule of tender quantities and unit prices or to assess the value of the Work completed in the case of a lump sum price Contract.

.04 The Contract Administrator shall provide an estimate of the amounts owing to the Contractor under the Contract as provided for in section GC 8.0, Measurement and Payment.

.05 The Contract Administrator, to not cause delay in the schedule, shall, with reasonable promptness, review and take appropriate action upon the Contractor's submissions such as shop drawings, product data, and samples in accordance with the Contract Documents .

.06 The Contract Administrator shall investigate all allegations of a Change in the Work made by the Contractor and issue appropriate instructions.

.07 The Contract Administrator shall prepare Change Directives and Change Orders for the Owner’s approval.

.08 Upon written application by the Contractor, the Contract Administrator and the Contractor shall jointly conduct an inspection of the Work to establish the date of Substantial Performance of the Work or the date of Completion of the Work or both.

.09 The Contract Administrator shall be, in the first instance, the interpreter of the Contract Documents and the judge of the performance thereunder by both parties to the Contract. Interpretations and decisions of the Contract Administrator shall be consistent with the intent of the Contract Documents and, in making these decisions, the Contract Administrator shall not show partiality to either party.

.10 The Contract Administrator shall have the authority to reject any part of the Work or Material that does not conform to the Contract Documents.

.11 In the event that the Contract Administrator determines that any part of the Work performed by the Contractor is defective, whether the result of poor workmanship the use of defective Material or damage through carelessness or other act or omission of the Contractor and whether or not incorporated in the Work or otherwise fails to conform to the Contract Documents, then the Contractor shall if directed by the Contract Administrator promptly, as directed by the Contract Administrator, remove the Work and replace, make good, or re-execute the Work at no additional cost to the Owner.

.12 Any part of the Work destroyed or damaged by such removals, replacements, or re-executions shall be made good, promptly, at no additional cost to the Owner.

.13 If, in the opinion of the Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with the Contract Documents, the Owner may deduct from monies otherwise due to the Contractor the difference in value between the Work as performed and that called for by the Contract Documents amount that will be determined in the first instance by the Contract Administrator.

.14 Notwithstanding any inspections made by the Contract Administrator or the issuance of any certificates or the making of any payment by the Owner, the failure of the Contract Administrator to reject any defective Work or Material shall not constitute acceptance of defective Work or Material.

.15 The Contract Administrator shall have the authority to temporarily suspend the Work for such reasonable time as may be necessary:

a) to facilitate the checking of any portion of the Contractor's construction layout;

b) to facilitate the inspection of any portion of the Work; or

c) for the Contractor to remedy its non-compliance with any provisions of the Contract Documents.

The Contractor shall not be entitled to any compensation for suspension of the Work in these circumstances.

.16 The Owner has the right to terminate the Contract for wilful or persistent violation by the Contractor or its workers of any applicable laws or bylaws, including but not limited to, the Occupational Health and Safety Act legislation and regulations, Workplace Safety and Insurance Board Act, and Regulation 347 of the Environmental Protection Act.

.17 If the Contract Administrator determines that any worker employed on the Work is incompetent, as defined by the Occupational Health and Safety Act, or is disorderly, then the Contract Administrator shall provide written notice to the Contractor and the Contractor shall immediately remove the worker from the Working Area. Such worker shall not return to the Working Area without the prior written consent of the Contract Administrator.

GC 3.02 Working Drawings

.01 The Contractor shall arrange for the preparation of clearly identified and dated Working Drawings as called for by the Contract Documents.

.02 The Contractor, to not cause delay in the Work, shall submit Working Drawings to the Contract Administrator with reasonable promptness and in orderly sequence . If either the Contractor or the Contract Administrator so requests, they shall jointly prepare a schedule fixing the dates for submission and return of Working Drawings. Working Drawings shall be submitted in printed form. At the time of submission, the Contractor shall notify the Contract Administrator in writing of any deviations from the Contract Documents that exist in the Working Drawings.

.03 The Contract Administrator shall review and return Working Drawings in accordance with an agreed upon schedule, or otherwise, with reasonable promptness so as not to cause delay.

.04 The Contract Administrator's review shall be to check for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the Working Drawings or of responsibility for meeting all requirements of the Contract Documents, unless a deviation on the Working Drawings has been approved in writing by the Contract Administrator.

.05 The Contractor shall make any changes in Working Drawings that the Contract Administrator may require to make the Working Drawings consistent with the Contract Documents and resubmit, unless otherwise directed by the Contract Administrator. When resubmitting, the Contractor shall notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.

.06 Work related to the Working Drawings shall not proceed until the Working Drawings have been signed and dated by the Contract Administrator.

.07 The Contractor shall keep one set of the reviewed Working Drawings, marked as above, at the site at all times.

GC 3.03 Right of the Contract Administrator to Modify Methods and Equipment

.01 The Contractor shall, when requested in writing, make alterations in the method, Equipment, or work force at any time the Contract Administrator considers the Contractor's actions to be unsafe, or damaging to either the Work or existing facilities or the environment.

.02 The Contractor shall, when requested in writing, alter the sequence of its operations on the Contract so as to avoid interference with work being performed by others.

.03 Notwithstanding the foregoing, the Contractor shall ensure that all necessary safety precautions and protection are maintained throughout the Work.

GC 3.04 Emergency Situations

.01 The Contract Administrator has the right to determine the existence of an emergency situation and, when such an emergency situation is deemed to exist, the Contract Administrator may instruct the Contractor to take action to remedy the situation. If the Contractor does not take timely action or, if the Contractor is not available, the Contract Administrator may direct others to remedy the situation.

.02 If the emergency situation was the fault of the Contractor, the remedial Work shall be done at the Contractor's expense. If the emergency situation was not the fault of the Contractor, the Owner shall pay for the remedial Work.

GC 3.05 Layout Information

.01 The Contract Administrator shall provide background information, including without limitation, baseline and benchmark information, to facilitate the general location, alignment, elevation and layout of the Work.

.02 The Contract Administrator shall provide pre and post construction inventories of all Monuments, etc. that are located within the Working Area.

.03 The Owner shall be responsible only for the correctness of the layout information provided by the Contract Administrator.

GC 3.06 Extension of Contract Time

.01 An application for an extension of Contract Time shall be made in writing by the Contractor to the Contract Administrator as soon as the need for such extension becomes evident and at least 15 Days prior to the expiration of the Contract Time. The application for an extension of Contract Time shall enumerate the reasons and state the length of extension required.

.02 Circumstances suitable for consideration of an extension of Contract Time include the following:

a) Delays, subsection GC 3.07.

b) Changes in the Work, clause GC 3.10.01.

c) Extra Work, clause GC 3.10.02.

d) Additional Work, clause GC 3.10.03.

.03 The Contract Administrator shall, in reviewing an application for an extension to the Contract Time, consider whether the delays, Changes in the Work, Extra Work, or Additional Work involve a Controlling Operation.

.04 The Contract Time shall be extended for such additional time as may be recommended by the Contract Administrator and deemed fair and reasonable by the Owner.

.05 The terms and conditions of the Contract shall continue for such extension of Contract Time.

GC 3.07 Delays

.01 If the Contractor is delayed in the performance of the Work by,

a) war, blockades, and civil commotions;

b) errors in the Contract Documents;

c) an act or omission of the Owner or Contract Administrator, or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the Contract Documents;

d) a stop work order issued by a court or public authority, provided that such order was not issued as the result of an act or omission of the Contractor or anyone employed or engaged by the Contractor directly or indirectly;

e) the Contract Administrator giving notice under section GC 7.0, Suspension of Work;

f) Abnormal Weather; or

g) archaeological finds, in accordance with subsection GC 3.15, Archaeological Finds,

then the Contractor shall be reimbursed by the Owner for reasonable costs incurred by the Contractor as the result of such delay, provided that in the case of an application for an extension of Contract Time due to Abnormal Weather, the Contractor shall, with the Contractor's application, submit evidence from Environment Canada in support of such application. Extension of Contract Time may be granted in accordance with subsection GC 3.06, Extension of Contract Time.

.02 If the Work is delayed by labour disputes, strikes or lock-outs, including lock-outs decreed or recommended to its members by a recognized contractor's association, of which the Contractor is a member or to which the Contractor is otherwise bound, which are beyond the Contractor's control, then the Contract Time shall be extended in accordance with subsection GC 3.06, Extension of Contract Time.

.03 In no case shall the extension of Contract Time be less than the time lost as the result of the event causing the delay, unless a shorter extension is agreed to by the Contractor. The Contractor shall not be entitled to payment for costs incurred as the result of such delays unless such delays are the result of actions by the Owner.

.04 The Contractor shall not be entitled to payment for the cost of delays incurred as a result of a dispute between the Contractor and Owner. The Contractor shall execute the Work and may pursue resolution of the dispute in accordance with subsection GC 3.13, Claims, Negotiations, Mediations.

GC 3.08 Assignment of Contract

.01 The Contractor shall not assign the Contract, either in whole or in part, without the prior written consent of the Owner.

GC 3.09 Subcontracting by the Contractor

.01 Subject to clause GC 3.09.03, Subcontracting by the Contractor, the Contractor may subcontract any part of the Work, in accordance with the Contract Documents and any limitations specified therein.

.02 The Contractor shall notify the Contract Administrator in writing in 10 Days prior to the start of construction of the intention to subcontract. Such notification shall identify the part of the Work, and the Subcontractor with whom it is intended.

.03 The Contract Administrator shall, within 5 Days of receipt of such notification, accept or reject the intended Subcontractor. The rejection shall be in writing and shall include the reasons for the rejection.

.04 The Contractor shall not, without the written consent of the Owner, change a Subcontractor who has been engaged in accordance with this subsection.

.05 The Contractor shall preserve and protect the rights of the Owner under the Contract Documents with respect to that part of the Work to be performed under subcontract and shall,

a) enter into agreements with the intended Subcontractors to require them to perform their Work in accordance with the Contract Documents; and

b) be as fully responsible to the Owner for acts and omissions of the Contractor's Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the Contractor.

.06 The Owner's consent to subcontracting by the Contractor shall not be construed to relieve the Contractor from any obligation under the Contract and shall not impose any liability upon the Owner. Nothing contained in the Contract Documents shall create a contractual relationship between a Subcontractor and the Owner.

GC 3.10 Changes

GC 3.10.01 Changes in the Work

.01 The Owner, or the Contract Administrator where so authorized, may, by order in writing, make a Change in the Work without invalidating the Contract. The Contractor shall not be required to proceed with a Change in the Work until in receipt of a Change Order or Change Directive. Upon the receipt of such Change Order or Change Directive the Contractor shall proceed with the Change in the Work.

.02 The Contractor may apply for an extension of Contract Time according to the terms of clause GC 3.06, Extension of Contract Time.

.03 If the Change in the Work relates solely to quantities, payment for that part of the Work shall be made according to the conditions specified in clause GC 8.01.02, Variations in Tender Quantities. If the Change in the Work does not solely relate to quantities, then either the Owner or the Contractor may initiate negotiations upwards or downwards for the adjustment of the Contract price in respect of the Change in the Work pursuant to subsection GC 3.13, Claims, Negotiations, Mediation or payment may be made according to the conditions contained in clause GC 8.02.05, Payment on a Time and Material Basis.

GC 3.10.02 Extra Work

.01 The Owner, or Contract Administrator where so authorized, may instruct the Contractor to perform Extra Work without invalidating the Contract. The Contractor shall not be required to proceed with the Extra Work until in receipt of a Change Order or Change Directive. Upon receipt of such Change Order or Change Directive the Contractor shall proceed with the Extra Work.

.02 The Contractor may apply for an extension of Contract Time according to the terms of clause GC 3.06, Extension of Contract Time.

.03 Either the Owner or Contractor may initiate negotiations upwards or downwards for the payment for the Extra Work pursuant to subsection GC 3.13, Claims, Negotiations, Mediation, or payment may be made according to the conditions contained in clause GC 8.02.05, Payment on a Time and Material Basis.

GC 3.10.03 Additional Work

.01 The Owner, or Contract Administrator where so authorized, may request the Contractor to perform Additional Work without invalidating the Contract. If the Contractor agrees to perform Additional Work, the Contractor shall proceed with such Additional Work upon receipt of a Change Order.

.02 The Contractor may apply for an extension of Contract Time according to the terms of subsection GC 3.06, Extension of Contract Time.

.03 Payment for the Additional Work may be negotiated pursuant to subsection GC 3.13, Claims, Negotiations, Mediation, or payment may be made according to the conditions contained in clause GC 8.02.05, Payment on a Time and Material Basis.

GC 3.11 Notices

.01 Any notice permitted or required to be given to the Contract Administrator or the Superintendent in respect of the Work shall be deemed to have been given to and received by the addressee on the date of delivery if delivered by hand, email, or by facsimile transmission and on the fifth Day after the date of mailing, if sent by mail.

.02 The Contractor and the Owner shall provide each other with the mail and email addresses; cell phone, and telephone numbers for the Contract Administrator and the Superintendent at the commencement of the Work, and update as necessary.

.03 In the event of an emergency situation or other urgent matter the Contract Administrator or the Superintendent may give a verbal notice, provided that such notice is confirmed in writing within 2 Days.

.04 Any notice permitted or required to be given to the Owner or the Contractor shall be given in accordance with the notice provision of the Contract.

GC 3.12 Use and Occupancy of the Work Prior to Substantial Performance

.01 Where it is not contemplated elsewhere in the Contract Documents, the Owner may use or occupy the Work or any part thereof prior to Substantial Performance, provided that at least 30 Days written notice has been given to the Contractor.

.02 The use or occupancy of the Work or any part thereof by the Owner prior to Substantial Performance shall not constitute an acceptance of the Work or parts so occupied. In addition, the use or occupancy of the Work shall not relieve the Contractor or the Contractor's Surety from any liability that has arisen, or may arise, from the performance of the Work in accordance with the Contract Documents. The Owner shall be responsible for any damage that occurs because of the Owner's use or occupancy. Such use or occupancy of any part of the Work by the Owner does not waive the Owner's right to charge the Contractor liquidated damages in accordance with the terms of the Contract.

GC 3.13 Claims, Negotiations, Mediation

GC 3.13.01 Continuance of the Work

.01 Unless the Contract has been terminated or completed, the Contractor shall in every case, after serving or receiving any notification of a claim or dispute, verbal or written, continue to proceed with the Work with due diligence and expedition. It is understood by the parties that such action shall not jeopardize any claim it may have.

GC 3.13.02 Record Keeping

.01 Immediately upon commencing Work that may result in a claim, the Contractor shall keep Daily Work Records during the course of the Work, sufficient to substantiate the Contractor's claim, and the Contract Administrator shall keep Daily Work Records to be used in assessing the Contractor's claim, all in accordance with clause GC 8.02.07, Records.

.02 The Contractor and the Contract Administrator shall attempt to reconcile their respective Daily Work Records on a daily basis, to simplify review of the claim, when submitted. If the Contractor and the Contract Administrator fail to reconcile their respective Daily Work Records, then the Contractor shall submit its Daily Work Records as part of its claim, whereby the resolution of the dispute about the Daily Work Records shall not be resolved until there is a resolution of the claim.

.03 The keeping of Daily Work Records by the Contract Administrator or the reconciling of such Daily Work Records with those of the Contractor shall not be construed to be acceptance of the claim.

GC 3.13.03 Claims Procedure

.01 The Contractor shall give verbal notice of any situation that may lead to a claim for additional payment immediately upon becoming aware of the situation.

.02 The Contractor shall provide written notice within 7 Days of the commencement of any part of the Work that may be affected by the situation.

.03 The Contractor shall submit detailed claims as soon as reasonably possible and in any event no later than 30 Days or such time as mutually agreed after completion of the Work affected by the situation. The detailed claim shall:

a) identify the item or items in respect of which the claim arises;

b) state the grounds, contractual or otherwise, upon which the claim is made; and

c) include the Records maintained by the Contractor supporting such claim.

.04 Within 30 Days of the receipt of the Contractor's detailed claim, the Contract Administrator may request the Contractor to submit any further and other particulars as the Contract Administrator considers necessary to assess the claim. The Contractor shall submit the requested information within 30 Days of receipt of such request.

.05 Within 90 Days of receipt of the detailed claim, the Contract Administrator shall advise the Contractor, in writing, of the Contract Administrator's opinion regarding the validity of the claim.

GC 3.13.04 Negotiations

.01 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, open and timely disclosure of relevant facts, information, and documents to facilitate these negotiations.

.02 Should the Contractor disagree with the opinion given in clause GC 3.13.03.05, with respect to any part of the claim, the Contract Administrator shall enter into negotiations with the Contractor to resolve the matters in dispute. Where a negotiated settlement cannot be reached and it is agreed that payment cannot be made on a Time and Material basis in accordance with clause GC 8.02.05, Payment on a Time and Material Basis, the parties shall proceed in accordance with clause GC 3.13.05, Mediation, or subsection GC 3.14, Arbitration.

.03 Prior to the expiry of 30 Business Days from the date of receipt of the Contractors claim, the Contract Administrator shall provide a written response to the Contractor stating the Contract Administrator’s final price for the Change Order and an explanation of the rationale and basis of the Contract Administrator’s position which shall be deemed to be the initial site response.

GC 3.13.05 Mediation

.01 If a claim is not resolved satisfactorily through the negotiation stage noted in clause GC 3.13.04, Negotiations, within a period of 30 Days following the opinion given in clause GC 3.13.03.05, and the Contractor wishes to pursue the issue further, the parties may, upon mutual agreement, utilize the services of an independent third-party mediator.

.02 The mediator shall be mutually agreed upon by the Owner and Contractor.

.03 The mediator shall be knowledgeable regarding the area of the disputed issue. The mediator shall meet with the parties together or separately, as necessary, to review all aspects of the issue. In a final attempt to assist the parties in resolving the issue themselves prior to proceeding to arbitration the mediator shall provide, without prejudice, a non-binding recommendation for settlement.

.04 The review by the mediator shall be completed within 90 Days following the opinion given in clause GC 3.13.03.05.

.05 Each party is responsible for its own costs related to the use of the mediation process. The cost of the third-party mediator shall be equally shared by the Owner and Contractor.

GC 3.13.06 Payment

.01 Payment of the claim shall be made no later than 28 Days after the date of resolution of the claim or dispute. Such payment shall be made according to the terms of section GC 8.0, Measurement and Payment.

GC 3.13.07 Rights of Both Parties

.01 It is agreed that no action taken under subsection GC 3.13, Claims, Negotiations, Mediation, by either party shall be construed as a renunciation or waiver of any of the rights or recourse available to the parties, provided that the requirements set out in this subsection are fulfilled.

.02 It is further agreed that the parties may at any time resort to the adjudication procedure contained in the Construction Act.

GC 3.14 Arbitration

GC 3.14.01 Conditions of Arbitration

.01 If a claim is not resolved satisfactorily through the negotiation stage noted in clause GC 3.13.04, Negotiations, or the mediation stage noted in clause GC 3.13.05, Mediation, either party may invoke the provisions of subsection GC 3.14, Arbitration, by giving written notice to the other party.

.02 Notification that arbitration shall be implemented to resolve the issue shall be communicated in writing as soon as possible and no later than 60 Days following the opinion given in clause GC 3.13.03.05. Where the use of a third-party mediator was implemented, notification shall be within 120 Days of the opinion given in clause GC 3.13.03.05.

.03 The parties shall be bound by the decision of the arbitrator.

.04 The rules and procedures of the Arbitration Act, 1991, S.O. 1991, c.17, as amended, shall apply to any arbitration conducted hereunder except to the extent that they are modified by the express provisions of subsection GC 3.14, Arbitration.

GC 3.14.02 Arbitration Procedure

.01 The following provisions are to be included in the agreement to arbitrate and are subject only to such right of appeal as exist where the arbitrator has exceeded his or her jurisdiction or have otherwise disqualified him or herself:

a) All existing actions in respect of the matters under arbitration shall be stayed pending arbitration;

b) All outstanding claims and matters to be settled are to be set out in a schedule to the agreement. Only such claims and matters as are in the schedule shall be arbitrated; and

c) Before proceeding with the arbitration, the Contractor shall confirm that all matters in dispute are set out in the schedule.

GC 3.14.03 Appointment of Arbitrator

.01 The arbitrator shall be mutually agreed upon by the Owner and Contractor to adjudicate the dispute.

.02 Where the Owner and Contractor cannot agree on a sole arbitrator within 30 Days of the notification of arbitration noted in clause GC 3.14.01.02, the Owner and the Contractor shall each choose an appointee within 37 Days of the notice of arbitration.

.03 The appointees shall mutually agree upon an arbitrator to adjudicate the dispute within 15 Days after the last appointee was chosen or they shall refer the matter to the ADR Institute of Ontario (ADRIO), which may select an arbitrator to adjudicate the dispute within 7 Days of being requested to do so.

.04 The arbitrator shall not be interested financially in the Contract nor in either party's business and shall not be employed by either party.

.05 The arbitrator may appoint independent experts and any other persons to assist him or her.

.06 The arbitrator is not bound by the rules of evidence that govern the trial of cases in court but may hear and consider any evidence that the arbitrator considers relevant.

.07 The hearing shall commence within 90 Days of the appointment of the arbitrator.

GC 3.14.04 Costs

.01 The arbitrator's fee shall be equally shared by the Owner and the Contractor.

.02 The fees of any independent experts and any other persons appointed to assist the arbitrator shall be shared equally by the Owner and the Contractor.

.03 The arbitration hearing shall be held in a place mutually agreed upon by both parties or in the event the parties do not agree, a site shall be chosen by the arbitrator. The cost of obtaining appropriate facilities shall be shared equally by the Owner and the Contractor.

.04 The arbitrator may, in his or her discretion, award reasonable costs, related to the arbitration.

GC 3.14.05 The Decision

.01 The reasoned decision shall be made in writing within 90 Days of the conclusion of the hearing. An extension of time to make a decision may be granted with consent of both parties. Payment shall be made in accordance with clause GC 3.13.06, Payment.

GC 3.15 Archaeological Finds

.01 If the Contractor's operations expose any items that may indicate an archaeological find, such as but not limited to building remains, hardware, accumulations of bones, pottery, or arrowheads, the Contractor shall immediately notify the Contract Administrator and suspend operations within the area identified by the Contract Administrator. Notification may be verbal provided that such notice is confirmed in writing within 2 Days. Work shall remain suspended within that area until otherwise directed by the Contract Administrator in writing, in accordance with subsection GC 7.09, Suspension of Work.

.02 Any delay in the completion of the Contract that is caused by such a suspension of Work shall be considered to be beyond the Contractor's control in accordance with clause GC 3.07.01.

.03 Any Work directed or authorized in connection with an archaeological find shall be considered as Extra Work in accordance with clause GC 3.10.02, Extra Work.

.04 The Contractor shall take all reasonable action to minimize additional costs that may accrue as a result of any work stoppage.

SECTION GC 4.0 - OWNER'S RESPONSIBILITIES AND RIGHTS

GC 4.01 Working Area

.01 The Owner shall acquire all property rights that are deemed necessary by the Owner for the construction of the Work, including temporary working easements, and shall indicate the full extent of the Working Area on the Contract Drawings.

GC 4.02 Approvals and Permits

.01 The Owner shall pay for all plumbing and building permits.

.02 The Owner shall obtain and pay for all permits, licences, and certificates solely required for the design of the Work.

GC 4.03 Management and Disposition of Materials

.01 The Owner shall identify in the Contract Documents the Materials to be moved within or removed from the Working Area and any characteristics of those Materials that necessitates special Materials management and disposition.

.02 In accordance with regulations under the Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended, the Owner advises that,

a) the designated substances silica, lead, and arsenic are generally present throughout the Working Area occurring naturally or as a result of vehicle emissions;

b) the designated substance asbestos may be present in cement products, asphalt, and conduits for Utilities;

c) the following hazardous materials are ordinarily present in construction activities: limestone, gypsum, marble, mica, and Portland cement; and

d) exposure to these substances may occur as a result of activities by the Contractor such as sweeping, grinding, crushing, drilling, blasting, cutting, and abrasive blasting.

.03 The Owner shall identify in the Contract Documents any designated substances or hazardous materials other than those identified above and their location in the Working Area.

.04 If the Owner or Contractor discovers or is advised of the presence of designated substances or hazardous Materials that are in addition to those listed in clause GC 4.03.02, or not clearly identified in the Contract Documents according to clause GC 4.03.03, then verbal notice shall be provided to the other party immediately with written confirmation within 2 Days. The Contractor shall stop Work in the area immediately and shall determine the necessary steps required to complete the Work in accordance with applicable legislation and regulations.

.05 The Owner shall be responsible for any reasonable additional costs of removing, managing and disposing of any Material not identified in the Contract Documents, or where conditions exist that could not have been reasonably foreseen at the time of tendering. All work under this paragraph shall be deemed to be Extra Work.

.06 Prior to commencement of the Work, the Owner shall provide to the Contractor a list of those products controlled under the Workplace Hazardous Materials Information System (WHMIS), that the Owner may supply or use on the Contract, together with copies of the Safety Data Sheets for these products. All containers used in the application of products controlled under WHMIS shall be labelled. The Owner shall notify the Contractor in writing of changes to the list and provide relevant Safety Data Sheets.

.07 Unless expressly permitted in the Contract Documents, the Contractor shall not bring onto the Work Area any designated substance or hazardous Material per OHSA without the prior written authorization of the Contract Administrator.

.08 The Contractor shall use all reasonable care to avoid spilling or disturbing any designated substances or hazardous Material per OHSA.

GC 4.04 Construction Affecting Railway Property

.01 The Owner shall pay the costs of all flagging and other traffic control measures required and provided by the railway company unless such costs are solely a function of the Contractor's chosen method of completing the Work.

.02 Every precaution shall be taken by the Contractor to protect all railway property at track crossings; or otherwise, on which construction operations are to take place in accordance with the terms of this Contract.

.03 The Contractor shall be required to conduct the construction operations in such a manner as to avoid a possibility of damaging any railway property in the vicinity of the Works. Every reasonable precaution shall be taken by the Contractor to ensure the safety of the workers, Subcontractors, and Equipment, as well as railway property throughout the duration of the Contract.

GC 4.05 Default by the Contractor

.01 If the Contractor fails to commence the Work within 14 Days of a formal order to commence Work signed by the Contract Administrator or, upon commencement of the Work, should neglect to prosecute the Work properly or otherwise fails to comply with the requirements of the Contract and, if the Contract Administrator has given a written statement to the Owner and Contractor that sufficient cause exists to justify such action, the Owner may, without prejudice to any other right or remedy the Owner may have, notify the Contractor in writing that the Contractor is in default of the Contractor’s contractual obligations and instruct the Contractor to correct the default in the 5 Working Days immediately following the receipt of such notice.

.02 If the Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the Contractor’s insolvency or if a receiver is appointed because of the Contractor’s insolvency, the Owner may, without prejudice to any other right or remedy the Owner may have, by giving the Contractor or receiver or trustee in bankruptcy notice in writing, terminate the Contract.

GC 4.06 Contractor's Right to Correct a Default

.01 The Contractor shall have the right within the 5 Working Days following the receipt of a notice of default to correct the default and provide the Owner with satisfactory proof that appropriate corrective measures have been taken.

.02 If the Owner determines that the correction of the default cannot be completed within the 5 Working Days following receipt of the notice, the Contractor shall not be in default if the Contractor,

a) commences the correction of the default within the 5 Working Days following receipt of the notice;

b) provides the Owner with a schedule acceptable to the Owner for the progress of such correction; and

c) completes the correction in accordance with such schedule.

GC 4.07 Owner's Right to Correct Default

.01 If the Contractor fails to correct the default within the time specified in subsection GC 4.06, Contractor's Right to Correct a Default, or subsequently agreed upon, the Owner, without prejudice to any other right or remedy the Owner may have, may correct such default and deduct the cost thereof, as certified by the Contract Administrator, from any payment then or thereafter due to the Contractor.

GC 4.08 Termination of Contractor's Right to Continue the Work

.01 Where the Contractor fails to correct a default within the time specified in subsection GC 4.06, Contractor's Right to Correct a Default, or subsequently agreed upon, the Owner, without prejudice to any other right or remedy the Owner may have, may terminate the Contractor's right to continue the Work in whole or in part by giving written notice to the Contractor.

.02 If the Owner terminates the Contractor's right to continue with the Work in whole or in part, the Owner shall be entitled to,

a) take possession of the Working Area or that portion of the Working Area devoted to that part of the Work terminated;

b) utilize any Material within the Working Area;

d) withhold further payments to the Contractor with respect to the Work or the portion of the Work withdrawn from the Contractor until the Work or portion thereof withdrawn is completed;

d) charge the Contractor the additional cost over the Contract price of completing the Work or portion thereof withdrawn from the Contractor, as certified by the Contract Administrator and any additional compensation paid to the Contract Administrator for such additional service arising from the correction of the default;

e) charge the Contractor a reasonable allowance, as determined by the Contract Administrator, to cover correction to the Work performed by the Contractor that may be required under subsection GC 7.16, Warranty;

f) charge the Contractor for any damages the Owner sustained as a result of the default; and

g) charge the Contractor the amount by which the cost of corrections to the Work under subsection GC 7.16, Warranty, exceeds the allowance provided for such corrections.

GC 4.09 Final Payment to Contractor

.01 If the Owner's cost to correct and complete the Work in whole or in part is less than the amount withheld from the Contractor under subsection GC 4.08, Termination of Contractor's Right to Continue the Work, the Owner shall pay the balance to the Contractor as soon as the final accounting for the Contract is complete.

GC 4.10 Termination of the Contract

.01 Where the Contractor is in default of the Contract the Owner shall, without prejudice to any other right or remedy the Owner may have, terminate the Contract by giving written notice of termination to the Contractor, the Surety, and any trustee or receiver acting on behalf of the Contractor's estate or creditors.

.02 If the Owner elects to terminate the Contract, the Owner shall provide the Contractor and the trustee or receiver with a complete accounting to the date of termination.

GC 4.11 Continuation of Contractor's Obligations

.01 The Contractor's obligation under the Contract as to quality, correction, and warranty of the Work performed prior to the time of termination of the Contract or termination of the Contractor's right to continue with the Work in whole or in part shall continue to be in force after such termination.

GC 4.12 Use of Performance Bond

.01 If the Contractor is in default of the Contract and the Contractor has provided a Performance Bond, the provisions of section GC 4.0, Owner’s Responsibilities and Rights, shall be exercised in accordance with the conditions of the Performance Bond.

GC 4.13 Payment Adjustment

.01 If any situation should occur in the performance of the Work that would result in a Change in the Work, the Owner shall be entitled to an adjustment and those adjustments shall be managed in accordance with clause GC 3.10.01, Changes in the Work.

SECTION GC 5.0 - MATERIAL

GC 5.01 Supply of Material

.01 All Material necessary for the proper completion of the Work, except that listed as being supplied by the Owner, shall be supplied by the Contractor. The Contract price for the appropriate tender items shall be deemed to include full compensation for the supply and delivery of such Material.

GC 5.02 Quality of Material

.01 All Material supplied by the Contractor shall be new, unless otherwise specified in the Contract Documents.

.02 Material supplied by the Contractor shall conform to the requirements of the Contract.

.03 As specified in the Contract Documents or as requested by the Contract Administrator, the Contractor shall make available, for inspection or testing, a sample of any Material to be supplied by the Contractor.

.04 The Contractor shall obtain for the Contract Administrator the right to enter onto the premises of the Material manufacturer or supplier to carry out such inspection, sampling, and testing as specified in the Contract Documents or as requested by the Contract Administrator.

.05 The Contractor shall notify the Contract Administrator of the sources of supply sufficiently in advance of the Material shipping dates to enable the Contract Administrator to perform the required inspection, sampling, and testing.

.06 The Owner shall not be responsible for any delays to the Contractor's operations where the Contractor fails to give sufficient advance notice to the Contract Administrator to enable the Contract Administrator to carry out the required inspection, sampling, and testing before the scheduled shipping date.

.07 The Contractor shall not change the source of supply of any Material without the written authorization of the Contract Administrator.

.08 Material that is not specified shall be of a quality best suited to the purpose required, and the use of such Material shall be subject to the approval of the Contract Administrator.

.09 All Material inspection, sampling, and testing shall be carried out on random basis in accordance with the standard inspection or testing methods required for the Material. Any approval given by the Contract Administrator for the Materials to be used in the Work based upon the random method shall not relieve the Contractor from the responsibility of incorporating Material that conforms to the Contract Documents into the Work or properly performing the Contract and of any liability arising from the failure to properly perform as specified in the Contract Documents.

GC 5.03 Rejected Material

.01 Rejected Material shall be removed from the Working Area expeditiously after the notification to that effect from the Contract Administrator. Where the Contractor fails to comply with such notice, the Contract Administrator may cause the rejected Material to be removed from the Working Area and disposed of, in what the Contract Administrator considers to be the most appropriate manner, and the Contractor shall pay the costs of disposal and the appropriate overhead charges.

GC 5.04 Substitutions

.01 Where the Contract Documents require the Contractor to supply a Material designated by a trade or other name, the Tender shall be based only upon supply of the Material so designated, that shall be regarded as the standard of quality required by the Contract Documents. After the acceptance of the Tender, the Contractor may apply to the Contract Administrator to substitute another Material identified by a different trade or other name for the Material designated as aforesaid. The application shall be in writing and shall state the price for the proposed substitute Material designated as aforesaid, and such other information as the Contract Administrator may require.

.02 Rulings on a proposed substitution shall not be made prior to the acceptance of the Tender. Substitutions shall not be made without the prior approval of the Contract Administrator. The approval or rejection of a proposed substitution shall be at the discretion of the Contract Administrator.

.03 If the proposed substitution is approved by the Contract Administrator, the Contractor shall be entitled to the first $1,000 of the aggregate saving in cost by reason of such substitution and to 50% of any additional saving in cost in excess of such $1,000. Each such approval shall be conveyed to the Contractor in writing or by issuance of a Certificate of Equality on the Owner's standard form of "Certification of Equality" and, if any adjustment to the Contract price is made by reason of such substitution, a Change Order shall be issued as well.

GC 5.05 Owner Supplied Material

GC 5.05.01 Ordering of Excess Material

.01 Where Material is supplied by the Owner and where this Material is ordered by the Contractor in excess of the amount specified to complete the Work, such excess Material shall become the property of the Contractor on completion of the Work and shall be charged to the Contractor at cost plus applicable overheads.

GC 5.05.02 Care of Material

.01 The Contractor shall, in advance of receipt of shipments of Material supplied by the Owner, provide adequate and proper storage facilities acceptable to the Contract Administrator, and on the receipt of such Material shall promptly place it in storage, except where it is to be incorporated forthwith into the Work.

.02 The Contractor shall be responsible for acceptance of Material supplied by the Owner, at the specified delivery point and for its safe handling and storage. If such Material is damaged while under the control of the Contractor, it shall be replaced or repaired by the Contractor at no expense to the Owner, and to the satisfaction of the Contract Administrator. If such Material is rejected by the Contract Administrator for reasons that are not the fault of the Contractor, it shall remain in the care and at the risk of the Contractor until its disposition has been determined by the Contract Administrator.

.03 Where Material supplied by the Owner arrives at the delivery point in a damaged condition or where there are discrepancies between the quantities received and the quantities shown on the bills of lading, the Contractor shall immediately report such damage or discrepancies to the Contract Administrator who shall arrange for an immediate inspection of the shipment and provide the Contractor with a written release from responsibility for such damage or deficiencies. Where damage or deficiencies are not so reported, it shall be assumed that the shipment arrived in good condition and order, and any damage or deficiencies reported thereafter shall be made good by the Contractor at no extra cost to the Owner.

.04 The full amount of Material supplied by the Owner in each shipment shall be accounted for by the Contractor and such Material shall be at the risk of the Contractor after taking delivery. Such Material shall not, except with the written permission of the Contract Administrator, be used by the Contractor for purposes other than the performance of the Work under the Contract.

.05 Empty reels, crates, containers, and other type of packaging from Material supplied by the Owner shall become the property of the Contractor when they are no longer required for their original purpose and shall be disposed of by the Contractor at the Contractor's expense unless otherwise specified in the Contract Documents.

.06 Immediately upon receipt of each shipment, the Contractor shall provide the Contract Administrator copies of bills of lading, or such other documentation the Contract Administrator may require to substantiate and reconcile the quantities of Material received.

.07 Where Material supplied by the Owner is ordered and stockpiled prior to the award of the Contract, the Contractor shall, at no extra cost to the Owner, immediately upon commencement of operations, check the Material, report any damage or deficiencies to the Contract Administrator and take charge of the Material at the stockpile site. Where damage or deficiencies are not so recorded by the Contractor, it shall be assumed that the stockpile was in good condition and order when the Contractor took charge of it, and any damage or deficiencies reported thereafter shall be made good by the Contractor at no extra cost to the Owner.

SECTION GC 6.0 - INSURANCE, PROTECTION AND DAMAGE

GC 6.01 Protection of Work, Persons and Property

.01 The Contractor, the Contractor's agents, and all workers employed by or under the control of the Contractor, including Subcontractors, shall protect the Work, persons, and property from damage or injury. The Contractor shall be responsible for all losses and damage that may arise as the result of the Contractor's operations under the Contract, unless indicated to the contrary below.

.02 The Contractor is responsible for the full cost of any necessary temporary protective Work and the restoration of all damage where the Contractor damages the Work or property in the performance of the Contract. If the Contractor is not responsible for the damage that occurs to the Work or property, the Contractor shall restore such damage, and such Work and payment shall be administered according to these General Conditions.

.03 The Contractor shall immediately inform the Contract Administrator of all damage and injuries that occur during the term of the Contract. The Contractor shall then investigate and report back to the Contract Administrator within 15 Days of occurrence of incident, or as soon as possible. The Contract Administrator may conduct its own investigation and the Contractor shall provide all assistance to the Contract Administrator as may be necessary for that purpose.

.04 The Contractor shall not be responsible for loss and damage that occurs as a result of,

a) war;

b) blockades and civil commotions;

c) errors in the Contract Documents; or

d) acts or omissions of the Owner, the Contract Administrator, their agents and employees, or others not under the control of the Contractor, but within the Working Area with the Owner's permission.

.05 The Contractor and the Contractor’s Surety shall not be released from any term or provision of any responsibility, obligation, or liability under the Contract or waive or impair any of the rights of the Owner, except by a release duly executed by the Owner.

GC 6.02 Indemnification

.01 The Contractor shall indemnify and hold harmless the Owner and the Contract Administrator, their elected officials, agents, officers, and employees from and against all claims, demands, losses, expenses, costs, damages, actions, suits, or proceedings by third parties, hereinafter called "claims", directly or indirectly arising or alleged to arise out of the performance of or the failure to perform the Work, provided such claims are,

a) attributable to bodily injury, sickness, disease, or death or to damage to or destruction of tangible property;

b) caused by negligent acts or omissions of the Contractor or anyone for whose acts the Contractor may be liable; and

c) made in writing within a period of 6 years from the date of Substantial Performance of the Work as set out in the Certificate of Substantial Performance of the Work or, where so specified in the Contract Documents, from the date of certification of Final Acceptance.

.02 The Contractor shall indemnify and hold harmless the Owner from all and every claim for damages, royalties or fees for the infringement of any patented invention or copyright occasioned by the Contractor in connection with the Work performed or Material furnished by the Contractor under the Contract.

.03 The Owner expressly waives the right to indemnity for claims other than those stated in clauses GC 6.02.01 and GC 6.02.02.

.04 The Owner shall indemnify and hold harmless the Contractor, their elected officials, agents, officers, and employees from and against all claims, demands, losses, expenses, costs, damages, actions, suits, or proceedings arising out of the Contractor's performance of the Contract that are attributable to a lack of or defect in title or an alleged lack of or defect in title to the Working Area.

.05 The Contractor expressly waives the right to indemnity for claims other than those stated in clause GC 6.02.04.

GC 6.03 Contractor's Insurance

GC 6.03.01 General

.01 Without restricting the generality of subsection GC 6.02, Indemnification, the Contractor shall provide, maintain, and pay for the insurance coverages listed under clauses GC 6.03.02 and GC 6.03.03. Insurance coverage in clauses GC 6.03.04, GC 6.03.05, and GC 6.03.06 shall only apply when so specified in the Contract Documents.

.02 The Contractor shall provide the Contract Administrator with an original Certificate of Insurance for each type of insurance coverage that is required by the Contract Documents. The Contractor shall ensure that the Contract Administrator is, at all times in receipt of a valid Certificate of Insurance for each type of insurance coverage, in such amounts as specified in the Contract Documents. The Contractor will not be permitted to commence Work until the Contract Administrator is in receipt of such proof of insurance. The Contract Administrator may withhold payments of monies due to the Contractor until the Contractor has provided the Contract Administrator with original valid Certificates of Insurance as required by the provisions of the Contract Documents.

GC 6.03.02 Commercial General Liability Insurance

.01 Commercial General Liability Insurance shall be in the name of the Contractor, with the Owner and the Contract Administrator named as additional insureds, with limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof. The insurance shall be provided in a form acceptable to the Owner.

.02 Approval of this insurance shall be conditional upon the Contractor obtaining the services of an insurer licensed to underwrite insurance in the Province of Ontario and obtaining the insurer's certificate of equivalency to the required insurance.

.03 The Contractor shall submit annually to the Owner, proof of continuation of the completed operations coverage and, if the Contractor fails to do so, the limitation period for claiming indemnity described in clause GC 6.02.01 c), shall not be binding on the Owner.

.04 Should the Contractor decide not to employ Subcontractors for operations requiring the use of explosives for blasting, pile driving or caisson work, removal or weakening of support of property building or land, the Commercial General Liability Insurance shall include the appropriate endorsements.

.05 The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, termination, or material change.

.06 "Claims Made" insurance policies shall not be permitted.

GC 6.03.03 Automobile Liability Insurance

.01 Automobile liability insurance in respect of licensed vehicles shall have limits of not less than five million dollars inclusive per occurrence for bodily injury, death and damage to property, in the following forms endorsed to provide the Owner with not less than 30 Days written notice in advance of any cancellation, termination, or material change.

a) standard non-owned automobile policy including standard contractual liability endorsement, and

b) standard owner's form automobile policy providing third party liability and accident benefits insurance and covering licensed vehicles owned or operated by the Contractor.

GC 6.03.04 Aircraft and Watercraft Liability Insurance

GC 6.03.04.01 Aircraft Liability Insurance

.01 Aircraft liability insurance with respect to owned or non-owned aircraft used directly or indirectly in the performance of the Work, including use of additional premises, shall be subject to limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof, and limits of not less than five million dollars for aircraft passenger hazard. Such insurance shall be in a form acceptable to the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage.

GC 6.03.04.02 Watercraft Liability Insurance

.01 Watercraft liability insurance with respect to owned or non-owned watercraft used directly or indirectly in the performance of the Work, including use of additional premises, shall be subject to limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof. Such insurance shall be in a form acceptable to the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage.

GC 6.03.05 Property and Boiler Insurance

GC 6.03.05.01 Property Insurance

.01 All risks property insurance shall be in the name of the Contractor, with the Owner and the Contract Administrator named as additional insureds, insuring not less than the sum of the amount of the Contract price and the full value, as may be stated in the Contract Documents, of Material that is specified to be provided by the Owner for incorporation into the Work.

GC 6.03.05.02 Boiler Insurance

.01 Boiler insurance insuring the interests of the Contractor, the Owner and the Contract Administrator for not less than the replacement value of boilers and pressure vessels forming part of the Work, shall be in a form acceptable to the Owner.

GC 6.03.05.03 Use and Occupancy of the Work Prior to Completion

.01 Should the Owner wish to use or occupy part or all of the Work prior to Substantial Performance, the Owner shall give 30 Days written notice to the Contractor of the intended purpose and extent of such use or occupancy. Prior to such use or occupancy, the Contractor shall notify the Owner in writing of

the additional premium cost, if any, to maintain property and boiler insurance, which shall be at the Owner's expense. If because of such use or occupancy the Contractor is unable to provide coverage, the Owner upon written notice from the Contractor and prior to such use or occupancy shall provide, maintain, and pay for property and boiler insurance insuring the full value of the Work, including coverage for such use or occupancy, and shall provide the Contractor with proof of such insurance. The Contractor shall refund to the Owner the unearned premiums applicable to the Contractor's policies upon termination of coverage.

.02 The policies shall provide that in the event of a loss or damage, payment shall be made to the Owner and the Contractor as their respective interests may appear. The Contractor shall act on behalf of both the Owner and the Contractor for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the Work. Loss or damage shall not affect the rights and obligations of either party under the Contract, except that the Contractor shall be entitled to such reasonable extension of Contract Time relative to the extent of the loss or damage as the Contract Administrator may decide in consultation with the Contractor.

GC 6.03.05.04 Payment for Loss or Damage

.01 The Contractor shall be entitled to receive from the Owner, in addition to the amount due under the Contract, the amount at which the Owner's interest in restoration of the Work has been appraised, such amount to be paid as the restoration of the Work proceeds, and in accordance with the requirements of section GC 8.0, Measurement and Payment. In addition, the Contractor shall be entitled to receive from the payments made by the insurers the amount of the Contractor's interest in the restoration of the Work.

.02 The Contractor shall be responsible for deductible amounts under the policies, except where such amounts may be excluded from the Contractor's responsibility by the terms of this Contract.

.03 In the event of a loss or damage to the Work arising from the action or omission of the Owner or others, the Owner shall pay the Contractor the cost of restoring the Work as the restoration of the Work proceeds and in accordance with the requirements of section GC 8.0, Measurement and Payment.

GC 6.03.06 Contractor's Equipment Insurance

.01 All risks Contractor's Equipment insurance covering construction equipment used by the Contractor for the performance of the Work, including boiler insurance on temporary boilers and pressure vessels, shall be in a form acceptable to the Owner and shall not allow subrogation claims by the insurer against the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage. Subject to satisfactory proof of financial capability by the Contractor for self-insurance of the Contractor's Equipment, the Owner agrees to waive the equipment insurance requirement, and for the purpose of this Contract, the Contractor shall be deemed to be insured. This policy shall be amended to provide permission for the Contractor to grant prior releases with respect to damage to the Contractor's Equipment.

GC 6.03.07 Insurance Requirements and Duration

.01 Each insurance policy as noted in the Contract Documents shall be in effect from the date of commencement of the Work until 10 Days after the date of Final Acceptance of the Work, as set out in the Final Acceptance Certificate.

.02 The Contractor shall provide the Owner, on a form acceptable to the Owner, proof of insurance prior to commencement of the Work and signed by the underwriter or the broker.

.03 The Contractor shall, on request, promptly provide the Owner with a certified true copy of each insurance policy exclusive of information pertaining to premium or premium bases used by the insurer to determine the cost of the insurance. The certified true copy shall include the signature of an officer of the insurer.

.04 Where a policy is renewed, the Contractor shall provide the Owner, on a form acceptable to the Owner, renewed proof of insurance immediately following completion of renewal.

.05 Unless specified otherwise, the Contractor shall be responsible for the payment of deductible amounts under the policies.

.06 If the Contractor fails to provide or maintain insurance as required in subsection GC 6.03, Contractor's Insurance, or elsewhere in the Contract Documents, then the Owner shall have the right to provide and maintain such insurance and give evidence thereof to the Contractor. The Owner's cost thereof shall be payable by the Contractor to the Owner on demand.

.07 If the Contractor fails to pay the cost of the insurance placed by the Owner within 28 Days of the date on which the Owner made a formal demand for reimbursement of such costs, the Owner may deduct the costs thereof from monies which are due or may become due to the Contractor.

GC 6.04 Bonding

.01 The Contractor shall provide the Owner with the surety bonds in the amount required by the Contract Documents.

.02 Such bonds shall be issued by a duly licensed surety company authorized to transact a business of suretyship in the Province of Ontario and shall be to the satisfaction of the Owner. The bonds shall be maintained in good standing until the Final Acceptance.

GC 6.05 Workplace Safety and Insurance Board

.01 The Contractor shall provide the Contract Administrator with a copy of a Certificate of Clearance indicating the Contractor’s good standing with the Workplace Safety and Insurance Board, as follows:

a) Immediately prior to the Contract Administrator authorizing the Contractor to commence Work.

b) Prior to issue of the Certificate of Substantial Performance.

c) Prior to expiration of the Warranty Period.

d) At any other time when requested by the Contract Administrator.

SECTION GC 7.0 - CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF THE WORK

GC 7.01 General

GC 7.01.01 Site Visit

.01 The Contractor warrants that the site of the Work has been visited during the preparation of the Tender and the character of the Work and all local conditions that may affect the performance of the Work are known.

GC 7.01.02 Commencement of Work

.01 The Contractor shall not commence the Work nor deliver anything to the Working Area until the Contractor has received a written order to commence the work from the Contract Administrator.

GC 7.01.03 Control and Responsibility

.01 The Contractor shall have complete control of the Work and shall effectively direct and supervise the Work so as to ensure conformity with the Contract Documents. The Contractor shall be responsible for construction means, methods, techniques, sequences, and procedures and for coordinating the various parts of the Work.

.02 The Contractor shall provide adequate labour, Equipment, and Material to ensure the completion of the Contract in accordance with the Contract Documents. The Work shall be performed as vigorously and as continuously as weather conditions or other interferences may permit.

.03 The Contractor shall have the sole responsibility for the design, erection, operation, maintenance, and removal of temporary structures and other temporary facilities and the design and execution of construction methods required in their use.

.04 Notwithstanding clause GC 7.01.03, where the Contract Documents include designs for temporary structures and other temporary facilities or specify a method of construction in whole or part, such facilities and methods shall be considered to be part of the design of the Work, and the Contractor shall not be held responsible for that part of the design or the specified method of construction. The Contractor shall, however, be responsible for the execution of such design or specified method of construction in the same manner that the Contractor is responsible for the execution of the Work.

.05 The Contractor shall comply with and conform to all statutes, laws, by-laws, regulations, requirements, ordinances, notices, rulings, orders, directives and policies of the municipal, provincial and federal governments and any other lawful authority and all court orders, judgments and declarations of a court of competent jurisdiction (collectively referred to as the “Laws”), applicable to the Work to be provided by, and the undertakings and obligations of, the Contractor under this Contract.

GC 7.01.04 Compliance with the Occupational Health and Safety Act

.01 The Contractor shall execute the terms of the Contract in strict compliance with the requirements of the Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended, (the "Act") and Ontario Regulation 213/91, as amended, (that regulates Construction Projects) and any other regulations as amended under the Act (the "Regulations") that may affect the performance of the Work, as the "Constructor" or "employer," as defined by the Act, as the case may be. The Contractor shall ensure that:

a) worker safety is given priority in planning, pricing, and performing the Work;

b) its officers and supervisory employees have a working knowledge of the duties of a "Constructor" and "employer" as defined by the Act and the provisions of the Regulations applicable to the Work, and a personal commitment to comply with them;

c) a copy of the most current version of the Act and the Regulations are available at the Contractor's office within the Working Area, or, in the absence of an office, in the possession of the supervisor responsible for the performance of the Work;

d) workers employed to carry out the Work possess the knowledge, skills, and protective devices required by law or recommended for use by a recognized industry association to allow them to work in safety;

e) its supervisory employees are “Competent Persons” as defined in the OHSA, and carry out their duties in a diligent and responsible manner with due consideration for the health and safety of the workers;

f) all Subcontractors and their workers are properly protected from injury while they are at the Working Area; and

g) following execution of the Contract and prior to the issuance of the order to commence by the Owner, upon request the Contractor submits to the Contract Administrator a copy of the Notice of Project issued to the Ministry of Labour.

.02 The Contractor, when requested, shall provide the Owner with a copy of its health and safety policy and program at the pre-start meeting and shall respond promptly to requests from the Owner for confirmation that its methods and procedures for carrying out the Work comply with the Act and Regulations. The Contractor shall cooperate with representatives of the Owner and the inspectors appointed to enforce the Act and the Regulations in any investigations of worker health and safety in the performance of the Work. The Contractor shall indemnify and save the Owner harmless from any additional expense that the Owner may incur to have the Work performed as a result of the Contractor's failure to comply with the requirements of the Act and the Regulations.

.03 Prior to commencement of the Work, the Contractor shall provide to the Contract Administrator a list of those products controlled under the Workplace Hazardous Materials Information System ~~or~~ “WHMIS”, which the Contractor expects to use on the Contract. Related Safety Data Sheets shall accompany the submission. All containers used in the application of products controlled under “WHMIS” shall be labelled. The Contractor shall notify the Contractor Administrator in writing of changes in the products to be used and provide relevant Safety Data Sheets.

.04 During the course of the Work, the Contractor shall furnish forthwith to the Contract Administrator a copy of all correspondence, reports, orders or charges respecting occupational health and safety, including under the Act, Technical Standards and Safety Act, 2000, S.O. 2000, c.16 as amended, and the Criminal Code, R.S.C., 1985, c. C-46 as amended, which are received by, or which come to the notice of, the Contractor that apply or are relevant to any of the Work or activities conducted under the terms of the Contract.

.05 Nothing in this Contract shall be construed as requiring the Owner to monitor or approve the workplace health and safety practices of the Contractor.

GC 7.01.05 Contractor’s Representatives

.01 The Contractor shall have an authorized representative on the site while any Work is being performed, to supervise the Work and act for or on the Contractor's behalf. Prior to commencement of construction, the Contractor shall notify the Contract Administrator of the names, addresses, positions, and cell phone, and telephone numbers of the Contractor's representatives who can be contacted at any time to deal with matters relating to the Contract, and update as necessary.

.02 The Contractor shall designate a person to be responsible for traffic control and work zone safety. The designated person shall be a competent worker who is qualified because of knowledge, training, and experience to perform the duties; is familiar with Book 7 of the Ontario Traffic Manual; and has knowledge of all potential or actual danger to workers and motorists. Prior to the commencement of construction, the Contractor shall notify the Contract Administrator of the name; address; position; cell phone, and telephone numbers of the designated person, and update as necessary. The designated person may have other responsibilities, including other construction sites, and need not be present in the Working Area at all times.

GC 7.01.06 Assistance to the Contract Administrator

.01 The Contractor shall, at no additional cost to the Owner, furnish all reasonable aid, facilities, and assistance required by the Contract Administrator for the proper inspection and examination of the Work or the taking of measurements for the purpose of payment.

GC 7.01.07 Schedule

.01 The Contractor shall prepare and update, as required, a construction schedule of operations, indicating the proposed methods of construction and sequence of Work and the time the Contractor proposes to complete the various items of Work within the time specified in the Contract Documents. The schedule shall be submitted to the Contract Administrator within 14 Days from the Contract award. If the Contractor's schedule is materially affected by changes in the work, the Contractor shall submit an updated construction schedule, if requested by the Contract Administrator, within 7 Days of the request. This updated schedule shall show how the Contractor proposes to perform the balance of the Work, to complete the Work within the time specified in the Contract Documents.

.02 For Contracts with a specified number of Working Days, the construction time shown on the initial schedule shall not exceed the specified number of Working Days. The activities on the critical path shall assist the Contract Administrator in determining the Controlling Operation for the purpose of the charging of Working Days. The construction schedule shall include all non-working periods and appropriate allowances for Inclement Weather.

.03 For Contracts which specify a Contract Time, the construction time shown on the initial construction schedule shall not extend beyond the specified Contract Time. The construction schedule shall include all non-working periods and appropriate allowances for Inclement Weather.

GC 7.01.08 Errors and Inconsistencies Relating to the Contract

.01 Where the Contractor finds any error, inconsistency, or omission relating to the Contract, the Contractor shall promptly report it to the Contract Administrator and shall not proceed with the activity affected until receiving direction from the Contract Administrator.

.02 The Contractor shall promptly notify the Contract Administrator in writing if the subsurface conditions observed in the Working Area differ materially from those indicated in the Contract Documents.

GC 7.01.09 Utilities

.01 The Contractor shall arrange with the appropriate Utility authorities for the stake out of all underground Utilities and service connections that may be affected by the Work. The Contractor shall observe the location of the stake outs prior to commencing the Work and if there is a discrepancy between the location of the stake outs and the locations shown on the Contract Documents, that may affect the Work, the Contractor shall immediately notify the Contract Administrator and the affected Utility companies, in order to resolve the discrepancy. The Contractor shall be responsible for any damage done to the underground Utilities and service connections by

the Contractor's forces during construction if the stake out locations are within the tolerances given in clause GC 2.01.01 a).

.02 In the case of damage to or interference with any Utilities, pole lines, pipe lines, conduits, farm tiles, or other public or privately-owned works or property, the Contractor shall immediately notify the Owner, Contract Administrator, and the owner of the works of the location and details of such damage or interference.

GC 7.02 Monuments and Layout

.01 Prior to commencement of construction, the Contract Administrator and the Contractor shall locate on site those Monuments that delineate the Working Area and may be used to lay out the Work, all as shown on the Contract Drawings. Property Monuments shall be inventoried in the report format required by the Owner.

.02 These Monuments shall be protected by highly visible T-bars or 1.0 metre tall stakes with survey ribbon set within 0.3 metres of the Monument.

.03 The Contractor shall be responsible for the preservation of all Property Monuments while the Work is in progress, except those Property Monuments that must be removed to facilitate the Work as identified and agreed by the Contractor and Contract Administrator. Monuments removed to facilitate the Work shall be replaced at the Owner's expense, and all others shall be replaced at the Contractor's expense.

.04 All Monuments disturbed, damaged, or removed by the Contractor's operations shall be documented in the inventory report and replaced under the supervision of an Ontario Land Surveyor.

.05 The Monument inventory report referred to in clauses GC 7.02.01 and GC 7.02.04 shall include as a minimum:

a) Contract number, Contract name, Contract Administrator's name;
b) Project/site construction limits;
c) Rough location, type, identification number, and condition of each Monument before and after construction;
d) The solutions for protection of the Monuments that may be impacted by construction;
e) Reference ties;
f) A summary of those Monuments affected by the Work and how they were reset or replaced, and by what type of Monument.

.06 At no extra cost to the Owner, the Contractor shall provide the Contract Administrator with such materials and devices as may be necessary to lay out the baseline and benchmarks, and as may be necessary for the inspection of the Work.

.07 The Contractor shall provide qualified personnel to lay out and establish all lines and grades necessary for construction. The Contractor shall notify the Contract Administrator of any layout work carried out, so that the same may be checked by the Contract Administrator.

.08 The Contractor shall install and maintain substantial alignment markers and secondary benchmarks as may be required for the proper execution of the Work. The Contractor shall supply one copy of all alignment and grade sheets to the Contract Administrator.

.09 The Contractor shall assume full responsibility for alignment, elevations, and dimensions of each and all parts of the Work, regardless of whether the Contractor's layout work has been checked by the Contract Administrator.

.10 All stakes, marks, and reference points shall be carefully preserved by the Contractor. In the case of their destruction or removal, for any reason, before the end of the Contract Time such stakes, marks, and reference points shall be replaced, unless otherwise mutually agreed between the Contractor and the Contract Administrator, at the Contractor's expense.

.11 Benchmarks and survey monuments identified in the Contract Documents shall be protected by the Contractor. In the case of their destruction or removal, such benchmarks and survey monuments shall be replaced by the Owner at the Contractor's expense.

GC 7.03 Working Area

.01 The Contractor shall maintain the Working Area in a tidy condition and free from the accumulation of debris and prevent dust nuisance, mud, and ponding water, other than that caused by the Owner or others.

.02 The Contractor's sheds, site offices, toilets, other temporary structures, and storage areas for Material and Equipment shall be grouped in a compact manner, maintained in a neat and orderly condition at all times and removed upon completion of the Work.

.03 The Contractor shall confine the construction operations to the Working Area. Should the Contractor require additional space, the Contractor shall obtain such space at no additional cost to the Owner.

.04 The Contractor shall not enter upon or occupy any private property for any purpose, unless the Contractor has received prior written permission from the property owner.

.05 Upon completion of the Contract, the Working Area used by the Contractor shall be restored to its original condition or better unless otherwise specified in the Contract Documents including the removal of all excavated and stockpiled materials at the Contractor's expense.

GC 7.04 Damage by Vehicles or Other Equipment

.01 If at any time, in the opinion of the Contract Administrator, damage is being done or is likely to be done to any Roadway or any improvement thereon, outside the Working Area, by the Contractor's vehicles or other Equipment, whether licensed or unlicensed Equipment, the Contractor shall, on the direction of the Contract Administrator, and at no extra cost to the Owner, make changes or substitutions for such vehicles or Equipment, and shall alter loadings, or in some other manner, remove the cause of such damage to the satisfaction of the Contract Administrator.

GC 7.05 Excess Loading of Motor Vehicles

.01 Where a vehicle is hauling Material for use on the Work, in whole or in part; upon a Highway; and where motor vehicle registration is required for such vehicle, the Contractor shall not cause or permit such vehicle to be loaded beyond the legal limit specified in the Highway Traffic Act, R.S.O. 1990, c.H.8, as amended, whether such vehicle is registered in the name of the Contractor or otherwise, except where there are designated areas within the Working Area where overloading is permitted. The Contractor shall bear the onus of weighing disputed loads.

GC 7.06 Maintaining Roads and Detours

.01 Unless otherwise specified in the Contract Documents, if an existing Roadway is affected by construction, it shall be kept open to both vehicular and pedestrian traffic.

.02 Subject to the approval of the Contract Administrator, the Contractor shall, at no additional cost to the Owner, be responsible for providing and maintaining for the duration of the Work an alternative route for both pedestrian and vehicular traffic through the Working Area in accordance with the OTM,

whether along the existing Highway under construction or on a detour road beside or adjacent to the Highway under construction.

.03 Subject to the approval of the Contract Administrator, the Contractor may block traffic for short periods of time to facilitate construction of the Work in accordance with the OTM. Any temporary lane closures shall be kept to a minimum.

.04 The Contractor shall not be required to maintain a road through the Working Area until such time as the Contractor has commenced operations or during seasonal shut down or on any part of the Contract that has been accepted in accordance with these General Conditions. The Contractor shall not be required to apply de-icing chemicals or abrasives or carry out snowplowing.

.05 Where only localized and separated sections of the Highway are affected by the Contractor's operations, the Contractor shall not be required to maintain intervening sections of the Highway until such times as these sections are located within the limits of the Highway affected by the Contractor's general operations under the Contract.

.06 Where the Contract Documents provide for or the Contract Administrator requires detours at specific locations, payment for the construction of the detours and, if required, for the subsequent removal of the detours, shall be made at the Contract prices appropriate to such Work.

.07 Compensation for all labour, Equipment, and Materials to do this Work shall be at the Contract prices appropriate to the Work and, where there are no such prices, at negotiated prices. Notwithstanding the foregoing, the cost of blading required to maintain the surface of such roads and detours shall be deemed to be included in the prices bid for the various tender items and no additional payment shall be made.

.08 Where Work under the Contract is discontinued for any extended period, including seasonal shutdown, the Contractor shall, when directed by the Contract Administrator, open and place the Roadway and detours in a passable, safe, and satisfactory condition for public travel.

.09 Where the Contractor constructs a detour that is not specifically provided for in the Contract Documents or required by the Contract Administrator, the construction of the detour and, if required, the subsequent removal shall be performed at the Contractor's expense. The detour shall be constructed and maintained to structural and geometric standards approved by the Contract Administrator. Removal and site restoration shall be performed as directed by the Contract Administrator.

.10 Where, with the prior written approval of the Contract Administrator, the Highway is closed and the traffic diverted entirely off the Highway to any other Highway, the Contractor shall, at no extra cost to the Owner, supply, erect, and maintain traffic control devices in accordance with the OTM.

.11 Compliance with the foregoing provisions shall in no way relieve the Contractor of its obligations under subsection GC 6.01, Protection of Work, Persons, and Property, dealing with the Contractor's responsibility for damage claims, except for claims arising on sections of Highway within the Working Area that are being maintained by others.

GC 7.07 Access to Properties Adjoining the Work and Interruption of Utility Services

.01 The Contractor shall provide at all times and at no extra cost to the Owner,

a) safe and adequate pedestrian and vehicular access;

b) continuity of Utility services; and

c) access for emergency response services;

to properties adjoining the Working Area.

.02 The Contractor shall provide at all times and at no extra cost to the Owner access to fire hydrants, water and gas valves, and all other Utilities located in the Working Area.

.03 Where any interruptions in the supply of Utility services are required and are authorized by the Contract Administrator, the Contractor shall give the affected property owners notice in accordance with subsection GC 7.11, Notices by the Contractor, and shall arrange such interruptions so as to create a minimum of interference to those affected.

GC 7.08 Approvals and Permits

.01 Except as specified in subsection GC 4.02, Approval and Permits, the Contractor shall obtain and pay for any permits, licences, and certificates, which at the date of tender closing, are required for the performance of the Work.

.02 The Contractor shall arrange for all necessary inspections required by the approvals and permits specified in clause GC 7.08.01, Approvals and Permit.

GC 7.09 Suspension of Work

.01 The Contractor shall, upon written notice from the Contract Administrator, discontinue or delay any or all of the Work and Work shall not be resumed until the Contract Administrator so directs in writing. Delays, in these circumstances, shall be administered according to subsection GC 3.07, Delays.

GC 7.10 Contractor's Right to Stop the Work or Terminate the Contract

.01 If the Owner is adjudged bankrupt or makes a general assignment for the benefit of creditors because of insolvency or if a receiver is appointed because of insolvency, the Contractor may, without prejudice to any other right or remedy the Contractor may have, by giving the Owner or receiver or trustee in bankruptcy written notice, terminate the Contract.

.02 If the Work is stopped or otherwise delayed for a period of 30 Days or more under an order of a court or other public authority and provided that such order was not issued as the result of an act or fault of the Contractor or of anyone directly employed or engaged by the Contractor, the Contractor may, without prejudice to any other right or remedy the Contractor may have, by giving the Owner written notice, terminate the Contract.

.03 The Contractor may notify the Owner in writing, with a copy to the Contract Administrator, that the Owner is in default of contractual obligations if,

a) the Contract Administrator fails to issue certificates in accordance with the provisions of section GC 8.0, Measurement and Payment;

b) the Owner fails to pay the Contractor, within 28 Days of the due dates identified in clause GC 8.02.04, Certification and Payment, the amounts certified by the Contract Administrator or within 28 Days of an award by an arbitrator or court; or

c) the Owner fails to comply with the requirements of the Contract.

.04 The Contractor's written notice to the Owner shall advise that if the default is not corrected in the 7 Days immediately following receipt of the written notice, the Contractor may, without prejudice to any other right or remedy the Contractor may have, stop the Work or terminate the Contract.

.05 If the Contractor terminates the Contract under the conditions set out in subsection GC 7.10, Contractor's Right to Stop the Work or Terminate the Contract, the Contractor shall be entitled to be paid for all Work performed according to the Contract Documents and for any losses or damage as the Contractor may sustain as a result of the termination of the Contract.

GC 7.11 Notices by the Contractor

.01 Before any Work is carried out that may affect the property or operations of any Ministry or agency of government or any person; company; partnership; or corporation, including a municipal corporation or any board or commission thereof, and in addition to such notices of the commencement of specified operations as are prescribed elsewhere in the Contract Documents, the Contractor shall give at least 48 hours advance written notice of the date of commencement of such Work to the person, company, partnership, corporation, board, or commission so affected.

GC 7.12 Environmental Incident Management under Legislation Protecting the Environment and Natural Resources

.01 The Contractor shall be in strict compliance with the requirements of the following legislation, as amended, regarding environmental incidents under the control of the Contractor or that are a result of the Contractor's operations:

a) Environmental Protection Act, R.S.O. 1990, c. E.19

b) Fisheries Act, R.S.C. 1985, c. F-14

c) Technical Standards and Safety Act, 2000, S.O. 2000, c. 16

d) Pesticides Act, R.S.O. 1990, c. P.11

e) Ontario Water Resources Act, R.S.O. 1990, c. O.40

f) Transportation of Dangerous Goods Act, 1992, S.C.1992, c. 34

.02 The requirements of the legislation listed in clause GC 7.12.01 include but are not restricted to:

a) Immediate containment of the material, pollutant, contaminant, deleterious substance, or dangerous good;

b) Immediate notification of the environmental incident to the proper authority; and

c) Clean up and restoration of the environment to preconditions.

.03 The Contractor shall possess a plan demonstrating that environmental incidents shall be managed to satisfy the requirements of clauses GC 7.12.01 and GC 7.12.02.

.04 The Contractor shall provide a copy of the environmental incident plan to the Contract Administrator when required and shall inform the Contract Administrator immediately of:

a) An environmental incident when it occurs; and

b) Any actions taken or intended to be taken by the Contractor regarding the environmental incident.

.05 The Contractor shall indemnify and save the Owner harmless from any additional expense that the Owner may incur to have the Work performed as a result of the Contractor's failure to comply with the requirements of the legislation listed in clause GC 7.12.01.

GC 7.13 Obstructions

.01 Except as otherwise noted in these General Conditions, the Contractor assumes all the risks and responsibilities arising out of any obstruction encountered in the performance of the Work and any traffic conditions, including traffic conditions on any Highway or road giving access to the Working Area caused by such obstructions, and the Contractor shall not make any claim against the Owner for any loss, damage, or expense occasioned thereby.

.02 Where the obstruction is an underground Utility or other man-made object, the Contractor shall not be required to assume the risks and responsibilities arising out of such obstruction, unless the location of the obstruction is shown on the Plans or described in the Contract Documents and the location so shown is within the tolerance specified in clause GC 2.01.01 a), or unless the presence and location of the obstruction has otherwise been made known to the Contractor or could have been determined by the visual site investigation made by the Contractor in accordance with these General Conditions.

.03 During the course of the Contract, it is the Contractor's responsibility to consult with Utility companies or other appropriate authorities for further information in regard to the exact location of these Utilities, to exercise the necessary care in construction operations, and to take such other precautions as are necessary to safeguard the Utilities from damage.

GC 7.14 Limitations of Operations

.01 Except for such Work as may be required by the Contract Administrator to maintain the Work in a safe and satisfactory condition, the Contractor shall not carry out operations under the Contract on Saturdays, Sundays, and any holidays recognized by the Owner without permission in writing from the Contract Administrator.

.02 The Contractor shall cooperate and coordinate the Work with other Contractors, Utility companies, and the Owner and they shall be allowed access to their Work or plant at all reasonable times.

GC 7.15 Cleaning Up Before Acceptance

.01 Upon attaining Substantial Performance of the Work, the Contractor shall remove surplus materials, tools, and Equipment not required for the performance of the remaining Work. The Contractor shall also remove all temporary works and debris other than that caused by the Owner or others and leave the Work and Working Area clean and suitable for occupancy by the Owner, unless otherwise specified.

.02 The Work shall not be deemed to have reached Completion until the Contractor has removed surplus materials, tools, and Equipment. The Contractor shall also have removed debris, other than that caused by the Owner, or others.

GC 7.16 Warranty

.01 Unless otherwise specified in the Contract Documents for certain Materials or components of the Work, the Contractor shall be responsible for the proper performance of the Work only to the extent that the design and standards permit such performance.

.02 Subject to the previous paragraph the Contractor shall correct promptly, at no additional cost to the Owner, defects or deficiencies in the Work that appear,

a) prior to and during the period of 12 months from the date of Substantial Performance of the Work, as set out in the Certificate of Substantial Performance of the Work,

b) where there is no Certificate of Substantial Performance, 12 months from the date of Completion of the Work as set out in the Completion Certificate, or

c) such longer periods as may be specified in the Contract Documents for certain Materials or some of the Work.

The Contract Administrator shall promptly give the Contractor written notice of observed defects or deficiencies.

.03 The Contractor shall correct or pay for damage resulting from corrections made under the requirements of clause GC 7.16.02.

GC 7.17 Contractor's Workers

.01 The Contractor shall only employ orderly, competent, and skillful workers to do the Work and whenever the Contract Administrator shall inform the Contractor in writing that any worker or workers involved in the Work are, in the opinion of the Contract Administrator, incompetent, or disorderly such worker or workers shall be removed from the Work and shall not be employed on the Work again without the consent in writing of the Contract Administrator.

GC 7.18 Drainage

.01 During construction and until the Work is completed, the Contractor shall make all reasonable efforts to keep all portions of the Work properly and efficiently drained, to at least the same degree as that of the existing drainage conditions.

SECTION GC 8.0 - MEASUREMENT AND PAYMENT

GC 8.01 Measurement

GC 8.01.01 Quantities

.01 The Contract Administrator shall make an Estimate in writing once a month, unless otherwise specified in the Contract Documents, of the quantity of Work performed and provide such Estimate to the Contractor within 10 Days of the Cut-Off Date.

.02 Quantities for progress payments shall be construed and held to approximate. The final quantities for the issuance of the Completion Payment shall be based on the measurement of Work completed.

.03 Measurement of the quantities of the Work performed may be either by Actual Measurement or by Plan Quantity principles as indicated in the Contract. Adjustments to Plan Quantity measurements shall normally be made using Plan Quantity principles but may, where appropriate, be made using Actual Measurements. Those items identified on the Tender by the notation (P) in the unit column shall be paid according to the Plan Quantity. Items where the notation (P) does not occur shall be paid according to Actual Measurement or lump sum.

GC 8.01.02 Variations in Tender Quantities

.01 Where it appears that the quantity of Work to be done or Material to be supplied or both by the Contractor under a unit price tender item may exceed or be less than the tender quantity, the Contractor shall proceed to do the Work or supply the Material or both required to complete the tender item and payment shall be made for the actual amount of Work done or Material supplied or both at the unit prices stated in the Tender except as provided below:

a) In the case of a Major Item where the quantity of Work performed or Material supplied or both by the Contractor exceeds the tender quantity by more than 15%, either party to the Contract may make a written request to the other party to negotiate a revised unit price for that portion of the Work performed or Material supplied or both which exceeds 115% of the tender quantity. The negotiation shall be carried out as soon as reasonably possible. Any revision of the unit price shall be based on the actual cost of doing the Work or supplying the Material or both under the tender item plus a reasonable allowance for profit and applicable overhead. Alternatively, where both parties agree, an allowance equal to 10% of the unit price on the amount of the underrun in excess of 15% of the tender quantity shall be paid.

b) In the case of a Major Item where the quantity of Work performed or Material supplied or both by the Contractor is less than 85% of the tender quantity, the Contractor may make a written request to negotiate for the portion of the actual overheads and fixed costs applicable to the amount of the underrun in excess of 15% of the tender quantity. For purposes of the negotiation, the overheads and fixed costs applicable to the item are deemed to have been prorated uniformly over 100% of the tender quantity for the item. Overhead costs shall be confirmed by a statement certified by the Contractor's senior financial officer or auditor and may be audited by the Owner. Alternatively, where both parties agree, an allowance equal to 10% of the unit price on the amount of the underrun in excess of 15% of the tender quantity shall be paid.

Written requests for compensation must be received no later than 60 Days after the issuance of the Completion Payment.

GC 8.02 Payment

GC 8.02.01 Non-Resident Contractor

.01 If the Contractor is not a registered entity in Ontario, the Contractor shall obtain all necessary approvals, consents, permits, licences, certificates, registrations, and other authorizations prior to execution of the Contract.

.02 The Contractor shall ensure that all Subcontractors the Contractor proposes to use for carrying out any of the Work required by the Contract and who are not a registered entity in Ontario have obtained all necessary approvals, consents, permits, certificates, registrations, and other authorizations prior to execution of the subcontract.

GC 8.02.02 Price for Work

.01 Prices for the Work shall be full compensation for all labour, Equipment and Material required in its performance. The term "all labour, Equipment, and Material" shall include Hand Tools, supplies, and other incidentals.

.02 Payment, for Work which is identified in the Contract Documents but not specifically detailed as part of any one item shall be deemed to be included in the items with which it is associated.

GC 8.02.03 Advance Payments for Material

.01 The Owner shall make advance payments for Material intended for incorporation in the Work upon the written request of the Contractor and according to the following terms and conditions:

a) The Contractor shall deliver the Material to a site approved by the Contract Administrator and the Contractor shall, in advance of receipt of the shipment of the Material, arrange for adequate and proper storage facilities.

b) The value of aggregates, processed and stockpiled, shall be assessed by the following procedure:

i. Sources Other Than Commercial

(A) Granular A, B, BI, BII, BIII, M, and O shall be assessed at the rate of 60% of the Contract price.

(B) Coarse and fine aggregates for hot mix asphaltic concrete, surface treatment and Portland cement concrete shall be assessed at the rate of 25% of the Contract price for each aggregate stockpiled.

ii. Commercial Sources
Payment for separated coarse and fine aggregates shall be considered at the above rate when such Materials are stockpiled at a commercial source where further processing is to be carried out before incorporating such Materials into a final product. Advance payments for other Materials located at a commercial source shall not be made.

c) Payment for all other Materials, unless otherwise specified elsewhere in the Contract Documents, shall be based on the invoice price, and the Contractor shall submit proof of cost to the Contract Administrator before payment can be made by the Owner.

d) The payment for all Materials shall be prorated against the appropriate tender item by paying for sufficient units of the item to cover the value of the Material. Such payment shall not exceed 80% of the Contract price for the item.

e) All Materials for which the Contractor wishes to receive advance payment shall be placed in the designated storage location immediately upon receipt of the Material and shall thenceforth be held by the Contractor in trust for the Owner as collateral security for any monies advanced by the Owner and for the due completion of the Work. The Contractor shall not exercise any act of ownership inconsistent with such security, or remove any Material from the storage locations, except for inclusion in the Work, without the consent, in writing, of the Contract Administrator.

f) Such materials shall remain at the risk of the Contractor who shall be responsible for any loss, damage, theft, improper use, or destruction of the Material however caused.

.02 Where the Owner makes advance payments subject to the conditions listed in clause GC 8.02.03.01, such payment shall not constitute acceptance of the Material by the Owner. Acceptance shall only be determined when the Material meets the requirements of the appropriate specification.

GC 8.02.04 Certification and Payment

GC 8.02.04.01 Progress Payment

.01 The Contractor shall submit a Proper Invoice for progress payments monthly or at intervals specified in the Contract Documents after starting the Work on this Contract. The Contractor shall submit the Proper Invoice to the Contract Administrator and to the Owner. This Proper Invoice shall be for work completed at the agreed to Cut-Off Date.

.02 A Proper Invoice shall include;

a) the requirements as set out in section 6.1 of the Construction Act;

b) the quantities of Work performed;

c) the value of Work performed;

d) any advanced payment for Material;

e) the amount of Statutory Holdback, liens, Owner's set-off;

f) the amount of any applicable taxes;

g) the amount due to the Contractor; and

h) any other information that may be prescribed in the Contract Documents.

.03 Payment shall be made within 28 Days of the submission of the Proper Invoice unless a notice of non-payment has been issued in accordance with the Construction Act.

.04 The Owner shall retain the Statutory Holdback in the form and amount as required under the Construction Act.

GC 8.02.04.02 Certification of Subcontract Completion

.01 Before the Work has reached the stage of Substantial Performance, the Contractor may notify the Contract Administrator, in writing that a subcontract is completed satisfactorily and ask that the Contract Administrator certify the completion of such subcontract.

.02 The Contract Administrator shall issue a Certificate of Subcontract Completion, if the subcontract has been completed in a form satisfactory to the Contract Administrator, and all required inspection and testing of the works covered by the subcontract have been carried out and the results are satisfactory to the Contract Administrator.

.03 The Contract Administrator shall set out in the Certificate of Subcontract Completion the date on which the subcontract was completed and, within 7 Days of the date the subcontract is certified complete, the Contract Administrator shall give a copy of the certificate to the Contractor and to the Subcontractor concerned.

GC 8.02.04.03 Subcontract Statutory Holdback Release Certificate and Payment

.01 Following receipt of the Certificate of Subcontract Completion, the Owner shall release and pay the Contractor the Statutory Holdback retained in respect of the subcontract. Such release shall be made 61 Days after the date the subcontract was certified complete and providing the Contractor submits the following to the Contract Administrator:

a) a document satisfactory to the Contract Administrator that shall release the Owner from all further claims relating to the subcontract, qualified by stated exceptions such as holdback monies;

b) evidence satisfactory to the Contract Administrator that the Subcontractor has discharged all liabilities incurred in carrying out the subcontract;

c) a satisfactory clearance certificate or letter from the Workplace Safety and Insurance Board relating to the subcontract; and

d) a copy of the contract between the Contractor and the Subcontractor and a satisfactory statement showing the total amount due the Subcontractor from the Contractor.

.02 Clause GC 8.02.04.03.01 d), shall only apply to Lump Sum Items and then only when the Contract Administrator specifically requests it.

.03 Upon receipt of the Statutory Holdback, the Contractor shall forthwith give the Subcontractor the payment due under the subcontract.

.04 Release of Statutory Holdback by the Owner in respect of a subcontract shall not relieve the Contractor, or the Contractor's Surety, of any of their responsibilities.

GC 8.02.04.04 Substantial Performance of Work

.01 The Contractor, as part of the application for Substantial Performance, shall submit an itemized list of the outstanding work.

.02 Upon application by the Contractor and when the Contract Administrator has verified that the Contract has been substantially performed, the Contract Administrator shall issue a Certificate of Substantial Performance.

.03 The Contract Administrator shall set out in the Certificate of Substantial Performance the date on which the Contract was substantially performed and, within 7 Days after signing the said certificate, and shall provide a copy to the Contractor.

.04 Upon receipt of a copy of the Certificate of Substantial Performance, the Contractor shall forthwith, as required by Section 32(1) Paragraph 5 of the Construction Act, as amended, publish a copy of the certificate in the manner set out in the regulations.

.05 Where the Contractor fails to publish a copy of the Certificate of Substantial Performance as required above within 7 Days after receiving a copy of the certificate signed by the Contract Administrator, the Owner may publish a copy of the certificate at the Contractor's expense.

.06 Except as otherwise provided for in Section 31 of the Construction Act, the 60 Day lien period prior to the release of holdback as referred to in clause GC 8.02.04.05, Substantial Performance Payment and Statutory Holdback Release Payment Certificates, shall commence from the date of publication of the Certificate of Substantial Performance as provided for above.

GC 8.02.04.05 Substantial Performance Payment and Substantial Performance Statutory Holdback Release Payment Certificates

.01 Prior to the Contract Administrator issuing the Certificate of Substantial Performance, the Contractor shall submit a Proper Invoice for the Work completed. In addition to the requirements specified under section 8.02.04.01.02, the Proper Invoice shall include:

a) the value of Work performed to the date of Substantial Performance;

b) the value of outstanding or incomplete Work;

c) the amount of the Statutory Holdback, allowing for any previous releases of Statutory Holdback to the Contractor in respect of completed subcontracts and deliveries of pre-selected Equipment; and

d) the amount due the Contractor.

.02 Payment shall be made within 28 Days of the date of submission of the Proper Invoice.

.03 The Substantial Performance Statutory Holdback Release Payment Certificate shall be a payment certificate releasing to the Contractor the Statutory Holdback due in respect of Work performed up to the date of Substantial Performance. Payment of such Statutory Holdback shall be due 61 Days after the date of publication of the Certificate of Substantial Performance but subject to the provisions of the Construction Act and the submission by the Contractor of the following documents:

a) a satisfactory Certificate of Clearance from the Workplace Safety and Insurance Board; and

b) proof of publication of the Certificate of Substantial Performance.

.04 Any amount of security retained shall be identified on the Substantial Performance Payment Certificate.

GC 8.02.04.06 Certification of Completion

.01 Upon application by the Contractor and when the Contract Administrator has verified that the Contract has reached Completion, the Contract Administrator shall issue a Completion Certificate.

.02 The Contract Administrator shall set out in the Completion Certificate the date on which the Work was completed and, within 7 Days of signing the said certificate, the Contract Administrator shall provide a copy to the Contractor.

GC 8.02.04.07 Completion Payment and Completion Statutory Holdback Release Payment Certificates

.01 Prior to the Contract Administrator issuing the Completion Certificate, the Contractor shall submit a Proper Invoice for the Work completed. In addition to the requirements noted under section 8.02.04.01.02, the Proper Invoice shall include:

a) measurement and value of Work at Completion;

b) the amount of the further Statutory Holdback based on the value of further Work completed over and above the value of Work completed shown in the Substantial Performance Payment Certificate referred to above; and

c) the amount due the Contractor.

.02 The Completion Statutory Holdback Release Payment Certificate shall be a payment certificate releasing to the Contractor the further Statutory Holdback. Subject to any outstanding liens and permissible set-offs and upon submission of a satisfactory Certificate of Clearance from the Workplace Safety and Insurance Board, the Owner shall pay the remaining holdback on the Work done, within 28 Days after the expiration of the 60-Day lien period.

.03 Any amount of security retained shall be identified on the Completion Payment Certificate.

GC 8.02.04.08 Interest

.01 Interest due to the Contractor shall be based on simple interest and calculated using the applicable Rate of Interest. Interest shall begin to accrue on an amount that is not paid when it is due to be paid under Part-I of the Construction Act, at the prejudgment interest rate determined under subsection 127 (2) of the *Courts of Justice Act* or, if the Contract specifies a different interest rate for this purpose, the greater of the prejudgment interest rate and the interest rate specified in the Contract.

GC 8.02.04.09 Interest for Late Payment

.01 Provided the Contractor has complied with the requirements of the Contract, including all documentation requirements, when payment by the Owner to the Contractor for Work performed, or for release of Statutory Holdback, is delayed by the Owner, then the Contractor shall be entitled to receive interest on the outstanding payment at the Rate of Interest, if payment is not received on the dates set out below:

a) Progress Payment: 28 Days after submission of Proper Invoice;

b) Subcontract Statutory Holdback Release Payment: 89 Days after the date on which the subcontract was completed;

c) Substantial Performance Payment: 28 Days after the date of issuance of the certificate;

d) Substantial Performance Statutory Holdback Release Payment: 89 Days after publication of the Payment Certificate of Substantial Performance;

e) Completion Payment: 28 Days after the date certified as the date on which the Contract reached Completion; and

f) Completion Statutory Holdback Release Payment: 89 Days after the date certified as the date that the Work was completed.

.02 If the Contractor has not complied with the requirements of the Contract, including all documentation requirements, prior to expiration of the time periods described in clause GC 8.02.04.09.01, interest shall only begin to accrue when the Contractor has completed those requirements.

GC 8.02.04.10 Interest for Negotiations and Claims

.01 Except as hereinafter provided, where a notice of negotiation, notice of intent to claim and the subsequent claims are submitted in accordance with the time limits or procedure or both described by subsection GC 3.13, Claims, Negotiations, Mediation, the Owner shall pay the Contractor the Rate of Interest on the amount of the negotiated price for that part of the Work or on the amount of the settled claim. Such interest shall not commence until 30 Days after the satisfactory completion of that part of the Work.

.02 Where the Contractor fails to give notice of a claim within the time limit prescribed by subsection GC 3.13, Claims, Negotiations, Mediation, interest shall not be paid.

.03 Where a Contractor fails to comply with the 30 Day time limit and the procedures prescribed in clause GC 3.13.03.03 for submission of claims, interest shall not be paid for the delay period.

GC 8.02.04.11 Owner's Set-Off

.01 Pursuant to the Construction Act, the Owner may retain from monies owing to the Contractor under this Contract an amount sufficient to cover any outstanding or disputed liabilities, including the cost to remedy deficiencies, the reduction in value of substandard portions of the Work, claims for damages by third parties that have not been determined in writing by the Contractor's insurer, undetermined claims by the Owner, and any assessment due the Workplace Safety and Insurance Board.

.02 Under these circumstances the Owner will give the Contractor appropriate notice of such action.

GC 8.02.04.12 Delay in Payment

.01 The Owner shall not be deemed to be in default of the Contract provided any delay in payment does not exceed the due dates as defined in clause GC 8.02.04.09.01.

GC 8.02.05 Payment on a Time and Material Basis

GC 8.02.05.01 Definitions

.01 For the purpose of clause GC 8.02.05 the following definitions apply:

Cost of Labour means the amount of wages, salary, travel, travel time, food, lodging, or similar items and Payroll Burden paid or incurred directly by the Contractor to or in respect of labour and supervision actively and necessarily engaged on the Work based on the recorded time and hourly rates of pay for such labour and supervision but shall not include any payment or costs incurred for general supervision, administration, and management time spent on the entire Work or any wages, salary, or Payroll Burden for which the Contractor is compensated by any payment made by the Owner for Equipment.

Cost of Material means the cost of Material purchased or supplied from stock and valued at current market prices for the purpose of carrying out Extra Work by the Contractor or by others, when such arrangements have been made by the Contractor for completing the Work, as shown by itemized invoices.

Operated Rented Equipment means Rented Equipment for which an operator is provided by the supplier of the Equipment and for which the rent or lease includes the cost of the operator.

Payroll Burden means the payments in respect of workplace insurance, vacation pay, employment insurance, public liability and property damage insurance, sickness and accident insurance, pension fund, and such other welfare and benefit payments forming part of the Contractor's normal labour costs.

Rented Equipment means Equipment that is rented or leased for the special purpose of Work on a Time and Material Basis from a person, firm, or corporation that is not an associate of the lessee as the word "associate" is defined by the Securities Act, R.S.O. 1990, c.S.5, as amended, and is approved by the Contract Administrator.

Road Work means the preparation, construction, finishing, and construction maintenance of roads, streets, Highways, and parking lots and includes all work incidentals thereto other than Work on structures.

Sewer and Watermain Work means the preparation, construction, finishing, and construction maintenance of sewer systems and watermain systems, and includes all work incidental thereto other than Work on structures.

Standby Time means any period of time that is not considered Working Time and which together with the Working Time does not exceed 10 hours in any one Working Day and during which time a unit of Equipment cannot practically be used on other Work but must remain on the site in order to continue with its assigned task and during which time the unit is in fully operable condition.

Structure Work means the construction, reconstruction, repair, alteration, remodelling, renovation, or demolition of any bridge, building, tunnel, or retaining wall and includes the preparation for and the laying of the foundation of any bridge, building, tunnel, or retaining wall and the installation of Equipment and appurtenances incidental thereto.

The 127 Rate means the rate for a unit of Equipment as listed in OPSS.PROV 127, Schedule of Rental Rates for Construction Equipment, Including Model and Specification Reference, that is current at the time the work is carried out or for Equipment that is not so listed, the rate that has been calculated by the Owner, using the same principles as used in determining The 127 Rates.

Work on a Time and Material Basis means Changes in the Work, Extra Work, and Additional Work approved by the Contract Administrator for payment on a Time and Material basis. The Work on a Time and Material Basis shall be subject to all the terms, conditions, Standard Specifications and provisions of the Contract.

Working Time means each period of time during which a unit of Equipment is actively and of necessity engaged on a specific operation and the first 2 hours of each immediately following period during which the unit is not so engaged but during which the operation is otherwise proceeding and during which time the unit cannot practically be transferred to other Work but must remain on the site in order to continue with its assigned tasks and during which time the unit is in a fully operable condition.

GC 8.02.05.02 Daily Work Records

.01 Daily Work Records, prepared as the case may be by either the Contractor's representative or the Contract Administrator reporting the labour and Equipment employed and the Material used on each Time and Material project, should be reconciled and signed each Day by both the Contractor's representative and the Contract Administrator. If it is not possible to reconcile the Daily Work Records, then the Contractor shall submit the un-reconciled Daily Work Records with its claim, whereby the resolution of the dispute about the Daily Work Records shall not be resolved until there is a resolution of the claim.

GC 8.02.05.03 Payment for Work

.01 Payment as herein provided shall be full compensation for all labour, Equipment, and Material to do the Work on a Time and Material Basis except where there is agreement to the contrary prior to the commencement of the Work on a Time and Material Basis. The payment adjustments on a Time and Material basis shall apply to each individual Change Order authorized by the Contract Administrator.

GC 8.02.05.04 Payment for Labour

.01 The Owner shall pay the Contractor for labour employed on each Time and Material project at 135% of the Cost of Labour up to $3,500, then at 120% of any portion of the Cost of Labour in excess of $3,500.

.02 The Owner shall make payment in respect of Payroll Burden for Work on a Time and Material Basis at the Contractor's actual cost of Payroll Burden.

.03 At the Owner's discretion, an audit may be conducted in which case the actual Payroll Burden so determined shall be applied to all Time and Material work on the Contract.

GC 8.02.05.05 Payment for Material

.01 The Owner shall pay the Contractor for Material used on each Time and Material project at 120% of the Cost of the Material up to $3,500, then at 115% of any portion of the Cost of Material in excess of $3,500.

GC 8.02.05.06 Payment for Equipment

GC 8.02.05.06.01 Working Time

.01 The Owner shall pay the Contractor for the Working Time of all Equipment, other than Rented Equipment and Operated Rented Equipment, used on the Work on a Time and Material basis at The 127 Rates with a cost adjustment as follows:

a) Cost $12,000 or less - no adjustment;

b) Cost greater than $12,000 but not exceeding $24,000 - payment $12,000 plus 90% of the portion in excess of $12,000; and

c) Cost greater than $24,000 - $22,800 plus 80% of the portion in excess of $24,000.

.02 The Owner shall pay the Contractor for the Working Time of Rented Equipment used on the Work on a Time and Material Basis at 110% of the invoice price approved by the Contract Administrator up to a maximum of 110% of the 127 Rate. This constraint shall be waived when the Contract Administrator approves the invoice price prior to the use of the Rented Equipment.

.03 The Owner shall pay the Contractor for the Working Time of Operated Rented Equipment used on the Work on a Time and Material Basis at 110% of the Operated Rented Equipment invoice price approved by the Contract Administrator prior to the use of the Equipment on the Work on a Time and Material Basis.

GC 8.02.05.06.02 Standby Time

.01 The Owner shall pay the Contractor for Standby Time of Equipment at 35% of The 127 Rate or 35% of the invoice price whichever is appropriate. The Owner shall pay reasonable costs for Rented Equipment where this is necessarily retained in the Working Area for extended periods agreed to by

the Contract Administrator. This shall include Rented Equipment intended for use on other work, but has been idled due to the circumstances giving rise to the Work on a Time and Material Basis.

.02 In addition, the Owner shall include the Cost of Labour of operators or associated labourers who cannot be otherwise employed during the Standby Time or during the period of idleness caused by the circumstances giving rise to the Work on a Time and Material Basis.

.03 The Contract Administrator may require Rented Equipment idled by the circumstances giving rise to the Work on Time and Material Basis to be returned to the lessor until the Work requiring the Equipment can be resumed. The Owner shall pay such costs as a result from such return.

.04 When Equipment is transported, solely for the purpose of the Work on a Time and Material Basis, to or from the Working Area on a Time and Material basis, payment shall be made by the Owner only in respect of the transporting units. When Equipment is moved under its own power it shall be deemed to be working. The method of moving Equipment and the rates shall be subject to the approval of the Contract Administrator.

GC 8.02.05.07 Payment for Hand Tools

.01 Notwithstanding any other provision of this Section, no payment shall be made to the Contractor for or in respect of Hand Tools or Equipment that are tools of the trade.

GC 8.02.05.08 Payment for Work by Subcontractors

.01 Where the Contractor arranges for Work on a Time and Material Basis, or a part of it, to be performed by Subcontractors on a Time and Material basis and has received approval prior to the commencement of such Work, in accordance with the requirements of subsection GC 3.09, Subcontracting by the Contractor, the Owner shall pay the cost of Work on a Time and Material Basis by the Subcontractor calculated as if the Contractor had done the Work on a Time and Material Basis, plus a markup calculated on the following basis:

a) 20% of the first $3,500; plus

b) 15% of the amount from $3,500 to $12,000; plus

c) 5% of the amount in excess of $12,000.

.02 No further markup shall be applied regardless of the extent to which the work is assigned or sublet to others. If Work is assigned or sublet to an associate, as defined by the Securities Act, no markup whatsoever shall be applied.

GC 8.02.05.09 Submission of Invoices

.01 At the start of the Work on a Time and Material Basis, the Contractor shall provide the applicable labour and Equipment rates not already submitted to the Contract Administrator during the course of such Work.

.02 Separate summaries shall be completed by the Contractor. Each summary shall include the Change Directive or Change Order number and covering dates of the Work and shall itemize separately the labour, Materials, and Equipment. Invoices for Materials, Rented Equipment, and other charges incurred by the Contractor on the Work on a Time and Material Basis shall be included with each summary.

.03 Each month the Contract Administrator shall include with the monthly progress payment, the costs of the Work on a Time and Material Basis incurred during the preceding month all in accordance with the contract administrative procedures and the Contractor's invoice of the Work on a Time and Material Basis.

.04 The final summary as per clause 8.02.05.09.02 shall be submitted by the Contractor within 60 Days after the completion of the Work on a Time and Material Basis.

GC 8.02.05.10 Payment Other Than on a Time and Material Basis

.01 Clause GC 8.02.05 does not preclude the option of the Contract Administrator and the Contractor negotiating a Lump Sum Item or unit price payment for Change in the Work, Extra Work, and Additional Work.

GC 8.02.05.11 Payment Inclusions

.01 Except where there is agreement in writing to the contrary, the compensation, as herein provided, shall be accepted by the Contractor as compensation in full for profit and all costs and expenses arising out of the Work, including all cost of general supervision, administration, and management time spent on the Work, and no other payment or allowance shall be made in respect of such Work.

GC 8.02.06 Final Acceptance Certificate

.01 After the acceptance of the Work or, where applicable, after the Warranty Period has expired, the Contract Administrator shall issue the Final Acceptance Certificate. The Final Acceptance Certificate shall not be issued until all known deficiencies have been adjusted or corrected, as the case may be, and the Contractor has discharged all obligations under the Contract.

.02 Any remaining amount of security shall be released upon Final Acceptance of the Contract.

GC 8.02.07 Records

.01 The Contractor shall maintain and keep accurate Records relating to the Work, Changes in the Work, Extra Work, Additional Work and claims arising therefrom. Such Records shall be of sufficient detail to support the total cost of the Work, Changes in the Work, Extra Work, Additional Work and claims arising therefrom. The Contractor shall preserve all such original Records until 12 months after the Final Acceptance Certificate is issued or until all claims have been settled, whichever is longer. The Contractor shall require that Subcontractors employed by the Contractor preserve all original Records pertaining to the Work, Changes in the Work, Extra Work, Additional Work and claims arising therefrom for a similar period of time.

.02 The Owner may inspect and audit the Contractor's Records relating to the Work, Changes in the Work, Extra Work, and Additional Work at any time during the period of the Contract. The Contractor shall supply certified copies of any part of its Records required, whenever requested by the Owner.

GC 8.02.08 Taxes

.01 Where a change in Canadian Federal or Provincial taxes occurs after the date of tender closing for this Contract, and this change could not have been anticipated at the time of Tender, the Owner shall increase or decrease Contract payments to account for the exact amount of tax change involved.

.02 Claims for compensation for additional tax cost shall be submitted by the Contractor to the Contract Administrator on forms provided by the Contract Administrator to the Contractor. Such claims for additional tax costs shall be submitted not less than 30 Days after the date of Final Acceptance.

.03 Where the Contractor benefits from a change in Canadian Federal or Provincial taxes, the Contractor shall submit to the Contract Administrator on forms provided by the Contract Administrator, a statement of such benefits. This statement shall be submitted not later than 30 Days after Final Acceptance.

.04 Changes in Canadian Federal or Provincial taxes that impact upon commodities, which when left in place form part of the finished Work, or the provision of services, where such services form part of the Work and where the manufacture or supply of such commodities or the provision of such services is carried out by the Contractor or a Subcontractor, are subject to a claim or benefit as detailed above. Services in the latter context means the supply and operation of Equipment, the provision of labour, and the supply of commodities that do not form part of the Work.

.05 The Contractor shall add the Harmonized Sales Tax (HST) to all invoices.

GC 8.02.09 Liquidated Damages

.01 When liquidated damages are specified in the Contract and the Contractor fails to complete the Work in accordance with the Contract, the Contractor shall pay such amounts as are specified in the Contract Documents.

ADDITIONAL INFORMATION

HURON STREET GEOTECHNICAL REPORT – JUNE 10, 2024

GEOTECHNICAL REPORT

New Water Intake and Huron Street Reconstruction,
Blind River, Ontario



June 2024

TULLOCH Project # 23-0821

June 10, 2024	0	Issued for Use	L. Meneghetti	J. Mercer	G. Liang
February 27, 2024	A	Draft	L. Meneghetti	J. Mercer	G. Liang
Date	**Rev.**	**Status**	**Prepared By**	**Checked By**	**Approved By**
TULLOCH					

TULLOCH

1100 South Service Rd. Suite 420
Stoney Creek, ON
L8E 0C5

T. 905.481.1678
TF. 800.797.2997
stoneycreek@tulloch.ca

www.TULLOCH.ca

23-0821
June 10, 2024

Town of Blind River
11 Hudson Street
Blind River, Ontario
P0R 1B0

Attention: Kathryn Scott | CAO/Clerk

RE: New Water Intake and Huron Street Reconstruction, Blind River, Ontario

Dear Mrs. Scott,

Please find enclosed our Geotechnical Report for the proposed HDD crossing and reconstruction of approximately 450 linear meters of paved road and municipal services on Huron Avenue, between Causley Street and Woodward Avenue in Blind River, Ontario.

This report outlines the results of the geotechnical investigation and provides geotechnical design recommendations and construction considerations for the HDD crossing and road reconstruction.

We trust the enclosed is adequate for your current needs. If there is anything further that we can assist with, please contact us at your convenience.

Sincerely,

Jackson Mercer, P. Eng.
Geotechnical Engineer

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1. INTRODUCTION AND SCOPE

TULLOCH Engineering Inc. (TULLOCH) was retained by the Town of Blind River (Client) to complete a geotechnical investigation for the proposed HDD crossing utilizing trenchless technology systems for the installation of a 300 mm watermain proposed to be installed below the Huron Central Railway crossing and Causley Street (Highway 17), and the reconstruction of approximately 450 linear meters of paved road and municipal services on Huron Avenue, between Causley Street and Woodward Avenue in Blind River, Ontario.

The purpose of the geotechnical investigation was to evaluate the subsurface conditions within the project site in order to provide recommendations for the trenchless crossing design and the reconstruction of the pavement structure as well as municipal services along Huron Street. A site plan attached in Appendix A outlines the borehole locations completed for the drilling investigation associated with the project.

This report provides the factual geotechnical investigation data and geotechnical design recommendations, which are based on the site investigation data, our understanding of the project scope and engineering experience. Common terminology used in this report can be found in Appendix B and specific terminology is referenced in table notes or in the report body.

2. REGIONAL GEOLOGY AND SITE INFORMATION

Based on review of Bedrock Geology and Northern Ontario Engineering Geology Terrain Study (NOEGTS) (OGS 2005) and Bedrock Geology of Ontario (OGS 2011) mapping as published by the Ontario Geological Survey, the site surficial geology consists of a till material predominantly of sand to silty sand matrix. The bedrock comprised of siltstone, wacke, and argillite, of the McKim Formation belonging to the Elliot Lake Group. The topography of the site is undulating to rolling, with moderate relief and exhibits missed wet and dry drainage conditions.

The project site is located from the shoreline of Lake Huron to the Huron Central Railway and Huron Avenue, between Causley Street and Woodward Avenue in Blind River, Ontario. The roadway proposed for reconstruction consists of a paved two-lane residential road with concrete sidewalks servicing north and south traffic flows. A detailed photo log of the site and investigation is attached in Appendix C.

3. SITE INVESTIGATION AND METHODOLOGY

The field investigation was undertaken from October 30 to November 1, 2023, and consisted of advancing nine (9) geotechnical boreholes referenced as BH-23-01 to BH-23-06, BH-23-09, BH-23-10 and BH-23-12, and three (3) environmental boreholes referenced as BH-23-07, BH-23-08 and BH-23-11. The geotechnical boreholes were advanced to a termination depth between 1.52 m below ground surface (mbgs) to 8.99 mbgs. Shallow auger and spoon refusal were encountered during the advance of BH-23-05 at 0.46 mbgs and BH-23-06 at 2.90 mbgs. The environmental boreholes were advanced to a termination depth of 0.76 mbgs. A supplemental excess soils management investigation was conducted by TULLOCH in accordance with O.Reg. 406/19 concurrently with the geotechnical investigation. Recommendations associated with soil disposal are not included within the scope of this report and are provided in a separate report issued by TULLOCH.

All boreholes were positioned, and field fit to avoid underground utilities present under the direction of a TULLOCH geotechnical representative based on the public and private locate clearances completed prior to the investigation. The following table summarizes the borehole investigation.

Table 3-1: Summary of Borehole Information

Borehole No.	Borehole Type	Easting (m)	Northing (m)	Ground Surface Elevation (m)	Depth of Borehole (mbgs)[1]
BH-23-01	Geotechnical	349 247	5 116 261	178.6	7.12
BH-23-02	Geotechnical	349 299	5 116 307	180.9	5.12
BH-23-03	Geotechnical	349 344	5 116 361	182.7	8.99
BH-23-04	Geotechnical	349 409	5 116 373	182.3	5.90
BH-23-05	Geotechnical	349 454	5 116 455	189.2	0.46
BH-23-06	Geotechnical	349 475	5 116 484	190.3	2.90
BH-23-07	Environmental	349 498	5 116 513	190.4	0.76
BH-23-08	Environmental	349 511	5 116 551	188.5	0.76
BH-23-09	Geotechnical	349 557	5 116 629	185.3	3.05
BH-23-10	Geotechnical	349 578	5 116 660	183.7	1.52
BH-23-11	Environmental	349 592	5 116 674	183.2	0.76
BH-23-12	Geotechnical	349 607	5 116 699	182.9	5.18

Note(s): [1]meters below ground surface.

Boreholes were advanced using a CME 55 truck-mounted drill rig owned and operated by Landcore Drilling in Chelmsford, Ontario. The geotechnical boreholes were advanced using 200 mm OD (outside diameter) continuous flight hollow stem augers and/or using NQ/NWT casing and wash boring. Bedrock cores were retrieved within the NW casing with an NQ2 (76 mm OD) rock core barrel., The environmental boreholes were advanced using continuous flight solid stem augers. The rig was equipped with standard soil sampling equipment including an automatic hammer.

In the overburden, soil samples were obtained using standard split spoon equipment in conjunction with Standard Penetration Tests (SPT) performed in accordance with ASTM D1586. SPT sampling generally occurred at 0.76 m intervals in the upper approximately 1.5 m of the boreholes, and at 1.5 m intervals thereafter and was conducted using an automatic hammer.

The drilling and soil/rock sampling program were directed by a TULLOCH representative, who logged the drilling operations and identified the soil samples and rock cores as they were retrieved. Detailed borehole logs for the proposed site can be found in Appendix D. Detailed bedrock core photos of the retrieved runs are attached in Appendix E.

The recovered soil/rock samples were transported to TULLOCH's CCIL-Certified Laboratory in Sault Ste. Marie for detailed examination and testing. A select number of soil samples were also submitted to Testmark Laboratories in Garson, ON for soil corrosivity analysis. All samples will be stored at the laboratory for three (3) months and then disposed of unless directed otherwise.

4. LABORATORY TESTING PROGRAM

A geotechnical laboratory testing program was performed on representative samples in accordance with ASTM standards. Table 4-1 provides a list of the testing program. Detailed laboratory reports for particle size distribution curves, moisture content, and corrosivity testing can be found in Appendix F.

Table 4-1: Summary of Soil Laboratory Testing Program

Item No.	Test	Number of Tests	ASTM Standard
1	Sieve/Hydrometer Analysis	14	ASTM D422/ D7928
2	Moisture Content	16	ASTM D2216
3	Corrosivity Analysis	2	Various
4	Unconfined Compression Test	4	ASTM D7012

5. SUBSURFACE CONDITIONS

5.1 General

Subsurface conditions encountered within the boreholes during the geotechnical investigation are summarized below. Detailed borehole and associated laboratory testing reports are provided in Appendix D and F, respectively. It should be noted that the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The soil encountered on the project site consisted of the main deposits outlined below and are described as they were encountered from ground surface.

5.1.1 TOPSOIL

Surficial topsoil was encountered in boreholes BH-23-01 to BH-23-03. The encountered topsoil was found to be approximately 0.2 to 0.4 m thick and was mainly comprised of fine to coarse grained sand with some fine to coarse grained gravel and non-plastic fines, rootlets, and organics. The material was typically dark brown in colour, non-cohesive, and field moisture observations on retrieved split spoon samples indicated the material was moist.

Laboratory testing on a representative sample yielded a moisture content of 17.6%.

Gradation testing was conducted on one (1) of the recovered samples of the topsoil. The laboratory sieve analysis yielded the grain size distributions shown in Table 5-1.

Table 5-1: Grain Size Distribution Summary – Topsoil

Borehole No.	Sample No.	Size Fraction (%)		
		Gravel	Sand	Silt/Clay
BH-23-02	SS01A	7	77	16

5.1.2 COBBLES and BOULDERS

Cobbles and boulders were encountered in BH-23-01 underlying the surficial topsoil. The cobbles and boulders were advanced by utilizing NW/NQ coring techniques from approximately 0.4 to 3.1 mbgs and recorded as Run 1 to Run 3 in the Record of Rockcore No. BH-23-01, found in Appendix D and shown in Appendix E.

5.1.3 (SP) SAND

A sand deposit was encountered below the topsoil layer in BH-23-02. This material was found to be approximately 0.7 m in thickness. The generally the sand deposit was found to be fine to medium grained sand with some fine-grained gravel and some non-plastic fines. The material was brown in colour, non-cohesive, and field moisture observations on retrieved split spoon samples indicated the material was moist. The sand deposit was found to overlie the soil to bedrock contact and exhibited a high SPT 'N' value of 60 blows for 30 cm of sampling advancement indicating a very dense material density and inferred to be caused by interference with the bedrock contact.

5.1.4 ASPHALT

Asphalt from the existing pavement structures was encountered in borehole BH-23-04 to BH-23-12. The encountered asphalt thickness was found between 75 mm to 50 mm across the site, with an average thickness of 53 mm across all boreholes advanced during the investigation. Generally, based on visual observation the pavement condition was generally fair to poor. Alligator, transverse, and longitudinal cracking were observed with patching throughout the project area.

5.1.5 Existing FILL - (SW) SAND to Gravelly SAND

Existing road base/sub-base fills were encountered directly below the topsoil in borehole BH-23-03 and the asphalt in boreholes BH-23-04 to BH-23-12. The walls of each borehole were scratched, and auger cuttings were examined in the field to determine road base and sub-base material thicknesses below the pavement. Distinction between the existing road base and sub-base fills was not possible during the investigation as the fill was found to contain variably mixed sands and gravels and due to the age of the pavement structure, may not exist. The material contained fine to coarse grained sand and gravel and trace to some amounts of non-plastic fines. The material was typically brown to dark brown and black in colour, non-cohesive, and field moisture observations on retrieved split spoon samples indicated the material was moist. Asphalt debris was encountered in samples of the existing fill material obtained from BH-23-03 and BH-23-10.

The SPT 'N' value in this deposit ranged from 2 to 83 blows per 30 cm of sampler advancement in all boreholes, typically the material was observed to be compact to very dense.

Laboratory testing on representative samples yielded moisture contents ranging from 2.6% to 30.1% with an average of 9.9%.

Gradation testing was conducted on nine (9) of the recovered samples of the existing fill. The laboratory sieve analysis yielded the grain size distributions shown in Table 5-2.

Table 5-2: Grain Size Distribution Summary – Existing Fill

Borehole No.	Sample No.	Size Fraction (%)			
		Gravel	Sand	Silt	Clay
BH-23-03	SS03	26	60	14	
BH-23-04	SS01	28	62	10	
BH-23-04	SS02	23	71	6	
BH-23-05	SS01	25	67	8	
BH-23-06	SS01	17	75	8	
BH-23-06	SS02	19	74	7	
BH-23-06	SS05	44	51	5	
BH-23-09	SS02	38	50	12	
BH-23-10	SS01	5	70	22	3

5.1.6 (SM) SILTY SAND

A silty sand deposit was encountered in BH-23-09, BH-23-10, and BH-23-12 below the existing fill. The material was found to range from approximately 1.1 m to 1.6 m thick. The material contained fine to coarse grained sand with trace fine grained gravel. The silty sand was found to be non-plastic, brownish grey to greyish brown in colour with field moisture observations on retrieved split spoon samples indicating the material was moist. The SPT 'N' value in this deposit ranged from 5 to 12 blows per 30 cm of sampler advancement in all boreholes indicating material density of loose to compact. High blow count values of 72 to 121 blows per 30 cm of sampler advancement were encountered in BH-23-09 and are inferred to be caused by interference with cobbles to boulders that resulted in auger and spoon refusal at 2.29 mbgs. BH-23-09 was moved approximately 1.0 m and was continued to 3.05 m.

Laboratory testing on representative samples yielded moisture contents ranging from 7% to 7.5% with an average of 7.3%.

Gradation testing was conducted on two (2) of the recovered samples of the silty sand. The laboratory sieve analysis yielded the grain size distributions shown in Table 5-3.

Table 5-3: Grain Size Distribution Summary – Silty Sand

Borehole No.	Sample No.	Size Fraction (%)			
		Gravel	Sand	Silt	Clay
BH-23-09	SS04	7	61	32	
BH-23-12	SS04	0	65	27	8

5.1.7 (ML) SILT and (SP) SAND

A silt and sand deposit was encountered below the silty sand deposit in BH-23-12. The material was encountered between 2.21 mbgs and 5.18 mbgs. The material contained fine grained sand and trace amounts of clay. The silt & sand was found to be non-plastic, greyish brown in colour with field moisture observations on retrieved split spoon samples indicating the material was moist to wet. The SPT 'N' value in this deposit ranged from 3 to 9 blows per 30 cm of sampler advancement indicating material density of very loose to loose.

Laboratory testing on representative samples yielded moisture contents ranging from 17.8% to 20.1% with an average of 19%.

Gradation testing was conducted on one (1) recovered sample of the silt and sand. The laboratory sieve analysis yielded the grain size distributions shown in Table 5-4.

Table 5-4: Grain Size Distribution Summary – Silt and Sand

Borehole No.	Sample No.	Size Fraction (%)			
		Gravel	Sand	Silt	Clay
BH-23-12	SS04	0	44	54	2

5.1.8 Bedrock

Bedrock was cored in BH-23-01 to BH-23-04 and inferred in BH-23-05 from auger and split spoon sampler refusal at approximately 0.5 m. Based on visual observations of the bedrock coring, the bedrock on the project site generally consisted of greywacke bedrock that was dark grey in colour, fine to medium grained and fresh to faintly weathered.

The RQD values of the retrieved core samples ranged from 0% to 95% indicating a very poor to excellent quality rock with an averaging of 48%. Generally, very poor to poor quality bedrock based on RQD values was recorded in the upper slightly to faintly weathered bedrock which increased to good to excellent quality fresh bedrock with depth.

The core recovery was fair to excellent, with recovery rates ranging from 47% to 100% with an average of 52%. Generally, poorer core recovery was experienced within the upper weathered zone and increased as the bedrock transitioned to slightly weathered to fresh rock.

Solid core recovery ranged from 8% to 92% with an average value of 89% and appears to generally increase with depth. The SCR index was generally influenced by the orientations of the fractures. The values of the Fracture Index range between 0 and 7 fractures per 300 mm of intact core recovered.

Unconfined compression testing was conducted on representative samples of the bedrock encountered throughout BH-23-01 to BH-23-04 and ranged from 45.8 MPa to 135.5 MPa with an average of 75.6 MPa.

5.2 Groundwater Conditions

Groundwater level measurements were taken down open boreholes upon completion of the drilling. Groundwater was not encountered in any of the boreholes advanced during this investigation.

It is noted that the proposed project is close to Lake Huron, for design purposes, the groundwater table can be assumed as the same as the lake level.

The groundwater levels encountered during the investigation may not represent stabilized conditions at the time of measurement, furthermore, it should be noted that groundwater level is subject to seasonal fluctuations with high levels occurring during wet weather conditions in the spring and fall and lower levels during dry weather conditions. As such additional precautions should be taken for groundwater management if necessary.

6. GEOTECHNICAL RECOMMENDATIONS

6.1 General

The following section will discuss trenchless crossing and pavement recommendations and construction considerations for the reconstruction of Huron Avenue. This section will provide our interpretation of the available geotechnical data and geotechnical recommendations and it is intended for the guidance of the design engineer. Where comments are made regarding construction, they are provided only to highlight any aspects that could affect the design of the project. Contractors bidding on or undertaking the construction should make their own interpretation of the provided subsurface information with respect to their planned construction methods, equipment selection, scheduling, and the like.

6.2 Trenchless Crossing

Based on the available information, the following factors should be considered:

- At the time of writing this report, the crossing design was not available to TULLOCH. TULLOCH understands that the proposed trenchless crossing alignment is to cross below the Huron Central Railway owned by Canadian Pacific Railway and Causley Street (Highway 17). From review of the borehole logs it is recommended that the crossing be targeted to go through the greywacke bedrock encountered in BH-23-02 south of Martin Street which will transition from good to excellent quality bedrock and good to fair quality bedrock encountered in BH-23-04 on the east side of Huron Street.

The installation of the trenchless crossing under the Huron Central Railway and Causley Street (Highway 17) must conform to the following standards and guidelines.

- Ontario Provincial Standard Specification (OPSS) 450 Construction Specification for Pipeline and Utility Installation by Horizontal Directional Drilling.
- American Railway Engineering and Maintenance of Way Association (AREMA) Manual for Railway Engineering (2018)
- Transport Canada TC E-10 Standards Respecting to Pipeline Crossing Under Railways
- Transportation Association of Canada (TAC). Guidelines for Underground Utility Installations Crossing Highway Rights-of-Way. March 2013

6.2.1 Installation Depth

It is understood that the proposed crossing pipeline will consist of a twin HDPE pipe watermain with an outside diameter of 12” (300 mm). At this time the proposed bore length is estimated at approximately 70 m.

In accordance with AREMA (2018), under-track bores are to be installed at a minimum depth of 1.68 m below the base of the railway rail and with TAC (2013), the service is to be installed at a minimum depth of 3.0 m under highways unless approved by the road authority. Based on the site geotechnical conditions, TULLOCH recommends installing the utility conduit to be within the good quality bedrock at the site. The target burial depth should be between 4.0 m to 6.0 m depth below the existing ground surface at the crossing location. In accordance with the AREMA guidelines, pipelines under railway tracks are required to be encased in a larger diameter steel casing pipe and extend a minimum distance of 25 m of the railway centerline. The outside

diameter of the casing pipe should be at least 100 mm greater than the carrier pipe. If the casing pipe is installed without protective coating or cathodically protected, the wall thickness of the casing pipe should be increased to the nearest standard size which is a minimum of 1.6 mm greater than the thickness required. The steel casing pipe should also have a specified minimum yield strength of 241 MPa or greater.

For Horizontal Directional Drilling installations, the burial depth will vary adjacent to the entry and receiving pits. At these locations, the cover depth should be at least 3D to maintain the bore stability, where D is the diameter of the conduit. Installing the conduit within the geological settings recommended above (i.e. the good-quality bedrock) will reduce the risk of unacceptable track settlement during the installation.

Section 6.2.4 below summarizes the parameters required to estimate settlement and stresses acting on the conduit.

6.2.2 Installation Method

Three (3) trenchless technologies were considered for the gas pipeline installation given the site geology and replacement pipeline alignment. These include:

- **Jack and Bore**: A horizontal solid auger is used to advance a steel casing from an entry pit to a receiving pit constructed on either side of the crossing. The entry and receiving pits must be excavated to a depth that is below the invert of the conduit since the bore path is straight. A bore machine is erected within the entry pit; this pit must be sized to accommodate the jacking and boring machine, steel casing segments, operators, soil cuttings and shoring system. The auger, which is situated inside the casing is advanced either slightly ahead of or behind the leading edge of the casing depending on the ground conditions. The casing is advanced with the auger using hydraulic jacks. Based on the need for a curved bore path to provide increased pipeline cover at the proposed crossing, this straight path method is considered feasible but likely uneconomical.

- **Horizontal Direction Drilling (HDD)**: HDD involves the boring and enlargement of an uncased borehole, which is kept open using a bentonite-water or bentonite-polymer-water slurry referred to as drill fluid. A relatively small diameter pilot hole is typically bored from an entry pit to a receiving pit along the proposed installation alignment. The drill bit or cutting head at the lead end of the drill string is used to steer the hole along the designed bore path. Accordingly, the bore path can be curved for this type of installation to provide sufficient soil cover between the pipeline and the surface of the proposed crossing

alignment. After executing the pilot hole, the borehole is then enlarged using a reamer until the desired bore diameter is achieved, typically slightly larger than the conduit, and the conduit is pulled through the borehole on the final reaming pass.

- **Micro-tunnelling**: Micro-tunneling involves the use of a Micro-tunnel Boring Machine (MTBM) to advance a small tunnel heading through the ground along the proposed bore path. The MTBM is typically placed in a launch pit and the MTBM and conduit, situated behind the MTBM, are advanced by pipe jacking. The cutting head of the MTBM is often lubricated with a bentonite slurry that is designed based on the sub-surface soil conditions. The MTBM cutter head excavates a tunnel of a slightly larger diameter than the conduit to reduce the friction on the conduit during advancement. Dewatering is necessary during construction to facilitate bore pit operations and prevent workplace flooding. MTBM operations tend to be used for larger-scale operations and often have a higher associated cost. Given the size and length of the bore path planned for this application, it is not considered economical.

Table 6-1 summarizes TULLOCH's assessment of the applicable trenchless technologies for the proposed crossing site. Based on Table 6-1, HDD is the recommended method for the proposed installation due to the small size of the pipe installation, the length of installation required between the sending and receiving pits, no dewatering requirement, the presence of shallow medium to high strength bedrock, lower installation stresses on the conduit from the geological deposits encountered at the project sites, satisfactory settlement control, and relatively low cost. Considering the constructability and economics, HDD is the preferred option when installed by an experienced contractor with adequate experience.

HDD borings are typically done from the ground surface without the use of deep staging excavations, reducing the extent of groundwater control required. HDD also has the ability to control the movement of the reamer to allow for steering of the bore path safely under the Huron Central Railway and Causley Street (Highway 17) crossing. The maximum pressure of the drilling fluid must be controlled to prevent the drilling fluid from migrating into the groundwater system during construction. Preventing and mitigating inadvertent drilling fluid returns should be part of the planning and construction of an HDD installation.

It is the contractor's responsibility for the slurry design and tooling systems for the HDD installation based on the specific site geotechnical conditions as presented in the borehole logs in this report.

The Jack and Bore methodology while feasible, is likely uneconomical and may be more difficult from an installation perspective due to the limited steering ability during advancement. This would require significantly deeper entry and exit pits than other methods and would require larger ground disturbance (e.g. bedrock excavation), resulting in significantly more impact on the roadway. Given the size of the pipe proposed for the trenchless crossing, Jack and Bore technology is likely uneconomical for this application.

It is assumed that more expensive options such as micro-tunnelling are likely not economically feasible in this area. The final choice of equipment and the method of tunnelling should be the Contractor's responsibility.

Successful completion of any trenchless technology or tunnelling project largely depends on an appropriate selection of equipment and methods and the skills and experience of the Contractor. The final selection of the trenchless crossing technique should be made by the Contractor based on their experience and equipment capabilities in addition to their assessment of the subsurface conditions. The soil deposits and groundwater conditions described above may pose several constraints to trenchless installations.

Table 6-1: Trenchless Method Evaluation

Trenchless Technology	Constructability	Cost	Installation Stresses on the Watermain	Ground Surface Settlement Control
Jack and Bore	• Requires deep entry and receiving pits plus shoring. Dewatering may be required to facilitate bore pit operations and prevent workplace flooding, for excavations that exceed the groundwater table. • A Permit to Take Water (PTTW) from the MOE may be required if the dewatering discharge is greater than 50,000 L/day. • Ground settlement may be caused by construction dewatering at the site. • The groundwater table is assumed the same as the adjacent lake level, however, a seasonal higher groundwater table may be encountered during construction. • Not feasible if hard bedrock is present. • Not feasible where curved bore path is needed due to limited steering ability.	• Normally very economical except when executed below the groundwater table. • Increased expense for sending and receiving pits at this site. • Increased expense of equipment for the size of the proposed trenchless installation	• Low to moderate jacking stresses during installation	• Very good settlement control provided the casing is advanced ahead of the auger. • Ground settlement may be caused by dewatering at the site during construction.
HDD	• Entry and receiving pits can be minimized or not required depending on the design and bore path required. • A workspace should be provided at both ends for storage and equipment. • Feasible in medium strength rock • Locally, the rock may be susceptible to raveling for large diameter bores. • No to minimal dewatering is anticipated during construction. • Sufficient installation accuracy over long distances	• Normally very economic	• Typically, lower than Jack and Bore; and much lower in stiff ground.	• Satisfactory settlement control provided the proper design of drill fluid mix and pressure.
Micro-Tunneling	• Requires large entry and exit pits. • Dewatering is required in entry and exit pits. • Micro-tunneling work can be extremely accurate.	• Highest cost option.	• Typically, lower than Jack and Bore; and much lower in stiff ground.	• Satisfactory settlement control can be achieved. • Ground settlement may be caused by dewatering at the entry and exit pits.

6.2.3 Ground Settlement

Invariably there is almost always some ground movement, deformation and settlement associated with tunneling regardless of the method used. It is anticipated that the replacement pipeline invert level will result in an earth cover above the bores of at least 4.0 m to 6.0 m under the Huron Central Railway and Causley Street (Highway 17) crossing. This would correspond to approximately 10 to 15 times the casing diameter of 16" (400 mm), which is considered to be adequate. Assuming a bore size of 16" (400 mm) and a maximum 1% ground loss during tunnelling through the greywacke bedrock, the maximum settlement at ground surface above the center line of the tunnel was estimated to be less than 1 mm at a minimum of 4.0 m relative depth under the Huron Central Railway and Causley Street (Highway 17) crossing, which is negligible. This assumes the bore is conducted exclusively through the medium to high strength greywacke bedrock with reasonably good slurry control and maintenance of appropriate slurry processes and pipe advancement rates.

Once the crossing design has been determined, calculations to determine the allowable ground loss to satisfy the required settlement criteria and Tunnel Induced Surface Settlement should be completed to develop a performance specification for the contractor placing the responsibility to manage the ground loss to the prescribed criteria.

6.2.4 Crossing Design Parameters

Based on the geotechnical investigations at the crossing location, Table 6-2 summarizes the recommended geotechnical parameters for the crossing design within the bedrock at the crossing location. The following summarizes TULLOCH's guidance for the crossing design:

- Based on the borehole data obtained from BH-23-03, the HDD may cross through a very poor to poor quality rock zone between the Huron Central Railway and Causley Street (Highway 17) when advanced with a minimum installation depth of 4.0 m. The contractor should ensure that the equipment performing the work can advance through the bedrock conditions presented in Appendix D and meet the settlement criteria developed for the project.

- The crossing pipeline should be designed for the *in-situ* earth pressures for subsurface conditions encountered at the site plus any additional earth pressure imposed by surface surcharge loads due to train and traffic loading caused by the Huron Central Railway and Causley Street (Highway 17).

- The *in-situ* earth pressures in the rock can be determined using the parameters in Tables 6-4 and 6-5 by the sum of the unit weight of each material times its thickness overlying the conduit centerline. For example, at BH-23-04 and a depth of 4 m, the material zones encountered are a Sand Fill overlying Greywacke bedrock, therefore, the vertical, P_V, and horizontal, P_H, earth pressures on the conduit are:

$$P_V = 0.9\,m \times 20\frac{kN}{m3} + 3.1m \times 25\frac{kN}{m3} = 95.5\,kPa;\;\; P_H = 2 \times P_v = 191\,kPa$$

- The design of the conduit should account for the *in-situ* stress and additional stresses due to installation and surcharge loads at the ground surface during the crossing design life.

- Boussinesq's equation (1985), i.e. for calculating ground stresses due to point load or line load at the surface, can be used to estimate the vertical and horizontal stress acting at the conduit centerline due to train wheel loads.

- The ground settlement caused by train loads can be estimated using elastic solutions and the elastic parameters, referred to as deformation modulus, listed in Tables 6-2 and 6-3.

- Pullback forces on the conduit can be estimated using methods such as PRCI Publication PR-277-144507-Z01 or equivalent using the friction factors listed in Tables 6-2 and 6-3 and assuming a drilling fluid specific gravity of 1.1.

Table 6-2: Overburden (Sand) Properties

Soil Property	Symbol	Unit	Value
Effective Internal Friction Angle	ϕ'	degree	32
Unit Weight	γ	kN/m^3	20
Earth Pressure Coefficient at Rest	K_0	Unitless	0.5
Passive Lateral Earth Pressure Coefficient	K_p	Unitless	3.2
Active Lateral Earth Pressure Coefficient	K_a	Unitless	0.3
Vertical Modulus of Subgrade Reaction	K	kN/m^3	50,000
Deformation Modulus	E'	MPa	80
Friction Coefficient, for HDD Pullback Forces	μ	Unitless	0.5

Table 6-3: Rock (Greywacke) Mass Properties

Rock Property	Symbol	Unit	Value
Unit Weight of Rock Mass	γ	kN/m^3	25
Earth Pressure Coefficient at Rest	K_0	Unitless	0.44
Intact Rock Strength[1]	σ_{ci}	MPa	75.6
Geological Strength Index	GSI	Unitless	50
Rock Mass Compressive Strength[2]	σ_{cm}	MPa	13.2
Deformation Modulus[3]	E_m	MPa	8700
Poisson's Ratio	v	–	0.2
Friction Angle (Residual)	ϕ'	degree	40

Note(s): [1] The intact rock strength is estimated from the average unconfined compression testing values on retrieved rock cores on site. [2] σcm=(0.0034m_i^0.8) σc [1.029+0.025e^((-0.1m_i))]^GSI (Eberhardt, 2003); [3] Given by Em= √(σc/100)*10^((GSI-10)/40) (Hoek and Brown, 1998).

6.2.5 Construction Considerations

The following considerations should be accounted for during the crossing design:

- Due to the very poor to poor rock quality found in BH-23-03, the conduit should be pulled into place as soon as practical after the initial pilot bore. TULLOCH recommends requiring the contractor to install the conduit during the 1st reaming pass after the initial pilot bore. The initial pilot bore should be as small as practical.
- The contractor should be equipped with appropriate tooling systems that should be selected to handle the possibility of cobbles and boulders as well as advancement through the medium to high strength bedrock encountered throughout the site. The selected contractor should have a contingency plan to handle boulders/cobbles if encountered at the site.
- The amount of surface settlement during construction will depend on the contractor's skill and the care taken to limit ground loss during the conduit installation. As noted above, during the crossing design, the design engineers should determine the allowable ground loss required to satisfy the appropriate settlement criteria and then develop a performance specification for the installation that informs the contractor of these limits and places the responsibility to comply with these limits on the contractor.

6.2.6 Temporary Excavations

As bedrock was encountered within 1.0 m below ground surface in BH-23-02 and BH-23-04, where the presumed sending and receiving pits would be located, the use of temporary excavation and support systems are unlikely. Should open excavations for the entry and receiving pits be adopted, they must be carried out in a manner that complies with the Occupational Health and Safety Act (OHSA), Ontario Regulation 213/91.

6.3 Pavement Design

6.3.1 Existing Pavement Condition

The existing asphalt was found to range between approximately 75 mm to 50 mm thick across BH-23-04 to BH-23-12. The subgrade conditions consisted of an existing gravelly sand to sand fill overlaying native silty sand. During the investigation, granular base and sub-base measurement attempts were made, however, due to the variability of existing fill, the distinguishment between base and sub-base was not possible at the time of investigation and may not exist beneath the asphalt.

Photographs of the asphalt surface of the road were taken during the investigation on October 30 and November 1, 2023, at the borehole locations. Selected representative photos can be found in Appendix C. Visual inspection of the pavement surface noted that it was in fair to poor condition. Most stretches of paved surfaces are visibly distressed, with frequent raveling, longitudinal and transverse cracking noted throughout the site. The depressions and frequent cracking are indications of inadequate or poorly constructed granular base/sub-base not sufficient to support the current traffic loading or future increased traffic volume and may be caused by consolidation or lateral movement of the materials due to traffic loading. No catch basins or manholes were observed along the southern half of Huron Street during the investigation which indicates that there is no existing storm sewer network to provide proper drainage to this portion of the project site. Poor existing fill grading which does not promote natural drainage and the lack of an adequate drainage network could also be leading to increased pavement degradation.

Table 6-4 summarizes the road conditions including asphalt, granular road base and groundwater depth.

Table 6-4: Existing Road Condition Summary Based on Borehole Data

Borehole	Asphalt Thickness (mm)	Existing Road Fill Thickness (mm)	Groundwater Depth (m)[1]
BH-23-01	-	-	N/E[2]
BH-23-02	-	-	N/E[2]
BH-23-03	-	-	N/E[2]
BH-23-04	75	835	N/E[2]
BH-23-05	50	410	N/E[2]
BH-23-06	50	710	N/E[2]
BH-23-07	50	710	N/E[2]
BH-23-08	50	710	N/E[2]
BH-23-09	50	710	N/E[2]
BH-23-10	50	400	N/E[2]
BH-23-11	50	710	N/E[2]
BH-23-12	50	710	N/E[2]

Note(s): [1] Field observation taken upon completion of borehole. Note that the groundwater level from this observation may not represent the stabilized groundwater level [2] N/E = Not Encountered.

6.3.2 Pavement Design

The following section will discuss pavement recommendations for the stretch of roadway. Table 6-2 presented below shows the minimum recommended specifications for a flexible asphaltic concrete pavement structure constructed on the native silty sand. Shallow bedrock was encountered along the southern portion of Huron Street between BH-23-04 and BH-23-05; therefore, recommendations are also provided for pavement structures constructed on exposed competent bedrock. The Client has not provided TULLOCH with the expected daily traffic volume and TULLOCH understands that there is no available traffic data or any published traffic studies for the project site. As such, pavement design has been conducted in accordance with the Routine (Empirical) Method – Experience-Based Standard Section design method as presented in the Pavement Design and Rehabilitation Manual (PDRM) (MTO 2013). The pavement structure design has been conducted to provide a Granular Base Equivalency in accordance with the PDRM and from our previous experience for similar pavement structures in the Blind River, Ontario area.

The reuse of the existing granular fill material has been deemed acceptable based on the gradation results of the existing fill and will be discussed further in Section 6.3.2. Therefore two (2) options have been presented for the Client's consideration. Option 1 is to partially reuse

the existing granular fill as granular sub-base with the Granular Base Equivalency (GBE) factor adjusted accordingly. Alternatively, Option 2 is to reinstate the pavement structure with new imported granular fills.

The recommended pavement options are shown below in Table 6-5.

Table 6-5: Pavement Design Parameters

Pavement Layer	Compaction Requirements	Option 1: Partial Reuse of Existing Fill		Option 2: New Imported Granular Fill	
		Silty Sand (mm)	Competent Bedrock (mm)	Silty Sand (mm)	Competent Bedrock (mm)
Surface Asphalt: HL3 (OPSS.MUNI 1150)	HMA (OPSS.MUNI 310)	40	40	40	40
Binder Asphalt: HL-8 (OPSS.MUNI 1150)	Same as above	50	50	50	50
Base Course: Granular "A" (OPSS 1010)	100% Standard Proctor Maximum Dry Density (ASTM-D698)	150	150	150	150
Sub-base Course: Granular "B" Type I (OPSS 1010)	100% Standard Proctor Maximum Dry Density (ASTM D698)	-	-	300	-
Sub-base Course: Reused Existing Granular Fill[1]	100% Standard Proctor Maximum Dry Density (ASTM D698)	500	-	-	-
Geogrid[2]	-	Yes	-	Yes	-
Non-woven Geotextile[3]	-	Yes	-	Yes	-
Minimum Total Thickness		650 mm	300 mm		

Note(s): [1] It is assumed that the existing sand fill material will be reused as granular subbase. [2] The geogrid should be TBX2500 from Terrafix Geosynthetics Inc. or approved equivalent. [3] Geotextile should be non-woven LP 8 from Layfield or approved equivalent with the grab tensile strength not less than 800 N and AOS (Apparent Opening Size) not larger than 0.3 mm.

Pavement design cases have been based on an estimated design life of 15 years prior to major rehab or reinstatement assuming adequate maintenance is conducted throughout its design life. Higher maintenance costs may be associated with the partial reuse of existing fills given the loose and highly frost susceptible nature of the native subgrade.

6.3.3 Subgrade Preparation

All topsoil, organics, soft soil, asphalt, and construction debris (if any) must be sub-excavated within the proposed subgrade areas below the pavement structure. The site should be graded to the target subgrade profile as per the final pavement profile and the total pavement thickness. Unless the Client elects to proceed with an option that includes the reuse of existing fills, all road base and sub-base material should be comprised of imported and approved engineered fill materials for this site. Given the fine-grained nature of the encountered subgrade, a non-woven geotextile (Layfield LP8 or approved equivalent) should be placed between the native subsoil material and any imported fill material to act as a separation medium and to promote drainage.

The exposed subgrade should be inspected and approved by the geotechnical engineer, or their representative during construction to ensure the encountered subgrade conditions are consistent with the design assumptions used to prepare this report. Proof rolling should be carried out as directed by the geotechnical engineer or their representative to spot and delineate soft areas and may not be required where the subgrade soil is deemed very sensitive. If a soft spot/area is identified, it should be sub-excavated and subsequently replaced with compacted engineered fill such as Granular B or as approved by the geotechnical engineer. If deemed necessary by the engineer, the density of the subgrade should be tested and recorded during backfill inspection. The native fine grained silty sand subgrade may easily become disturbed or degraded when exposed to weather or heavy vibration, as such caution should be taken when compacting the initial lift of fill not to leave the subgrade exposed and should be backfilled immediately upon exposure and inspection.

Should the subgrade soils become disturbed during construction or pockets of unstable or unsuitable areas be encountered, TULLOCH can provide recommendations at the time, which may include but not be limited to the following:

- Compaction of the subgrade soil
- Removal of subgrade material and subsequent replacement with engineered fill
- Stabilization with a non-woven geotextile or geogrid

Post compaction settlement of fine-grained soils can be expected, even when placed to compaction specifications. As such, fill material should be installed as far in advance as possible before finishing the parking lot and roadway for best grade integrity.

Imported granular fill material is to be placed in maximum 200 mm thick lifts compacted to minimum 100% SPMDD within ±2% of optimum moisture content.

Where existing fill is to be re-used it should be recompacted in-situ to 100% of the materials SPMDD and proof-rolled and certified by a geotechnical engineer prior to placement of imported fills.

Quality control will be of utmost importance when selecting the material. The selection of the material should be done as early in the contract as possible to allow sufficient time for gradation and proctor testing on representative samples to ensure it meets project specifications. This material may also be used for general landscaping purposes where compaction is not critical.

The final subgrade crossfall should be at least 2% to drain and be free of depressions. Grading should be completed to promote positive drainage to existing ditches and as required.

6.3.4 Reuse of Existing Granular Fill

Excavated existing granular fills may be re-used assuming sufficient testing and inspection have been conducted to confirm their general conformance with OPSS 1010 standards. While still usable, given the unknown age and construction history of Huron Street, the material may contain greater than 10% fines content causing increased frost susceptibility and decreased strength over time. However, the largely granular fill will likely still be suitable for general re-use on site given the above understanding of risk associated with the re-use of the existing fill and based on inspection and certification by a qualified geotechnical engineer, or their representative.

The native silty sand soils on site may be re-used as general landscaping fills but given high fines contents are frost susceptible and should not be used within the pavement structure reconstruction areas where settlement and/or movement are a concern.

6.3.5 Pavement Materials, Placement and Compaction

The asphalt, base and subbase granular fill should be placed and compacted as per the requirement in this section.

6.3.5.1 Asphalt

The mix design should follow the specifications in OPSS 1150 for HL3. Table 6-6 summarizes the specifications regarding asphalt. The mix designs can use Traffic Category “B” as per the expected traffic volume. The mix design should be submitted and approved by a geotechnical engineer prior to use.

6.3.5.2 Base and Sub-base Fill

Table 6-6 below summarizes the specifications regarding base and sub-base fills.

Table 6-6: Requirement for Asphalt, Base and Sub-base Materials

Materials	Notes
Asphalt HMA (OPSS 1150)	- PGAC: Zone 1 52-34 with up to 15% RAP - Performance graded asphalt should conform to OPSS 1101 - Asphalt construction and QA/QC as per OPSS 310 - Mix properties in accordance with AASHTO M323
Base Course: Granular "A" (OPSS 1010)	- 100% Standard Proctor Maximum Dry Density (ASTMD698) at ± 2% of Optimum Moist Content (OMC) - Placement in maximum 200 mm lifts, or as accepted by the engineer in writing
Sub-base Course: Granular "B" Type I, Type II or Approved Fill (OPSS 1010)	- 100% Standard Proctor Maximum Dry Density (ASTMD698) at ± 2% of Optimum Moist Content (OMC) - Placement in maximum 200 mm lifts, or as accepted by the engineer in writing

6.3.5.3 Inspection and Testing

During construction, subgrade inspection and in-situ density tests should be conducted, by the field geotechnical engineer, or their representative, to confirm that the conditions exposed are consistent with those encountered in boreholes and to verify the conformance to the design specifications.

6.3.6 Pavement End Treatment

Joints between new and existing asphalt should be stepped and constructed according to the requirements of OPSS.PROV 313.07.09 regarding Longitudinal and Transverse joints. The step should be constructed with a width of 300 mm and height equal to half the existing surface course of asphalt, (average step height 25 mm). Tack coating should be applied to any milled surface, including the vertical joint surface.

6.3.7 Horizontal Transition

Horizontal transition treatment is required where pavement structure changes occur. The following recommendations should be considered:

- The frost tapers for the transition zone between fine-grained native soil and granular fill should be designed at least 10H:1V to mitigate abrupt differential frost heave.

- Horizontal transition from backfill and native soil should follow OPSD 803.010, OPSD 803.030, and OPSD 803.031.
- To ensure a good tie-in from new to old asphalt, the joints along both longitudinal and transverse direction should be designed as per Section 310.07.11 in OPSS 310.

6.3.8 Pavement Over Underground Utilities

After installation of underground service, the pavement should be constructed as per the recommended pavement structure. Appropriate frost tapers should be implemented in the backfill geometry for the underground service utilities such as culverts as per the OPSD 803 series (e.g., 803.030 and 803.031).

The backfill should be placed in a maximum 200 mm loose lifts and compacted to minimum 95% SPMDD, except the top 1 m of the pavement subgrade which should be compacted to at least 100%.

6.3.9 Pavement Drainage

The surface of the subgrade, subbase and base should be graded with a suitable slope to ensure satisfactory drainage performance.

6.4 Site Utility Servicing – Bedding and Backfilling

Bedding for utilities should be placed as per the pipe design. It is recommended to place a minimum of 150 mm to 200 mm OPSS Granular A below the pipe invert as bedding material. A minimum 300 mm thick cover consisting of Granular A should be placed above and along the sides of the pipe.

In areas where a relatively high groundwater table is encountered during construction, 19 mm clear stone pipe bedding may need to be used as an alternative to Granular A where compaction of the bedding materials may not be possible. A non-woven geotextile such as Layfield LP8 or equivalent should be placed to completely encapsulate the clear stone pipe bedding and act as a filter to prevent fines migration into the bedding material.

Trench backfilling may be completed as per Section 6.7.

If backfilling against slopes, fills should be benched into native slopes per OPSD 208.010.

6.5 Frost Protection

The estimated frost penetration depth at the site is 1.8 m, as such, all servicing shall be situated at least 1.8 m below ground surface to provide adequate soil cover against frost heaving. Alternatively, insulation equivalent to a soil cover can be used to raise the frost line. If shallower embedment is needed, Expanded Polystyrene (EPS) insulation or equivalent can be designed to prevent frost action. A demonstration of a typical methodology can be seen in OPSD 1109.030. Installing insulation does not alter conventional utility line construction practices to an appreciable extent. It should be noted that a wider trench may be required to accommodate frost tapering if backfill soils differ from the surrounding native soils to prevent differential frost heaving and subsequent thaw settlement. A preliminary estimate for cost evaluation can be made assuming that 25 mm of rigid insulation designed for below grade installation is equivalent to approximately 0.3 m soil cover. It should also be noted that as per OPSD 1109.030, the minimum recommended insulation thickness is 50 mm.

If construction is undertaken during the winter months, road subgrade must be protected from freezing.

6.6 Excavation and Groundwater Control

All excavation should be carried out in accordance with Occupational Health and Safety Act (OHSA), Ontario Regulation 213/9, Construction Projects, January 1, 2010, and OPSS 902. Based on the OHSA, the soils are classified as Type 3 soils above the groundwater table and Type 4 soils below the groundwater table. Temporary excavation side slopes in Type 3 soils should remain stable at a slope of 1H:1V. Temporary excavation side slopes in Type 4 soils should remain stable at a slope of 3H:1V. As the native materials are of a glacial origin, there is the possibility of encountering boulders and cobbles during excavation that were not identified in the geotechnical investigation for the proposed road rehabilitation. Therefore, the contractor undertaking the work should supply equipment capable of removing such material. Excavation safety and the stability of temporary construction slopes and lateral support systems are the contractor's responsibility.

Groundwater control may be required during construction to maintain dry excavations. The contractor should direct any surface water and runoff generated from the excavation area. The groundwater level was lower than the expected pavement structure of the boreholes during the investigation. However, seasonal variations in the water table should be expected. Pumping from filtered sumps will likely be sufficient to control groundwater unless deeper excavations are required for such things as servicing where excavation depth extends 0.5 m below the

groundwater table, in which case active de-watering may be required. The temporary groundwater control measures for excavation are the contractor's responsibility.

An application under the Environmental Activity Sector Registry (EASR) of the Ministry of the Environment and Climate Change should be submitted in the event that the dewatering pumping volumes exceed 50,000 L/day.

6.7 Excavated Soil and Trench Backfill

Typical practice in Northern Ontario is to reuse a portion of the in-situ excavated material as fill within utility service trenches, especially where these trenches interrupt travelled sections of a roadway. This is to ensure compatibility with adjacent subgrade soils to minimize differential frost heaving. Maintaining compatibility with adjacent subgrade conditions is crucial to minimize the annual differential frost heaving. This is usually accomplished by backfilling the service trenches with excavated materials. If dissimilar materials are used for trench backfilling, frost tapers should be incorporated in the backfill trench geometry as discussed in Section 6.3.7.

The non-organic material from the service trench excavation may be re-used as backfill above the top of the pipe cover material to the underside of the pavement structure subbase materials. Prior to re-use, all fill materials should be inspected and certified by a qualified geotechnical engineer. All re-used materials must be placed in lifts not exceeding 200 mm and be compacted to 95% of the SPMDD within 2% of the optimum moisture content. Subgrade materials within 1.0m of the road base should be compacted to 100% SPMDD.

TULLOCH cautions that any native material below the groundwater level may not meet the above compaction requirements without reworking (drying) prior to placement. If stockpiling of trench excavated material for re-use is required, it is recommended that it be covered to prevent exposure to rain, and it cannot be allowed to freeze. Furthermore, stockpiles should be kept at a safe distance (distance at least equal to the depth of the excavation) away from open excavations. All unsuitable materials (construction rubble, organics, etc.) from the trench excavation must be disposed of off-site in an environmentally compliant method. Any excavated material contaminated with organics must not be re-used as backfill material. It is recommended that the excavated native soils be inspected and certified by a geotechnical engineer prior to re-use.

6.8 Soil Corrosivity

Testing was completed for soil corrosivity and sulphate concentrations on recovered samples from the borehole investigation. The results of the testing are shown below in Table 6-7. Samples were tested at TESTMARK Laboratories based in Garson, Ontario. The detailed results can be found in Appendix E.

Table 6-7: Soil Corrosivity Results

Borehole No. / Sample No.	Depth (m)	Resistivity (Ω cm)	pH	Redox Potential (mV)	Chloride (µg/g)	Sulfide (µg/g)	Sulphate (µg/g)
BH-23-06 SS04	1.83	21300	6.48	350	4.3	<0.2[1]	11.2
BH-23-12 SS03	1.52	4650	6.26	383	89.8	<0.3[1]	15.7

Note(s): [1]Sulfide testing detection limit.

The results of the chemical testing were assessed in reference to the AWWA C-105 Standard from ANSI/AWWA Corrosivity Rating System. A score greater than 10 indicates the requirement of corrosion protective measures for buried cast iron alloys. The tested samples analyzed for the boreholes referenced in Table 6-4 above scored a ranking of 1, which is below the threshold.

In addition, chloride ions can lead to corrosion of steel. Typically, soils with chloride concentrations greater than 500 µg/g are considered corrosive. As noted in the table, chloride concentrations are less than 500 µg/g in the tested samples. Corrosion protection measures shouldn't be utilized in this area of the site to protect subsurface infrastructure.

The concentration of sulphate indicates the degree of sulphate attack for concrete buried at the site. As shown in the table, the sulphate concentrations are less than 1000 µg/g indicating a low degree of sulphate attack. Type GU Portland Cement should be suitable for use at this site.

7. CLOSURE

This geotechnical report has been prepared by TULLOCH for The Town of Blind River and their authorized agents for the New Water Intake and Huron Street Reconstruction project. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering, for the above-noted location. Classification and identification of soils, and geologic units have been based upon commonly accepted methods employed in professional geotechnical practice. No warranty or other conditions, expressed or implied, should be understood. Please refer to Appendix F, Notice to Reader, which pertains to this report.

We trust that the information in this report will be sufficient for the project. Should further elaboration be required for any portion of this project, we would be pleased to assist.

Laura Meneghetti
Engineering Technologist

Reviewed By:
George Liang, P.Eng.
Senior Geotechnical Engineer/Project Manager

Jackson Mercer, P. Eng
Project Engineer

REFERENCES

TULLOCH Geotechnical Report for Project 1038712 - 1038713 Pedestrian Paving and Roadway Renewal for the Ontario Government Building, 5520 Highway 101 East, South Porcupine, Ontario, September 2017.

VanDine, D.F. 1979. Northern Ontario Engineering Geology Terrain Study. Data Base Map, Blind River. Ontario Geological Survey, Map 5008. Scale 1:100 000.

Ministry of Transportation, Pavement Design and Rehabilitation Manual. Queen's Printer, 2013

Ontario Geological Survey 1991. Bedrock Geology of Ontario, scale 1:1000 000.

Quaternary Geology of Ontario, East-Central Sheet Map, scale 1:1000 000.

Ministry of Northern Development and Mines, Surficial Geology of Northern Ontario.

Ontario Geological Survey 1991, Quaternary Geology of Ontario, southern sheet. scale 1:1 000 000.

Ontario Geological Survey, Ministry of Northern Development and Mines, and Northeast Science and Information Section, Ministry of Natural Resources 2005. Digital Northern Ontario Engineering Geology Terrain Study (NOEGTS); Ontario Geological Survey, Miscellaneous Release--Data 160.

Occupational Health and Safety Act (OHSA), Ontario Regulation 213/9, Construction Projects, January 1, 2010, Part III - Excavations, Section 226.

Canadian Geotechnical Foundation Engineering Design Manual 4th Edition, 2006.

APPENDIX A

SITE LOCATION PLAN

BOREHOLE LOCATION PLAN

0 200
METERS

PROJECT LOCATION

COORDINATES

NAME	EASTING	NORTHING	NAME	EASTING	NORTHING
BH-23-01	349 247	5 116 261	BH-23-07	349 498	5 116 513
BH-23-02	349 299	5 116 307	BH-23-08	349 511	5 116 551
BH-23-03	349 344	5 116 361	BH-23-09	349 557	5 116 629
BH-23-04	349 409	5 116 373	BH-23-10	349 578	5 116 660
BH-23-05	349 454	5 116 455	BH-23-11	349 592	5 116 674
BH-23-06	349 475	5 116 484	BH-23-12	349 607	5 116 699

NOTES:

1. CO–ORDINATES ARE IN UTM ZONE 17T (NAD83 CSRS).

LEGEND:

BH–23–01 BOREHOLE LOCATION

No.	DATE	BY	ISSUES / REVISIONS
0	2024-01-10	LM	ISSUED FOR USE

TULLOCH

DRAWING: BOREHOLE LOCATION PLAN

PROJECT: **BLIND RIVER WATER INTAKE GEOTECHNICAL INVESTIGATION**

DRAWN BY: L. MENEGHETTI	CHECKED BY: E. GILES	PROJECT No. : 23-0821	
DESIGNED BY: L. MENEGHETTI	APPROVED BY: E. GILES	DRAWING No. 23-0821-001	REVISION No. 0
SCALE: AS NOTED	DATE: 2024-01-10		

P:\2023\230821 Blind River Water Intake\Geotechnical\03 Drawings\03.02 Current\Siteplan\230821_Siteplan.dwg

APPENDIX B

TERMINOLOGY

ABBREVIATIONS, TERMINOLOGY AND PRINCIPAL SYMBOLS USED IN REPORT AND BOREHOLE LOGS

BOREHOLES AND TEST PIT LOGS

Soils

AS	Auger/Grab Sample	w	Water Content
SS	Split Spoon	wP	Plastic Limit
SH	Shelby Tube	wL	Liquid Limit
PISTON	Thin-walled Piston	VANE	Field Vane
WS	Washed Sample	OR	Organic Content
SC	Soil Core	GR	Gravel
BS	Block Sample	SA	Sand
WH	Weight of Rods & Hammer	SI	Silt
WR	Weight of Rods	CL	Clay

Bedrock

TCR	Total Core Recover	VN	Vein
SCR	Solid Core Recovery	CO	Contact
FI	Fracture Frequency Index	KV	Karstic Void
HQ	Rock Core (63.5 mm dia.)	MB	Mechanical Break
NQ	Rock Core (47.6 mm dia.)	PL	Planar
BQ	Rock Core (36.5 mm dia.)	CU	Curved
JN	Joint	UN	Undulating
FLT	Fault	IR	Irregular
SH	Shear	SM	Smooth
SK	Slickensided	SR	Slightly Rough
BD	Bedding	R	Rough
FO	Foliation	VR	Very rough

IN SITU SOIL TESTING

Standard Penetration Test (SPT) "N" value is the number of blows required to drive a 51 mm OD split barrel sampler into the soil a distance of 300 mm with a 63.5kg weight free falling a distance of 760 mm after an initial penetration of 150 mm has been achieved.

Dynamic Cone Penetration Test (DCPT) is the number of blows required to drive a cone with a 60-degree apex attached to "A" size drill rods continuously into the soil for each 300 mm penetration with a 63.5 kg weight free falling a distance of 760 mm.

Cone Penetration Test (CPT) is an electronic cone point with a 10 cm base area with a 60-degree apex pushed through the soil at a penetration rate of 2cm/s.

Field Vane Test (FVT) consists of a vane blade, a set of rods and torque measuring apparatus used to determine the undrained shear strength of cohesive soils.

SOIL DESCRIPTIONS

The soil descriptions and classifications are based on an expanded Unified Soil Classification System (USCS). The USCS classifies soils on the basis of engineering properties. The system divides soils into three major categories: coarse grained, fine grained and highly organic soils. The soil is then subdivided based on either gradation or plasticity characteristics. The classification excludes particles larger than 75 mm. To aid in quantifying material amounts by weight within the respective grain size fractions, the following terms have been included to expand the USCS:

Soil Classification	
Clay	<0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.075 to 4.75 mm
Gravel	4.751 to 75 mm
Cobbles	75 to 300 mm
Boulders	>300 mm

Terminology	Proportion
“trace”, sand, etc.	1% to 10%
"some"	10% to 20%
Sandy, Gravelly, etc.	20% to 35%
“and” SAND, SILT, (non-cohesive)	>35%
“with” SAND, SILT, (cohesive)	>35%

Notes:

1. Soil properties, such as strength, gradation, plasticity, structure, etc., dictate the soils engineering behaviour over the grain size fractions;
2. With the exception of soil samples tested for grain size distribution or plasticity, all soil sample classifications are based on visual and tactile observations and, therefore, constitute an approximate description.

The following table outlines the qualitative terms used to describe the relative density condition of cohesionless soils related to the SPT “N” value:

Cohesionless Soils

Compactness	SPT “N” Value (blows/30cm)
Very Loose	0 to 4
Loose	5 to 10
Compact	11 to 30
Dense	31 to 50
Very Dense	>50

The following table outlines the qualitative terms used to describe the consistency of cohesive soils related to undrained shear strength and SPT “N” value:

Cohesive Soils

Consistency	Undrained Shear Strength (kPa)	SPT “N” Value (blows/30 cm)
Very Soft	<12.5	< 2
Soft	12.5 to 25	2 to 4
Firm	25 to 50	5 to 8
Stiff	50 to 100	9 to 15
Very Stiff	100 to 200	16 to 30
Hard	> 200	>30

Note: Utilizing the SPT “N” value to correlate the consistency and undrained shear strength of cohesive soils is very approximate and needs to be used with caution.

Particle Sizes

Constituent	Description	Size (mm)	Size (in)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by Plasticity	< 0.075	< (200)

Note: Brackets () indicate US Standard Sieve Size Number

ROCK CORING

Rock Quality Designation (RQD) is an indirect measure of the number of fractures within a rock mass, Deere et al. (1967). It is the sum of sound pieces of rock core equal to or greater than 100 mm recovered from the core run, divided by the total length of the core run, expressed as a percentage. If the core section is broken during coring or handling, the pieces are fitted together and, if 100 mm or greater included in the total sum.

Intact Rock Strength

Intact Strength (MPa)	Description
< 1	Extremely low strength
1 to 5	Very low strength
5 to 25	Low strength
25 to 50	Medium strength
50 to 100	High strength
100 to 250	Very high strength
>250	Extremely high strength

Rock Mass Quality

RQD Classification	RQD Value (%)
Very Poor Quality	<25
Poor Quality	25 to 50
Fair Quality	50 to 75
Good Quality	75 to 90
Excellent Quality	90 to 100

Rock Mass Weathering

Term	Description
Unweathered (Fresh)	No visible sign of material weathering and slight discoloration on major discontinuity surfaces.
Slightly Weathered	Discoloration indicates the weathering of rock material and discontinuity of surfaces. All of the rock material may be discoloured by weathering and may be somewhat weaker than its fresh condition.
Moderately Weathered	Less than half the rock material is decomposed and/or disintegrates to soil. Fresh or discoloured rock is present either as a continuous framework of as core stones.
Highly Weathered	More than half the rock material is decomposed and/or disintegrated to soil. Fresh or discoloured rock is present either as a discontinuous framework or as core stones.
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

Joint and Foliation Spacing

Description	Spacing
Very Wide	Greater than 3 m
Wide	1 m to 3 m
Moderately Close	0.3 m to 1 m
Close	50 mm to 300 mm
Very Close	Less than 50 mm

Bedding Thickness

Description	Spacing
Very thick	Greater than 2 m
Thick	0.6 m to 2 m
Medium	0.2 m to 0.6 m
Thin	60 mm to 0.2 m
Very thin	20 mm to 60 mm
Laminated	6 to 20 mm
Thinly Laminated	Less than 6 mm

SYMBOLS

General

w_N Natural water content within the soil sample
γ Unit weight
γ' Effective unit weight
γ_D Dry unit weight
γ_{SAT} Saturated unit weight
ρ Density
ρ_s Density of solid particles
ρ_w Density of water
ρ_D Dry density
ρ_{SAT} Saturated density
e Void ratio
n Porosity
S Degree of saturation
E_{50} Fifty percent secant modulus

Consistency

w_L Liquid Limit
w_P Plastric Limit
I_P Plasticity Index
w_S Shrinkage Limit
I_L Liquidity Index
I_C Consistency Index
e_{max} Void ratio in loosest state
e_{min} Void ratio in densest state
I_D Density Index (formerly relative density)

Shear Strength

S_u Undrained shear strength parameter (total stress)
c' Effective cohesion intercept
ϕ' Effective friction angle
τ_P Peak shear strength
τ_R Residual shear strength
δ Angle of interface friction
μ Coefficient of friction = tan ϕ'

Consolidation

C_c Compression index (normally consolidated range)
C_r Recompression index (over consolidated range)
m_v Coefficient of volume change
c_v Coefficient of consolidation
T_v Time factor (vertical direction)
U Degree of consolidation
σ'_v Effictive overburden pressure
OCR Overconsolidation ratio

APPENDIX C

SITE PHOTOGRAPH LOG

Photo 1: BH-23-01 during advancement. Photo taken facing west.

Photo 2: BH-23-01 following completion of backfill. Photo taken facing southwest.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-01 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			1

Photo 3: BH-23-02 during advancement. Photo taken facing northwest.

Photo 4: BH-23-02 following completion of backfill. Photo taken facing north.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-02 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			2

Photo 5: BH-23-03 during advancement. Photo taken facing southwest.

Photo 6: BH-23-03 following completion of backfill. Photo taken facing southwest.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-03 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			3

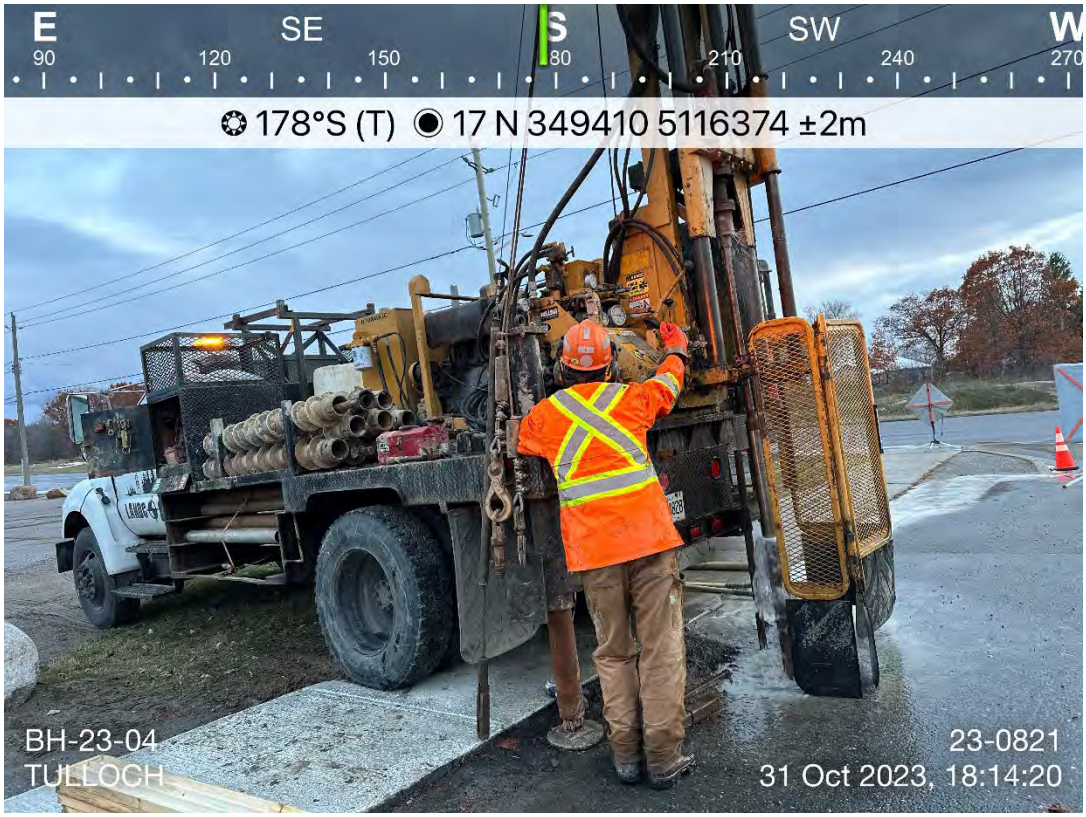


Photo 7: BH-23-04 during advancement. Photo taken facing south.

Photo 8: BH-23-04 following completion of backfill. Photo taken facing north.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-04 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			4

Photo 9: BH-23-05 during advancement. Photo taken facing south.

Photo 10: BH-23-05 following completion of backfill. Photo taken facing north.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-05 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			5

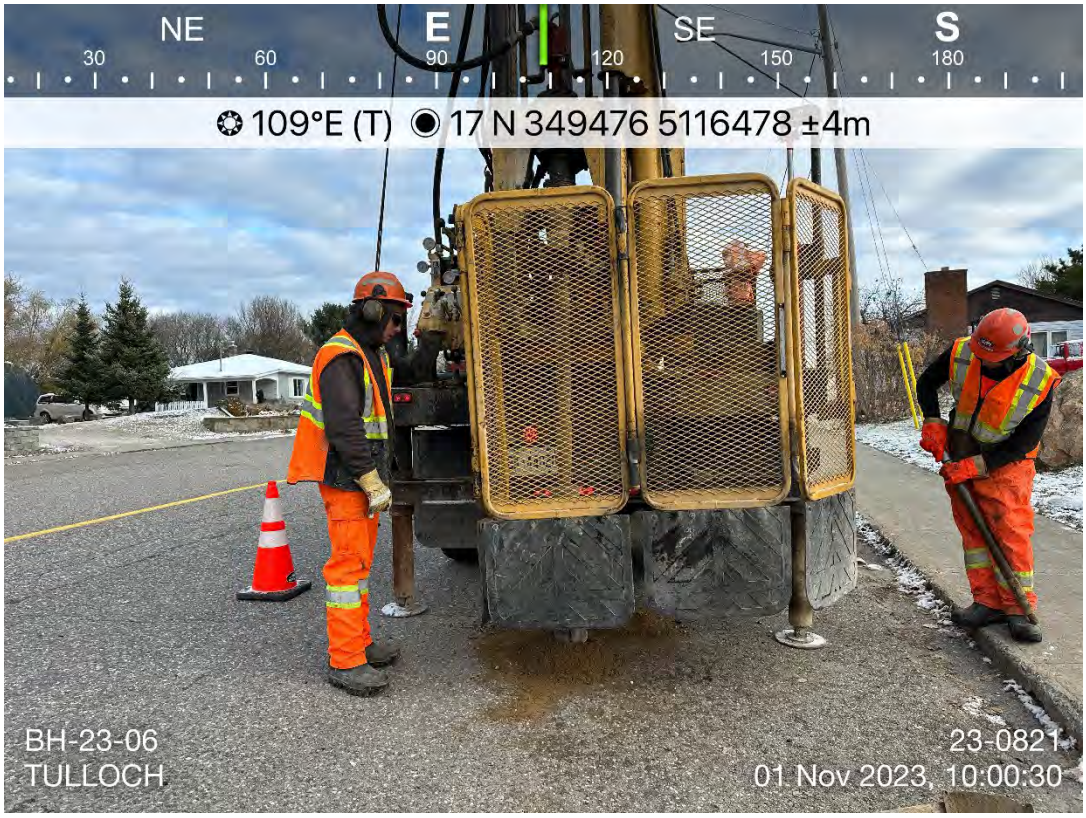


Photo 11: BH-23-06 during advancement. Photo taken facing southeast.

Photo 12: BH-23-06 following completion of backfill. Photo taken facing southwest.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-06 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			6

Photo 13: BH-23-07 following completion of backfill. Photo taken facing northeast.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-07 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			**7**

Photo 14: BH-23-08 during advancement. Photo taken facing northeast.

Photo 15: BH-23-08 following completion of backfill. Photo taken facing northeast.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-08 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			8

Photo 16: BH-23-09 during advancement. Photo taken facing northeast.

Photo 17: BH-23-09 following completion of backfill. Photo taken facing southeast.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-09 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			9

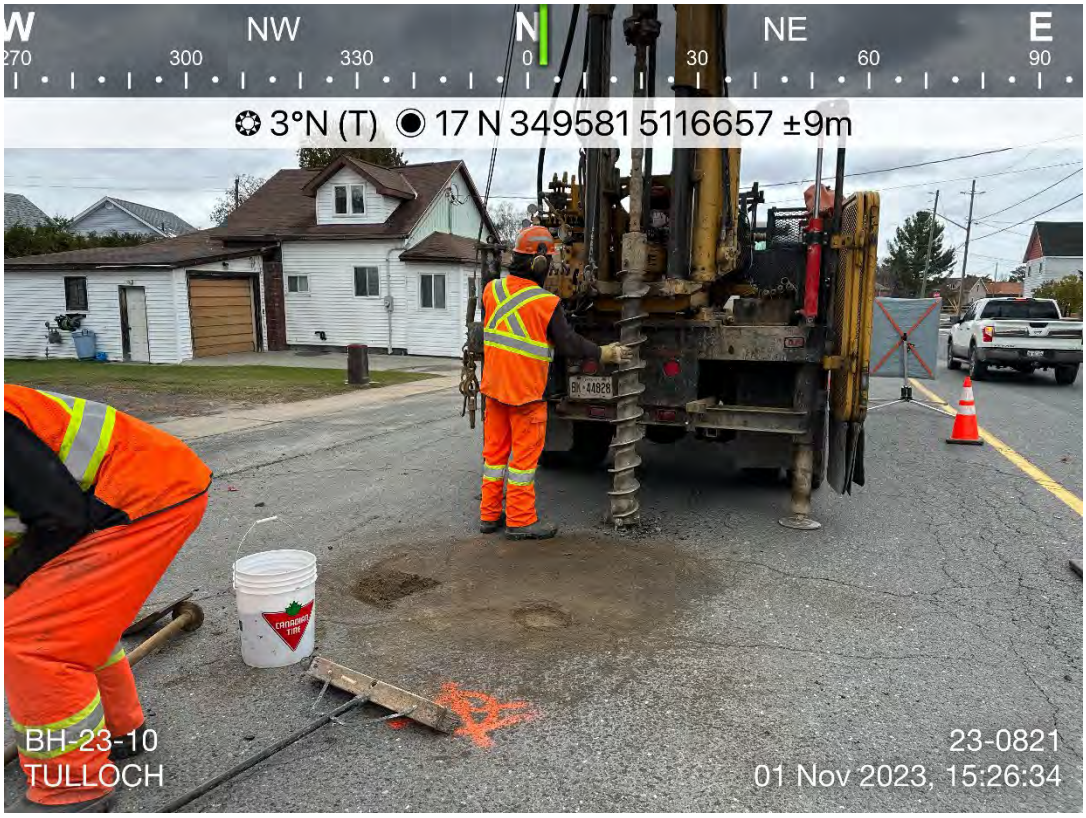


Photo 18: BH-23-10 during advancement. Photo taken facing north.

Photo 19: BH-23-10 following completion of backfill. Photo taken facing northeast.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-10 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			10

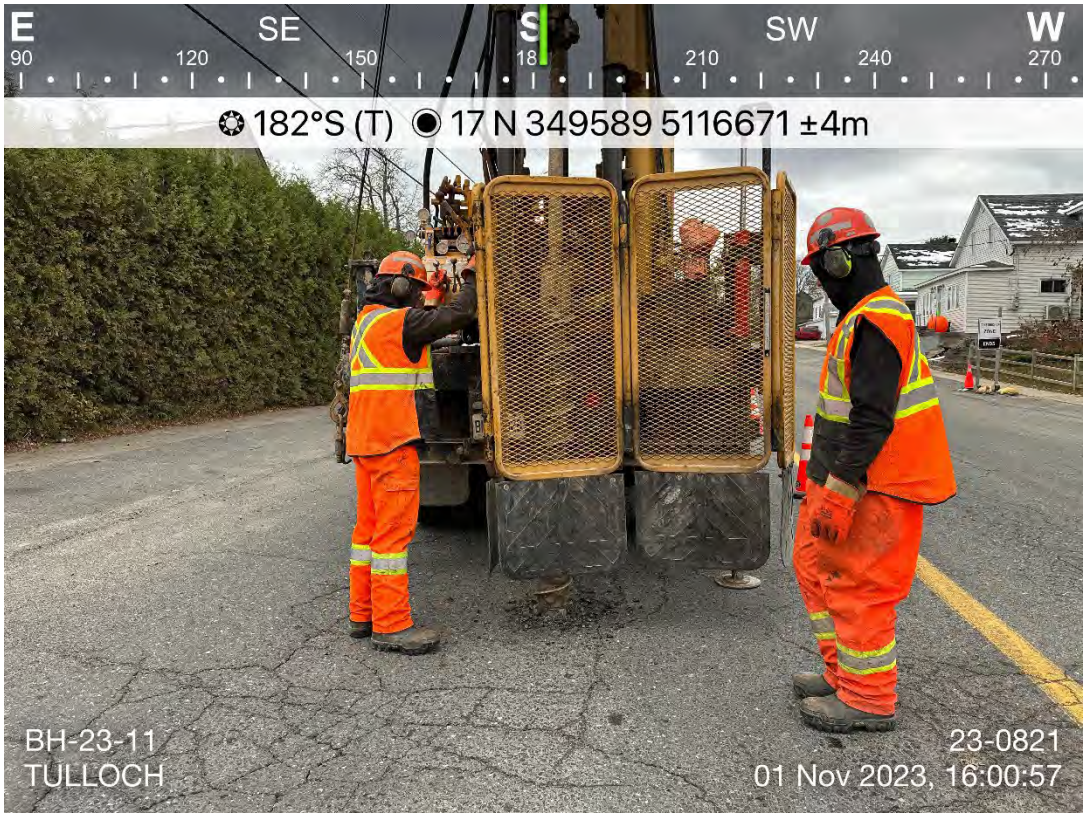


Photo 20: BH-23-11 during advancement. Photo taken facing south.

Photo 21: BH-23-11 following completion of backfill. Photo taken facing south.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-11 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			11

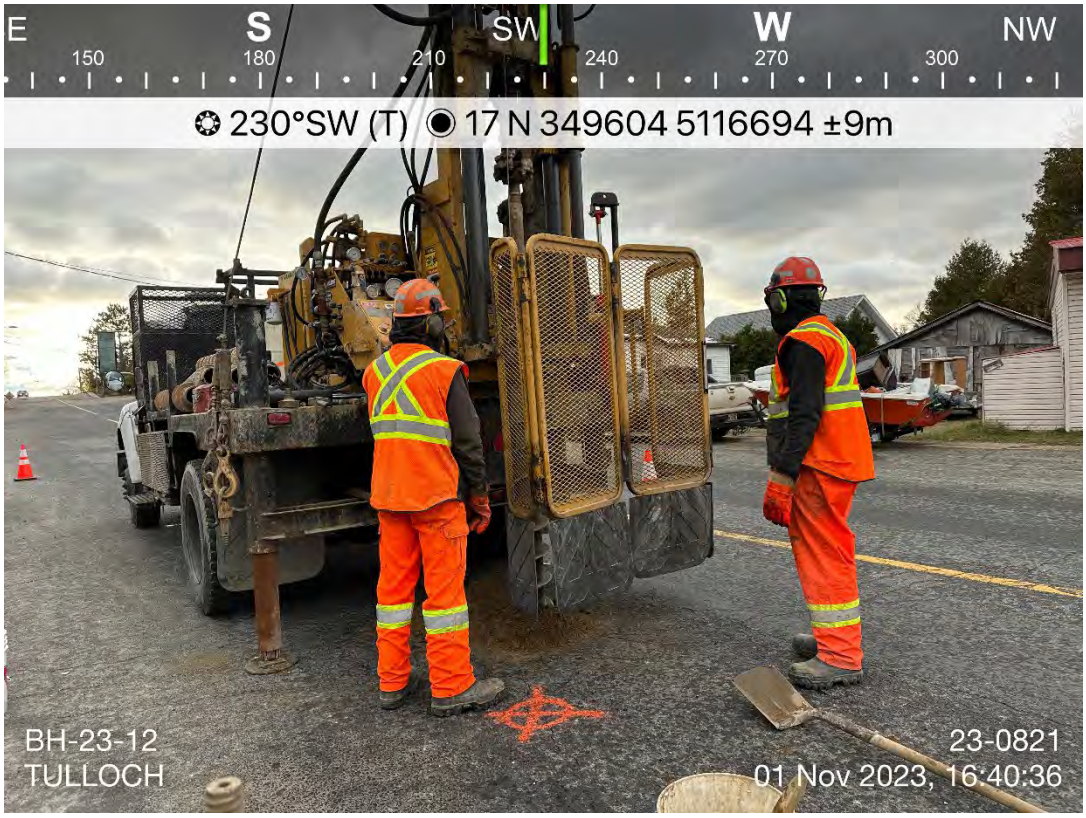


Photo 22: BH-23-12 during advancement. Photo taken facing southwest.

Photo 23: BH-23-12 following completion of backfill. Photo taken facing west.

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-29
PREPARED	LM
DESIGNED	
REVIEWED	JM
APPROVED	EG

TITLE
BH-23-12 Site Photographs

PROJECT NO.	Phase/Task	Rev.	FIGURE
23-0821			12

APPENDIX D

BOREHOLE LOGS

TULLOCH ENGINEERING

RECORD OF ROCKCORE No BH-23-01

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River DATUM 17T BOREHOLE TYPE NW/NQ COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.10.30 NORTHING 5116261 EASTING 349247 CHECKED BY JM

Elev. / Depth	Strat Plot	Description	Depth (m)	Sample No.	Recovery Parameters	RQD % (25 50 75)	Fracture index / ft	Discontinuity Data: Dip Angles W.R.T Core Axis (30 60)	Discontinuity Data: Type and Description (see core log photos)	Compressive Strength (MPa) (50 100 150)	Remarks
178.6											
0.00 178.2		TOPSOIL - with organics and rootlets, fine to coarse grained sand, some fine to coarse grained gravel, non-plastic, dark brown, non-cohesive, moist - Switched from hollow stem augers to NW casing and NQ core barrel at 0.43 mbgs									
0.43		COBBLES and BOULDERS encountered from 0.39 mbgs to 3.05 mbgs	1	RUN 1							
				RUN 2							
			2	RUN 3							
175.5			3								
3.11		GREYWACKE, dark grey, fine to medium grained, fresh to faintly weathered rock, poor rock quality based on RQD - Good rock quality based on RQD below 3.55 mbgs		RUN 4	TCR= 61% SCR= 45% RQD= 36%		1				
			4	RUN 5	TCR= 98% SCR= 78% RQD= 76%		2 2 1 1				
			5	RUN 6	TCR= 100% SCR= 72% RQD= 52%		2 3 2				
		- Excellent rock quality based on RQD below 6.14 mbgs	6	RUN 7	TCR= 97% SCR= 92% RQD= 95%		1 1			45.8	
171.5			7								
7.12		END OF BOREHOLE Note(s): 1. Groundwater level was unable to be accurately measured following drilling due to injection of water during coring. 2. It should be noted that groundwater may not have stabilized upon completion of the borehole.	8								
			9								

TULLOCH ENGINEERING

Filling		Surface		Type		Aperture	Weathering	
Clean - CL	Clay - Cy	PL	Planar	BD	Bedding	Tight: 0.1 - 0.5mm (T)	FR	Fresh
Iron Stained - Fe	Calcite - Cal	CU	Curved	JN	Joint	Moderately Open:	SW	Slighty
Manganese Stained - Mn	Hematite - Hem	UN	Undulating	FLT	Fault	0.5-2.5mm (MO)	MW	Moderately
Carbonate - C	Pyrite - Py	IR	Irregular	SH	Shear	Open: 2.5-10mm (O)	HW	Highly
Gypsum - G	Serpentine - St			KV	Karstic Void	Very Open: > 10mm (VO)	EW	Extremely
Silty/Clay - SC	Chlorite - Ch							

5. ROCK CORE LOG 230821 ROCK LOGS W ELEVATIONS.GPJ LOG A_RNGN01.GDT 24-2-12

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-02

1 OF 2

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.10.30 NORTHING 5116307 EASTING 349299 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
180.90									20 40 60 80 100	20 40 60	GR SA SI CL
0.00 180.75	TOPSOIL - with organics and rootlets, some medium grained sand, non-plastic, dark brown, non-cohesive, moist, very dense		SS01A	SS	60	54				○	7 77 (16)
0.15	(SP) SAND, fine to medium grained, some fine grained gravel, some non-plastic fines, brown, non-cohesive, moist, very dense		SS01B	SS	60	54					SS01A: HEX = 60 ppm, IBL = 0 ppm SS01B: HEX = 60 ppm, IBL = 0 ppm
180.09	- Switched from hollow stem augers to NW casing and NQ core barrel at 0.81 mbgs										
0.81	END OF SOIL BOREHOLE LOG; see attached RECORD OF ROCKCORE No. BH-23-02										

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}, \times^{3}$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF ROCKCORE No BH-23-02

2 OF 2

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River DATUM 17T BOREHOLE TYPE NW/NQ COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.10.30 NORTHING 5116307 EASTING 349299 CHECKED BY JM

Elev. / Depth	Strat Plot	Description	Depth (m)	Sample No.	Recovery Parameters	RQD % (25 50 75)	Fracture index / ft	Discontinuity Data: Dip Angles W.R.T Core Axis (30 60)	Discontinuity Data: Type and Description (see core log photos)	Compressive Strength (MPa) (50 100 150)	Remarks
180.9 / 0.00		Soil Overburden; Please refer to RECORD OF BOREHOLE No. BH-23-02									
180.1 / 0.81		GREYWACKE, dark grey, fine to medium grained, fresh to faintly weathered rock, fair rock quality based on RQD	1	RUN 1	TCR= 91% SCR= 53% RQD= 57%		3				
			2	RUN 2	TCR= 100% SCR= 52% RQD= 59%		1 2 3 2				
		- Good rock quality based on RQD below 3.0 mbgs	3	RUN 3	TCR= 88% SCR= 84% RQD= 84%		2 2 2				
		- Excellent rock quality based on RQD below 4.19 mbgs	4	RUN 4	TCR= 78% SCR= 78% RQD= 94%		1				
				RUN 5	TCR= 100% SCR= 54% RQD= 62%		1 3			73	
175.8 / 5.12		END OF BOREHOLE Note(s): 1. Groundwater level was unable to be accurately measured following drilling due to injection of water during coring. 2. It should be noted that groundwater may not have stabilized upon completion of the borehole.	5								
			6								
			7								
			8								

TULLOCH ENGINEERING

Filling		Surface		Type		Aperture	Weathering	
Clean - CL	Clay - Cy	PL	Planar	BD	Bedding	Tight: 0.1 - 0.5mm (T)	FR	Fresh
Iron Stained - Fe	Calcite - Cal	CU	Curved	JN	Joint	Moderately Open:	SW	Slighty
Manganese Stained - Mn	Hematite - Hem	UN	Undulating	FLT	Fault	0.5-2.5mm (MO)	MW	Moderately
Carbonate - C	Pyrite - Py	IR	Irregular	SH	Shear	Open: 2.5-10mm (O)	HW	Highly
Gypsum - G	Serpentine - St			KV	Karstic Void	Very Open: > 10mm (VO)	EW	Extremely
Silty/Clay - SC	Chlorite - Ch							

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-03

1 OF 2

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.10.31 NORTHING 5116361 EASTING 349344 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
182.70									GR SA SI CL
0.00 182.55	TOPSOIL - trace organics and rootlets, some fine to coarse grained sand and gravel, non-plastic, dark brown, non-cohesive, moist, compact		SS01A	SS	23	58			SS01A: HEX = 5 ppm, IBL = 3 ppm
0.15	FILL - (SW) Gravelly SAND, fine to coarse grained, trace to some non-plastic fines, dark brown to black, with asphalt debris, non-cohesive, moist to wet, compact to very loose		SS01B	SS	23	58			SS01B: HEX = 15 ppm, IBL = 20 ppm
								182	
			SS02	SS	3	8			SS02: HEX = 0 ppm, IBL = 0 ppm
								181	
			SS03 AS01	SS AS	5	13			SS03: HEX = 0 ppm, IBL = 1 ppm 26 60 (14) AS01: HEX = 15 ppm, IBL = 20 ppm
180.57	- Switched from hollow stem augers to NW casing and NQ core barrel at 2.13 mbgs								
2.13	END OF SOIL BOREHOLE LOG; see attached RECORD OF ROCKCORE No. BH-23-03								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 20 40 60

$200+$: Numbers refer to Field Vane Over Limit $+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF ROCKCORE No BH-23-03

2 OF 2

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River DATUM 17T BOREHOLE TYPE NW/NQ COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.10.31 NORTHING 5116361 EASTING 349344 CHECKED BY JM

Elev. / Depth	Strat Plot	Description	Depth (m)	Sample No.	Recovery Parameters	RQD % (25 50 75)	Fracture index / ft	Discontinuity Data: Dip Angles W.R.T Core Axis (30 60)	Discontinuity Data: Type and Description (see core log photos)	Compressive Strength (MPa) (50 100 150)	Remarks
182.7 / 0.00		Soil Overburden; Please refer to RECORD OF BOREHOLE No. BH-23-03	1								
180.6 / 2.13		GREYWACKE, dark grey, fine to medium grained, faintly to slightly weathered rock, poor rock quality based on RQD	2	RUN 1	TCR= 93% SCR= 48% RQD= 15%		2 1 2				
			3	RUN 2	TCR= 92% SCR= 42% RQD= 36%		4				
			4	RUN 3	TCR= 94% SCR= 29% RQD= 15%		3 1				
			5	RUN 4	TCR= 92% SCR= 40% RQD= 29%		2 2				
			6	RUN 5	TCR= 100% SCR= 33% RQD= 12%		4 5 3				
		- Good rock quality based on RQD below 7.47 mbgs	7	RUN 6	TCR= 100% SCR= 50% RQD= 42%		2 1 2				
173.7 / 8.99		END OF BOREHOLE Note(s): 1. Groundwater level was unable to be accurately measured following drilling due to injection of water during coring. 2. It should be noted that groundwater may not have stabilized upon completion of the borehole.	8	RUN 7	TCR= 100% SCR= 72% RQD= 77%		1			48.3	
			9								
			10								

Filling

Clean - CL	Clay - Cy
Iron Stained - Fe	Calcite - Cal
Manganese Stained - Mn	Hematite - Hem
Carbonate - C	Pyrite - Py
Gypsum - G	Serpentine - St
Silty/Clay - SC	Chlorite - Ch

Surface

PL	Planar
CU	Curved
UN	Undulating
IR	Irregular

Type

BD	Bedding
JN	Joint
FLT	Fault
SH	Shear
KV	Karstic Void

Aperture

Tight: 0.1 - 0.5mm (T)
Moderately Open: 0.5-2.5mm (MO)
Open: 2.5-10mm (O)
Very Open: > 10mm (VO)

Weathering

FR	Fresh
SW	Slighty
MW	Moderately
HW	Highly
EW	Extremely

TULLOCH ENGINEERING

5. ROCK CORE LOG 230821 ROCK LOGS W ELEVATIONS.GPJ LOG A_RNGN01.GDT 24-2-12

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-04

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.10.31 NORTHING 5116373 EASTING 349409 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					GR SA SI CL
182.30											
0.00 / 182.23	ASPHALT - 75 mm										
0.08	FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, dense to very dense		SS01 AS01	SS AS	35	25					SS01: HEX = 0 ppm, IBL = 4 ppm AS01: HEX = 0 ppm, IBL = 0 ppm
										○	28 62 (10)
181.39	- Switched from hollow stem augers to NW casing and NQ core barrel at 0.91 mbgs		SS02	SS	55	25				○	23 71 (6)
0.91	END OF SOIL BOREHOLE LOG; see attached RECORD OF ROCKCORE No. BH-23-04										SS02: HEX = 0 ppm, IBL = 0 ppm

2. SOIL REPORT+REC. (DEPTH) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

200 + : Numbers refer to Field Vane Over Limit

+ 3 , × 3 : Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF ROCKCORE No BH-23-04

2 OF 2

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River DATUM 17T BOREHOLE TYPE NW/NQ COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.10.31 NORTHING 5116373 EASTING 349409 CHECKED BY JM

Elev. / Depth	Strat Plot	Description	Depth (m)	Sample No.	Recovery Parameters	RQD % (25 50 75)	Fracture index / ft	Discontinuity Data: Dip Angles W.R.T Core Axis (30 60)	Discontinuity Data: Type and Description (see core log photos)	Compressive Strength (MPa) (50 100 150)	Remarks
182.3 0.00		Soil Overburden; Please refer to RECORD OF BOREHOLE No. BH-23-04									
181.4 0.91		GREYWACKE, dark grey, fine to medium grained, faintly to slightly weathered rock, very poor to poor rock quality based on RQD	1	RUN 1	TCR= 47% SCR= 14% RQD= 0%						
			2	RUN 2	TCR= 72% SCR= 8% RQD= 0%		3 3				
			3	RUN 3	TCR= 88% SCR= 47% RQD= 29%		5 1				
		- Good rock quality based on RQD below 4.07 mbgs	4	RUN 4	TCR= 92% SCR= 58% RQD= 76%		3 1				
			5	RUN 5	TCR= 94% SCR= 53% RQD= 65%		2 1			135.2	
176.4 5.90		END OF BOREHOLE Note(s): 1. Groundwater level was unable to be accurately measured following drilling due to injection of water during coring. 2. It should be noted that groundwater may not have stabilized upon completion of the borehole.	6 7 8								

TULLOCH ENGINEERING

Filling		Surface		Type		Aperture	Weathering	
Clean - CL	Clay - Cy	PL	Planar	BD	Bedding	Tight: 0.1 - 0.5mm (T)	FR	Fresh
Iron Stained - Fe	Calcite - Cal	CU	Curved	JN	Joint	Moderately Open:	SW	Slighty
Manganese Stained - Mn	Hematite - Hem	UN	Undulating	FLT	Fault	0.5-2.5mm (MO)	MW	Moderately
Carbonate - C	Pyrite - Py	IR	Irregular	SH	Shear	Open: 2.5-10mm (O)	HW	Highly
Gypsum - G	Serpentine - St			KV	Karstic Void	Very Open: > 10mm (VO)	EW	Extremely
Silty/Clay - SC	Chlorite - Ch							

5. ROCK CORE LOG 230821 ROCK LOGS W ELEVATIONS.GPJ LOG A_RNGN01.GDT 24-2-12

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-05

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116455 EASTING 349454 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
189.20											
189.15	ASPHALT - 50mm										
0.05	FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, very dense		1 1	SS AS	83	83		189		○	25 67 (8)
188.74 0.46	Auger and spoon refusal - END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										SS01: HEX = 0 ppm, IBL = 4 ppm - Auger and spoon refusal at 0.46 mbgs - Borehole moved 1m southwest

200 + : Numbers refer to Field Vane Over Limit

+ 3 , × 3 : Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-06

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116484 EASTING 349475 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
190.30											
190.25 / 0.05	ASPHALT - 50mm										
	FILL - (SW) SAND , fine to coarse grained, some fine grained gravel, trace non-plastic fines, brown, non-cohesive, moist, dense to compact		1 1	SS AS	39	75		190			SS01: HEX = 0 ppm, IBL = 0 ppm 17 75 (8) AS01: HEX = 0 ppm, IBL = 0 ppm SS02: HEX = 5 ppm, IBL = 0 ppm
			2	SS	27	53					19 74 (7)
	- Loose below 1.22 mbgs		3	SS	6	29		189			SS03: Spoon refusal encountered at 1.14 mbgs, augered to 1.22 mbgs SS03: HEX = 5 ppm, IBL = 0 ppm
			4	SS	5	58					SS04: HEX = 0 ppm, IBL = 0 ppm
188.01											
2.29	FILL - (SW/GW) SAND and GRAVEL, fine to coarse grained, trace non-plastic fines, brown, wet, very loose		5	SS	2	13		188			44 51 (5) SS05: HEX = 5 ppm, IBL = 0 ppm
187.40											
2.90	END OF BOREHOLE Note(s): - Borehole terminated when crew could not retrieve the spoon following SS05. Crew required to pull augers to retrieve sample and elected to terminate the borehole due to caving and heaving sands. - Heaving sands encountered between 2.74 and 2.90 mbgs - Borehole cave-in at 2.19 mbgs upon removal of augers. - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole.										

200 + : Numbers refer to Field Vane Over Limit +3, ×3: Numbers refer to Sensitivity ○3% STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-07

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116513 EASTING 349498 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
190.40											
190.35 / 0.05	ASPHALT - 50mm FILL - (SP) SAND, fine to medium grained, trace fine gravel, brown, non-cohesive, moist		1	AS				190			SS01: HEX = 0 ppm, IBL = 0 ppm
189.64											
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT; WATER CONTENT (%): 20 40 60

200^{+} : Numbers refer to Field Vane Over Limit $+^{3}, \times^{3}$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-08

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116551 EASTING 349511 CHECKED BY JM

SOIL PROFILE			SAMPLES						DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%)	GR SA SI CL
188.50									20 40 60 80 100	w_P w w_L	
188.45 0.05	ASPHALT - 50mm FILL - (SP) SAND, fine to medium grained, trace fine gravel, dark brown, non-cohesive, moist		1	AS				188			SS01: HEX = 10 ppm, IBL = 0 ppm
187.74											
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

$200+$: Numbers refer to Field Vane Over Limit $+^3, \times^3$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-09

1 OF 1 **METRIC**

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116629 EASTING 349557 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
185.30											
185.25 / 0.05	ASPHALT - 50mm FILL - (SP) Gravelly SAND, fine to medium grained, some non-plastic fines, brown, non-cohesive, moist, dense		1 1	SS AS	39	54		185			SS01: HEX = 15 ppm, IBL = 0 ppm AS01: HEX = 15 ppm, IBL = 0 ppm SS02: HEX = 0 ppm, IBL = 0 ppm
			2	SS	25	29				○ 20 40 60	38 50 (12)
183.85 / 1.45	(SM) SILTY SAND, fine to medium grained, some to trace fine gravel, non-plastic, brownish grey, non-cohesive, moist, very dense		3	SS	72	67		184			SS03: HEX = 0 ppm, IBL = 0 ppm - Auger and spoon refusal at 2.29 mbgs - Borehole moved 1m northeast
			4	SS	121	79		183		○ 20 40 60	7 61 (32) SS04: HEX = 0 ppm, IBL = 0 ppm
182.25											
3.05	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit +3, ×3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-10

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116660 EASTING 349578 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE; 20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
183.70											
183.65 / 0.05	ASPHALT - 50mm										
	FILL - (SP) SAND, fine to medium grained, some to trace fine gravel, greyish brown, with asphalt debris, non-cohesive, moist, very dense		1	SS	22	92				○	SS01: HEX = 0 ppm, IBL = 0 ppm
183.25 / 0.45	- Approximately 50 mm of ashaplt pavement encoutnered at approximately 0.40 mbgs.		1	AS							5 70 22 3
	(SM) SILTY SAND, fine to medium grained, trace fine gravel, non-plastic, greyish brown, non-cohesive, moist, very dense							183			AS01: HEX = 0 ppm, IBL = 0 ppm
			2	SS	12	79					SS02: HEX = 0 ppm, IBL = 0 ppm
182.18											
1.52	END OF BOREHOLE										

Note(s):
- Groundwater was not encountered upon completion of drilling.
- It should be noted that groundwater may not have stabilized upon completion of the borehole.
- Borehole did not cave in upon removal of augers.

200 + : Numbers refer to Field Vane Over Limit +3, ×3: Numbers refer to Sensitivity ○3% STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-11

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116674 EASTING 349592 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)			20 40 60 80 100		GR SA SI CL
183.20											
183.15 0.05	ASPHALT - 50mm FILL - (SP) SAND, fine grained, trace fine gravel, brown, non-cohesive, moist		1	AS				183			SS01: HEX = 0 ppm, IBL = 0 ppm
182.44											
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L

200 + : Numbers refer to Field Vane Over Limit +3, ×3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-12

1 OF 1

METRIC

JOB NUMBER 23-0821 LOCATION Blind River, Ontario ORIGINATED BY LM

CLIENT Town of Blind River Geodetic DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore Drilling DATE 2023.11.01 NORTHING 5116699 EASTING 349607 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)	GROUND WATER CONDITIONS	ELEVATION (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
182.90											
182.85	ASPHALT - 50mm										
0.05	FILL - (SP) SAND, fine grained, trace coarse gravel, light brown, non-cohesive, moist, compact		1	SS	16	83					SS01: HEX = 0 ppm, IBL = 0 ppm
182.14											
0.76	(SM) SILTY SAND, fine grained, non-plastic, greyish brown, non-cohesive, moist, loose		2	SS	5	63		182		○	SS02: HEX = 0 ppm, IBL = 0 ppm 0 65 27 8
			3	SS	8	83		181			SS03: HEX = 0 ppm, IBL = 0 ppm
180.69											
2.21	(ML) SILT and SAND, non-plastic, fine grained sand, trace clay, greyish brown, non-cohesive, moist to wet, loose to very loose		4	SS	9	71				○	SS04: HEX = 0 ppm, IBL = 0 ppm 0 44 54 2
			5	SS	4	71		180			SS05: HEX = 0 ppm, IBL = 0 ppm
								179			
			6	SS	3	58		178		○	SS06: HEX = 0 ppm, IBL = 0 ppm
177.72											
5.18	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole cave-in at 3.81 mbgs upon removal of augers.										

$200+$: Numbers refer to Field Vane Over Limit $+^{3}, \times^{3}$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

3. SOIL REPORT+REC. (ELEVATION) 230821 SOIL LOGS W ELEVATIONS.GPJ ONTARIO MTO.GDT 24-2-13

APPENDIX E

ROCK CORE PHOTOGRAPH LOG

Retrieved Rock Core at Borehole Location

BH-23-01

Run 1 to 6

Top of Bedrock Elevation: 178.6 m

CLIENT	Town of Blind River
PROJECT	Blind River Water Intake Geotechnical Investigation
CONSULTANT	TULLOCH ENGINEERING
YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL
TITLE	Rock Core Photos – BH-23-01

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**1**

Photos of Bedrock Core – Discontinuity Logging

BH-23-01

Run 1 to 6

1

2

3

4

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-01

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**2**

Retrieved Rock Core at Borehole Location

BH-23-01

Run 7

Bottom of Core Elevation: 171.5 m

CLIENT	Town of Blind River
CONSULTANT	TULLOCH ENGINEERING
PROJECT	Blind River Water Intake Geotechnical Investigation
TITLE	Rock Core Photos – BH-23-01

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**3**

Photos of Bedrock Core – Discontinuity Logging

BH-23-01

Run 7

1

2

3

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-01

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**4**

Retrieved Rock Core at Borehole Location

BH-23-02

Run 1 to 3

Top of Bedrock Elevation: 180.90 m

CLIENT	Town of Blind River
PROJECT	Blind River Water Intake Geotechnical Investigation
CONSULTANT	TULLOCH ENGINEERING
YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL
TITLE	Rock Core Photos – BH-23-02

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**5**

Photos of Bedrock Core – Discontinuity Logging

BH-23-02

Run 1 to 3

1

2

3

4

CLIENT	Town of Blind River
PROJECT	Blind River Water Intake Geotechnical Investigation
CONSULTANT	TULLOCH ENGINEERING
YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL
TITLE	Rock Core Photos – BH-23-02

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**6**

Retrieved Rock Core at Borehole Location

BH-23-02

Run 4 to 5

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-02

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**7**

Photos of Bedrock Core – Discontinuity Logging

BH-23-02

Run 4 to 5

1

2

3

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-02

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**8**

Retrieved Rock Core at Borehole Location

BH-23-03

Run 1 to 4

Top of Bedrock Elevation: 182.70 m

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-03

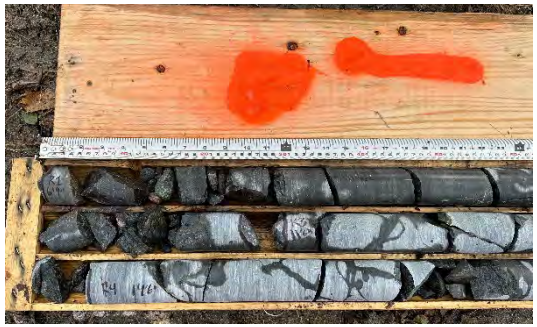
PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**9**

Photos of Bedrock Core – Discontinuity Logging

BH-23-03

Run 1 to 4

1



2

3

4

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-03

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**10**

Retrieved Rock Core at Borehole Location

BH-23-03

Run 4 to 6

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-03

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**11**

Photos of Bedrock Core – Discontinuity Logging

BH-23-03

Run 4 to 6

1

2

3

4

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-03

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**12**

Retrieved Rock Core at Borehole Location

BH-23-03

Run 7

Bottom of Core Elevation: 175.8 m

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-03

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**13**

Photos of Bedrock Core – Discontinuity Logging

BH-23-03

Run 7

1

2

3

4

CLIENT	Town of Blind River
CONSULTANT	TULLOCH ENGINEERING
YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL
PROJECT	Blind River Water Intake Geotechnical Investigation
TITLE	Rock Core Photos – BH-23-03

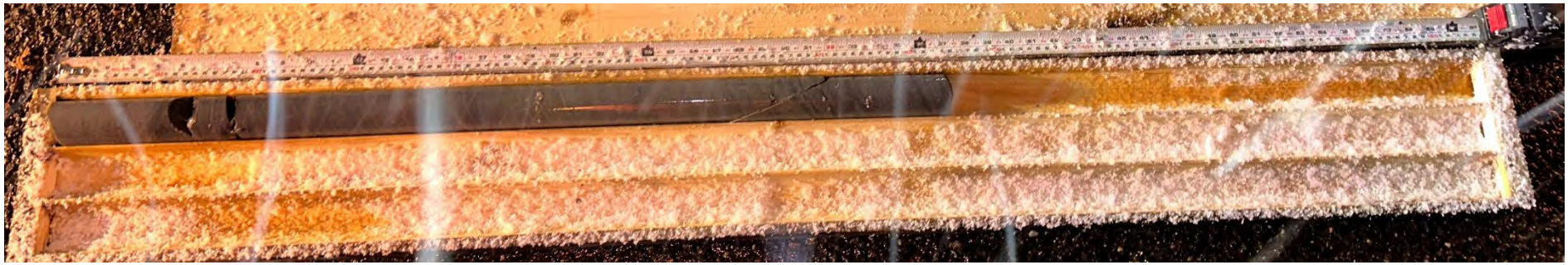
PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**14**

Retrieved Rock Core at Borehole Location

BH-23-04

Run 1 to 5

Top of Bedrock Elevation: 182.30 m



Bottom of Core Elevation: 176.4 m

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-04

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**15**

Photos of Bedrock Core – Discontinuity Logging

BH-23-04

Run 1 to 5

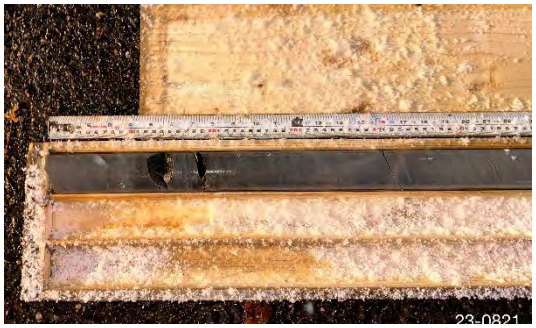
1

2

3

4

5



6

CLIENT
Town of Blind River

PROJECT
Blind River Water Intake Geotechnical Investigation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-02-13
PREPARED	AU
DESIGN	AU
REVIEW	JM
APPROVED	GL

TITLE
Rock Core Photos – BH-23-04

PROJECT No.	Phase / Task	Rev.	Figure
23-0821	**103**	**0**	**16**

APPENDIX F

LABORATORY RESULTS

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-10-31

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-02 SS01A	0.0 to 0.2	357.62	335.96	212.55	21.66	17.6%

REMARKS:

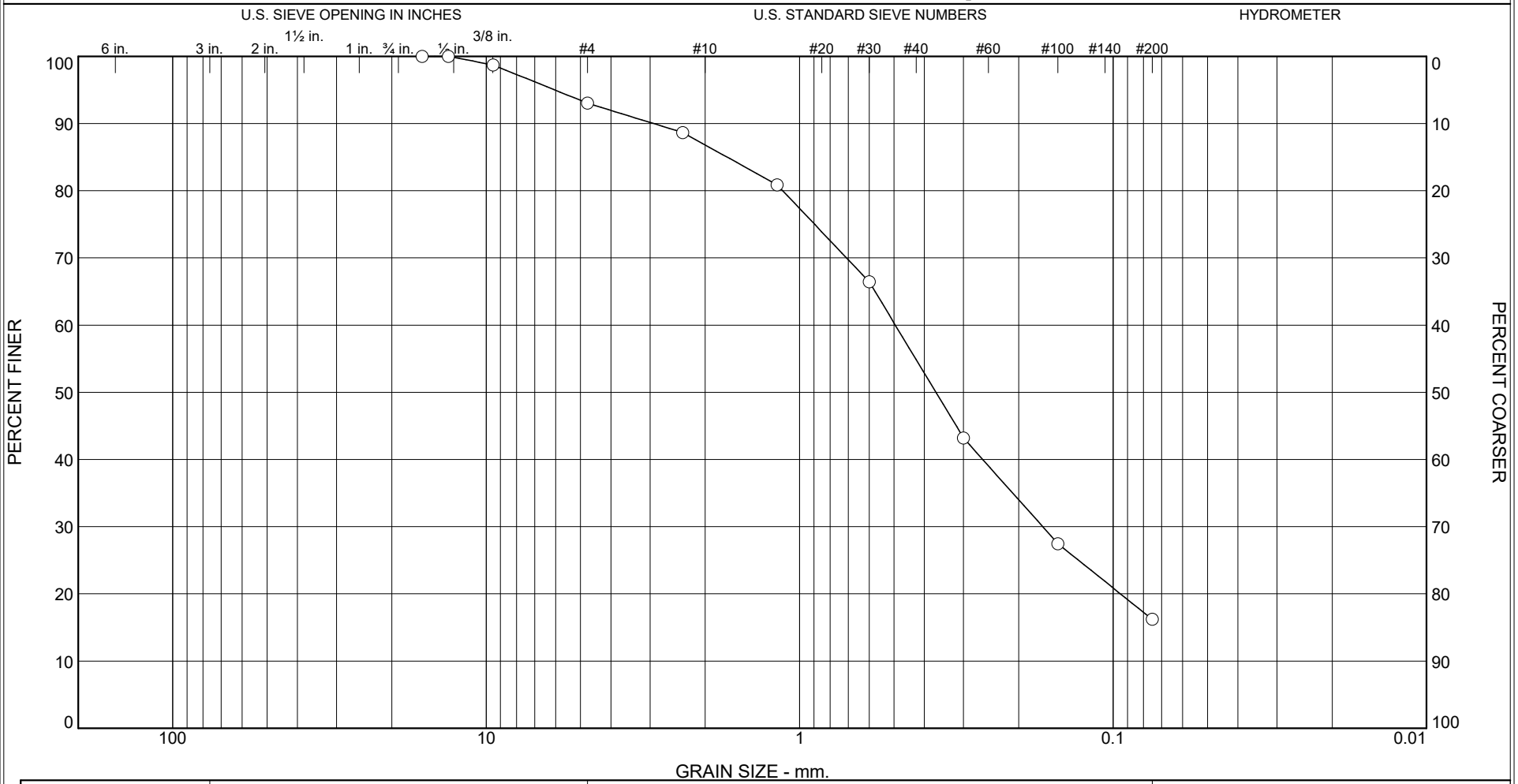
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	Silt
○	0.0	0.0	7.0	6.2	31.9	38.7	16.2

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-02 Sample Number: SS1A	Oct 31, 2023		Nov 24, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-02
Sample Number: SS1A
Date Sampled: Oct 31, 2023 **Date Tested:** Nov 24, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
336.00	212.60	16mm	0.00	0.00	100.0	0.0
		13.2mm	0.00	0.00	100.0	0.0
		9.5mm	1.60	0.00	98.7	1.3
		#4	7.00	0.00	93.0	7.0
		#8	5.40	0.00	88.7	11.3
		#16	9.60	0.00	80.9	19.1
		#30	17.80	0.00	66.5	33.5
		#50	28.70	0.00	43.2	56.8
		#100	19.40	0.00	27.5	72.5
		#200	13.90	0.00	16.2	83.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.0	7.0	6.2	31.9	38.7	76.8			16.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0947	0.1677	0.2606	0.3675	0.4951	1.1326	1.7041	2.9262	6.0422

Fineness Modulus
2.02

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-10-31

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-03 SS01A	0.2 to 0.6	689.53	658.03	271.80	31.5	8.2%
	BH23-03 SS02	0.8 to 1.4	101.57	87.06	13.78	14.51	19.8%
	BH23-03 SS03	1.5 to 2.1	398.06	361.89	241.85	36.17	30.1%

REMARKS:

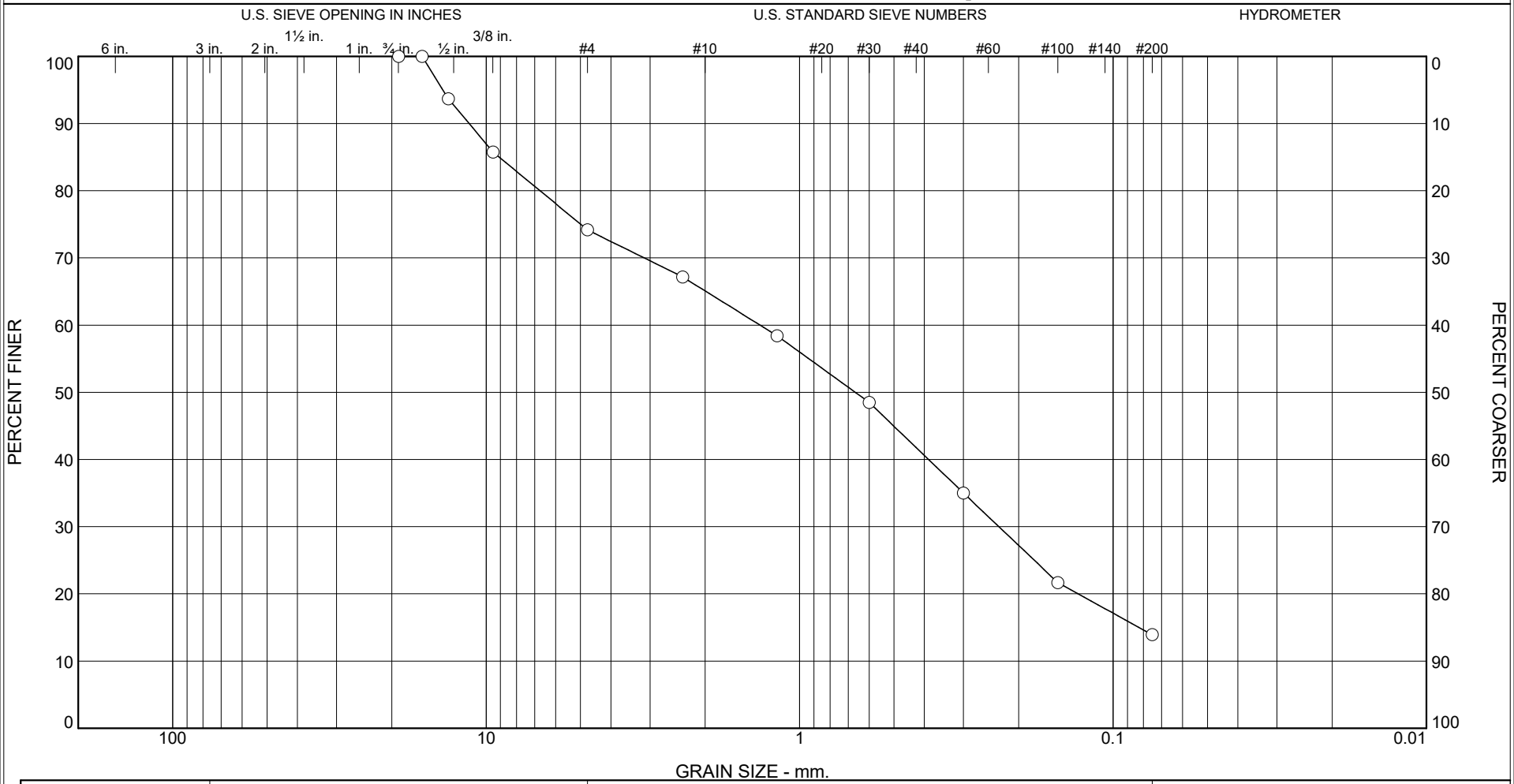
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
0.0	0.0	25.8	9.1	23.3	27.9	13.9

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-03 Depth: 1.5m - 2.1m Sample Number: SS03	Oct 31, 2023		Nov 21, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-03
Depth: 1.5m - 2.1m **Sample Number:** SS03
Date Sampled: Oct 31, 2023 **Date Tested:** Nov 21, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
361.90	241.90	19mm	0.00	0.00	100.0	0.0
		16mm	0.00	0.00	100.0	0.0
		13.2mm	7.60	0.00	93.7	6.3
		9.5mm	9.50	0.00	85.8	14.2
		#4	13.90	0.00	74.2	25.8
		#8	8.40	0.00	67.2	32.8
		#16	10.50	0.00	58.4	41.6
		#30	11.90	0.00	48.5	51.5
		#50	16.20	0.00	35.0	65.0
		#100	16.00	0.00	21.7	78.3
		#200	9.30	0.00	13.9	86.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	25.8	25.8	9.1	23.3	27.9	60.3			13.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0826	0.1292	0.2313	0.3878	0.6646	1.3377	6.7343	9.0831	11.3347	13.7456

Fineness Modulus
3.09

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-10-31

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-04-SS01	0.2 to 0.8	658.70	634.46	217.58	24.24	5.8%
	BH23-04-SS02	0.8 to 1.4	510.36	486.26	219.53	24.1	9.0%

REMARKS:

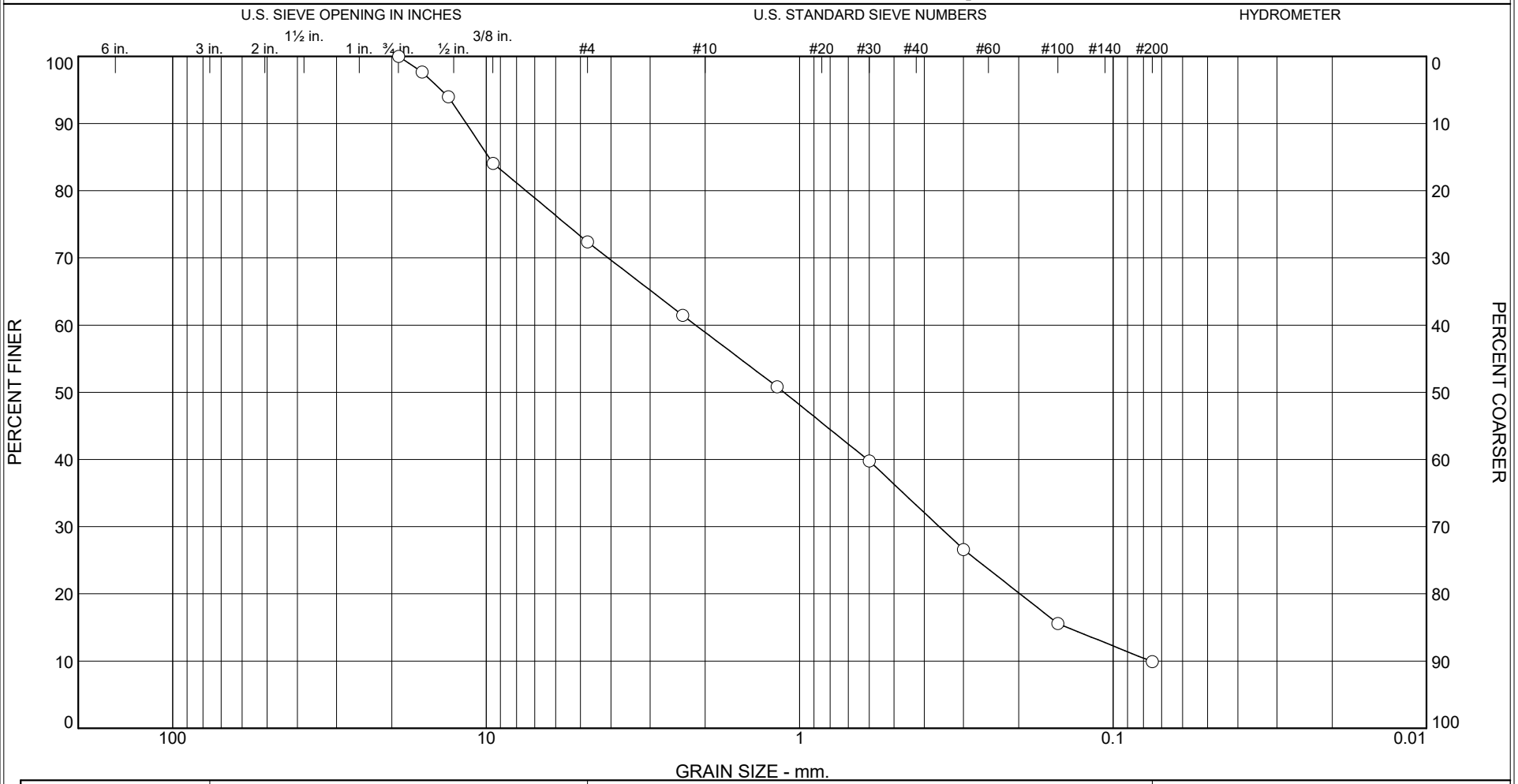
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
0.0	0.0	27.6	13.5	25.7	23.3	9.9

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-04 Depth: 0.2m - 0.8m Sample Number: SS1	Oct 31, 2023		Nov 22, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-04
Depth: 0.2m - 0.8m **Sample Number:** SS1
Date Sampled: Oct 31, 2023 **Date Tested:** Nov 22, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
634.50	217.60	19mm	0.00	0.00	100.0	0.0
		16mm	9.80	0.00	97.6	2.4
		13.2mm	15.30	0.00	94.0	6.0
		9.5mm	41.30	0.00	84.1	15.9
		#4	48.80	0.00	72.4	27.6
		#8	45.50	0.00	61.5	38.5
		#16	44.30	0.00	50.8	49.2
		#30	46.00	0.00	39.8	60.2
		#50	55.00	0.00	26.6	73.4
		#100	46.00	0.00	15.6	84.4
		#200	23.60	0.00	9.9	90.1

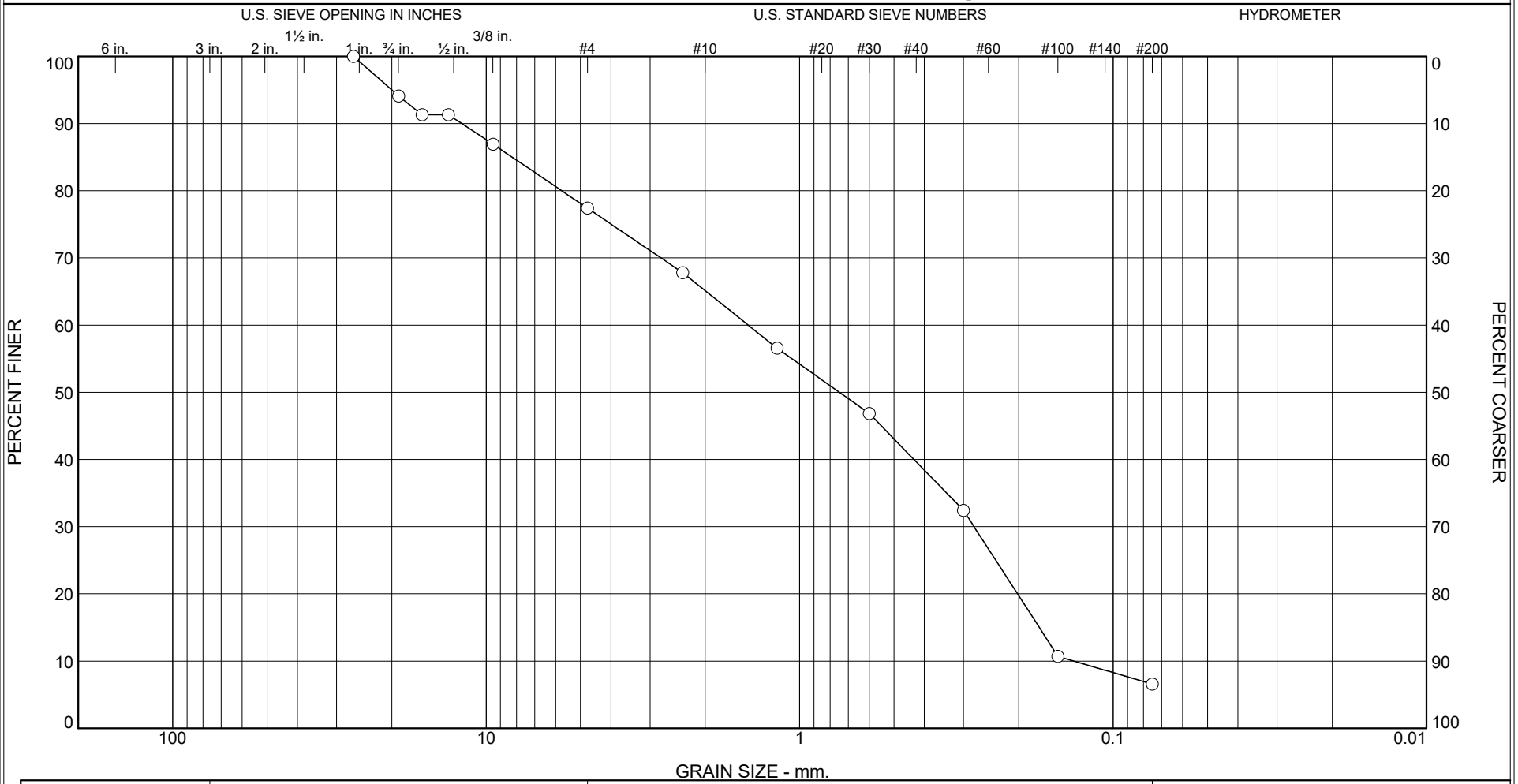
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	27.6	27.6	13.5	25.7	23.3	62.5			9.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0759	0.1399	0.1982	0.3587	0.6076	1.1216	2.1465	7.4641	9.7970	11.5662	13.9254

Fineness Modulus	C_u	C_c
3.49	28.29	0.79

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	Silt
○	0.0	5.9	16.7	12.3	25.4	33.1	6.6

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-04 Depth: 0.8m - 1.4m Sample Number: SS2	Oct 31, 2023		Nov 23, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-04
Depth: 0.8m - 1.4m **Sample Number:** SS2
Date Sampled: Oct 31, 2023 **Date Tested:** Nov 23, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
486.30	219.50	26.5mm	0.00	0.00	100.0	0.0
		19mm	15.80	0.00	94.1	5.9
		16mm	7.40	0.00	91.3	8.7
		13.2mm	0.00	0.00	91.3	8.7
		9.5mm	11.70	0.00	86.9	13.1
		#4	25.40	0.00	77.4	22.6
		#8	25.60	0.00	67.8	32.2
		#16	30.00	0.00	56.6	43.4
		#30	25.90	0.00	46.9	53.1
		#50	38.50	0.00	32.4	67.6
		#100	57.90	0.00	10.7	89.3
		#200	11.10	0.00	6.6	93.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	5.9	16.7	22.6	12.3	25.4	33.1	70.8			6.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1331	0.1720	0.2018	0.2777	0.4317	0.7472	1.4588	5.7404	8.2612	11.9698	20.0102

Fineness Modulus	C_u	C_c
3.27	10.96	0.40

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-11-01

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-05-SS01	0.2 to 0.5	869.91	820.24	214.53	49.67	8.2%

REMARKS:

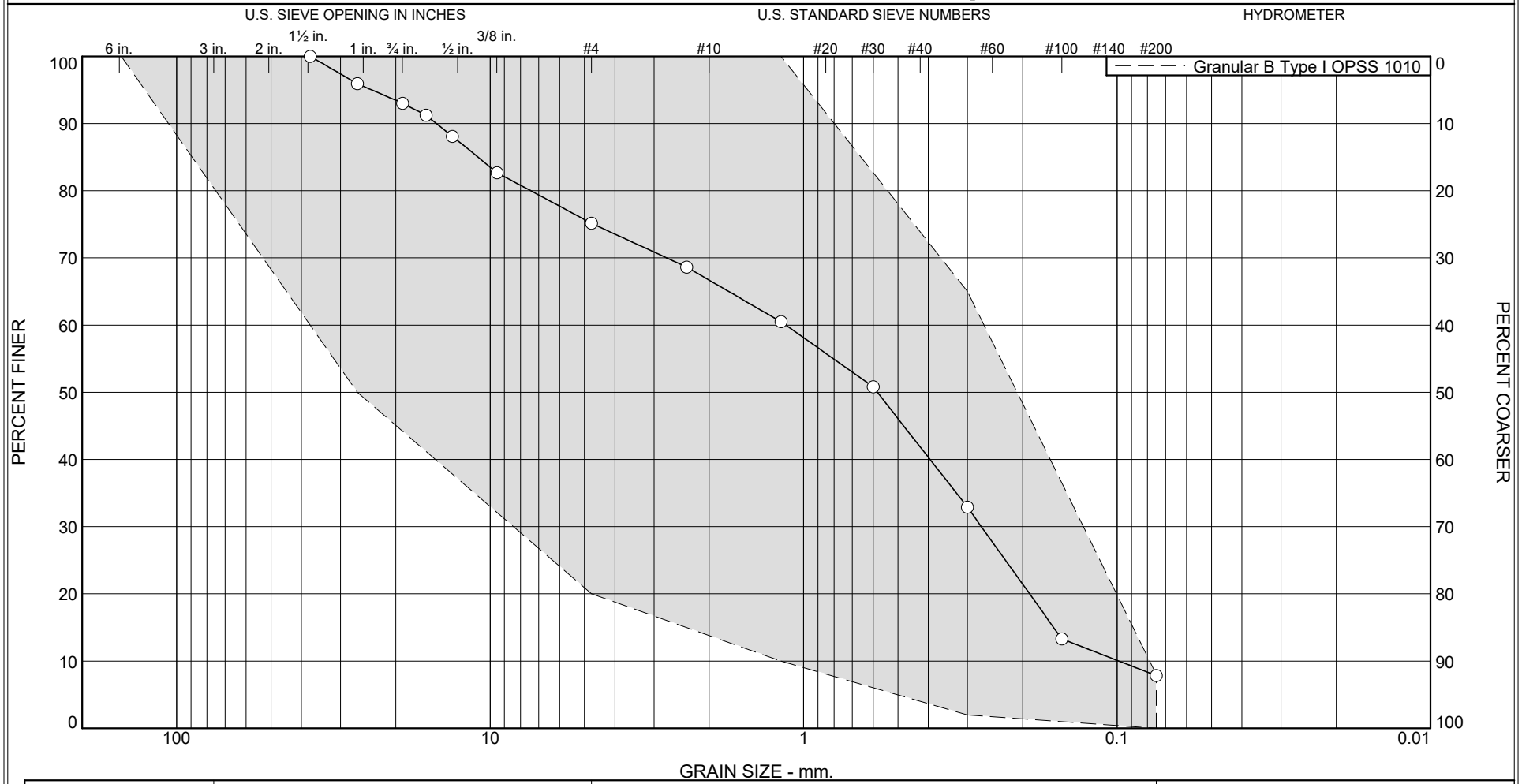
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	Silt
○	0.0	7.0	17.8	8.5	24.8	34.1	7.8

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-05 Depth: 0.2m - 0.5m Sample Number: SS1	Nov 1, 2023		Nov 21, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-05
Depth: 0.2m - 0.5m **Sample Number:** SS1
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 21, 2023
Tested by: S. Campbell **Checked by:** T. Linley
Material specification: Granular B Type I OPSS 1010

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
820.20	214.50	37.5mm	0.00	0.00	100.0	0.0			
		26.5mm	24.70	0.00	95.9	4.1	50.0	100.0	
		19mm	17.70	0.00	93.0	7.0			
		16mm	10.70	0.00	91.2	8.8			
		13.2mm	19.00	0.00	88.1	11.9			
		9.5mm	32.80	0.00	82.7	17.3			
		#4	45.60	0.00	75.2	24.8	20.0	100.0	
		#8	39.50	0.00	68.6	31.4			
		#16	49.30	0.00	60.5	39.5	10.0	100.0	
		#30	58.70	0.00	50.8	49.2			
		#50	108.50	0.00	32.9	67.1	2.0	65.0	
		#100	118.70	0.00	13.3	86.7			
		#200	33.00	0.00	7.8	92.2	0.0	8.0	

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	7.0	17.8	24.8	8.5	24.8	34.1	67.4			7.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0987	0.1594	0.1902	0.2709	0.3950	0.5817	1.1402	7.4219	10.9369	14.8345	23.8591

Fineness Modulus	C_u	C_c
3.23	11.55	0.65

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-11-01

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-06-SS01	0.2 to 0.8	1350.76	1265.53	204.26	85.23	8.0%
	BH23-06-AS01	0.2 to 0.8	93.89	91.84	13.78	2.05	2.6%
	BH23-06-SS02	0.8 to 1.2	500.91	487.46	171.33	13.45	4.3%
	BH23-06-SS03	1.2 to 1.8	135.62	124.26	15.24	11.36	10.4%
	BH23-06-SS05	2.3 to 2.9	413.49	390.51	169.39	22.98	10.4%

REMARKS:

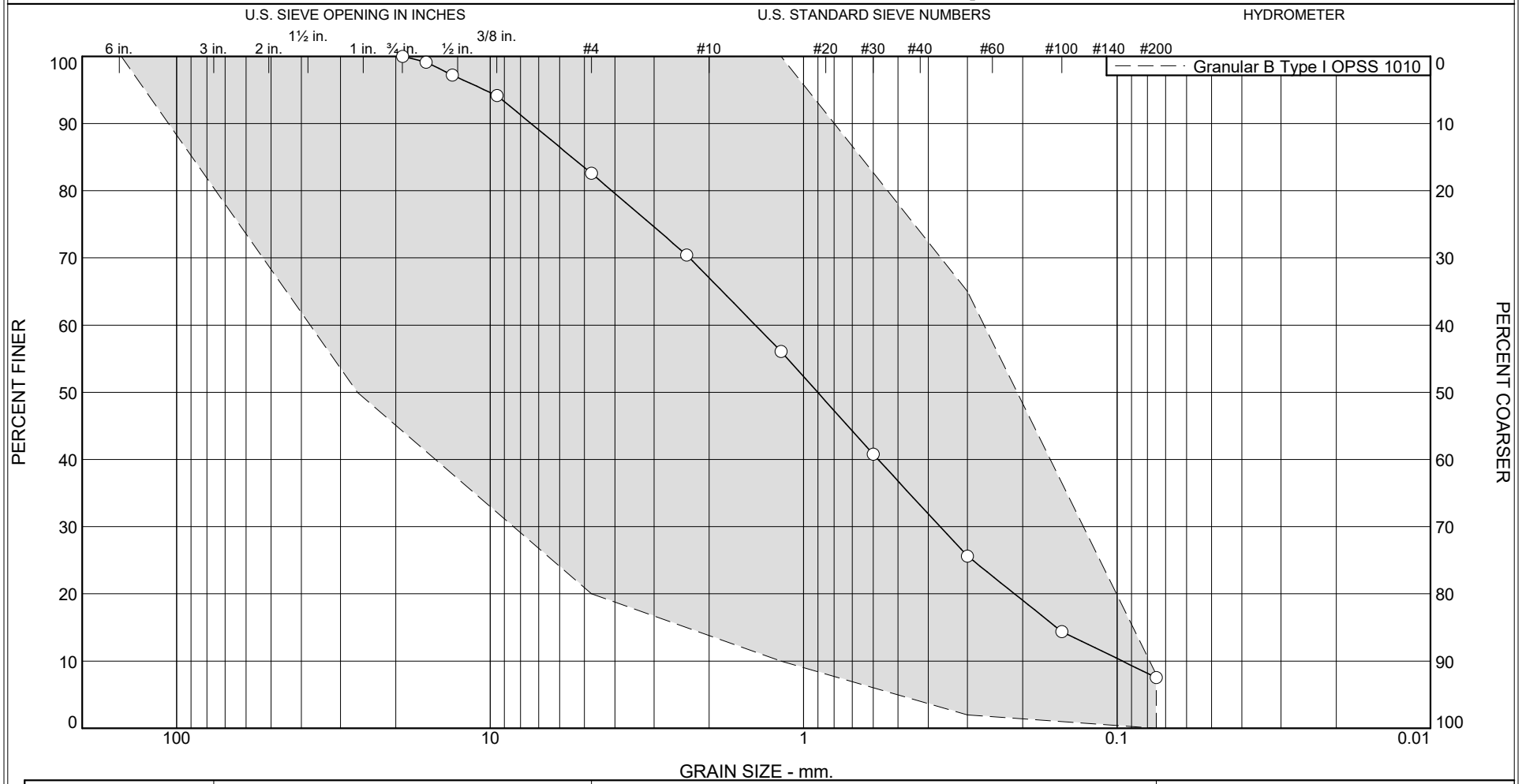
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
0.0	0.0	17.4	15.6	33.8	25.6	7.6

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-06 Depth: 0.2m - 0.8m Sample Number: SS1	Nov 1, 2023		Nov 23, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-06
Depth: 0.2m - 0.8m **Sample Number:** SS1
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 23, 2023
Tested by: S. Campbell **Checked by:** T. Linley
Material specification: Granular B Type I OPSS 1010

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
1265.50	204.30	19mm	0.00	0.00	100.0	0.0			
		16mm	9.30	0.00	99.1	0.9			
		13.2mm	20.30	0.00	97.2	2.8			
		9.5mm	32.40	0.00	94.2	5.8			
		#4	122.80	0.00	82.6	17.4	20.0	100.0	
		#8	128.90	0.00	70.4	29.6			
		#16	152.30	0.00	56.1	43.9	10.0	100.0	
		#30	162.40	0.00	40.8	59.2			
		#50	161.00	0.00	25.6	74.4	2.0	65.0	
		#100	119.30	0.00	14.4	85.6			
		#200	72.30	0.00	7.6	92.4	0.0	8.0	

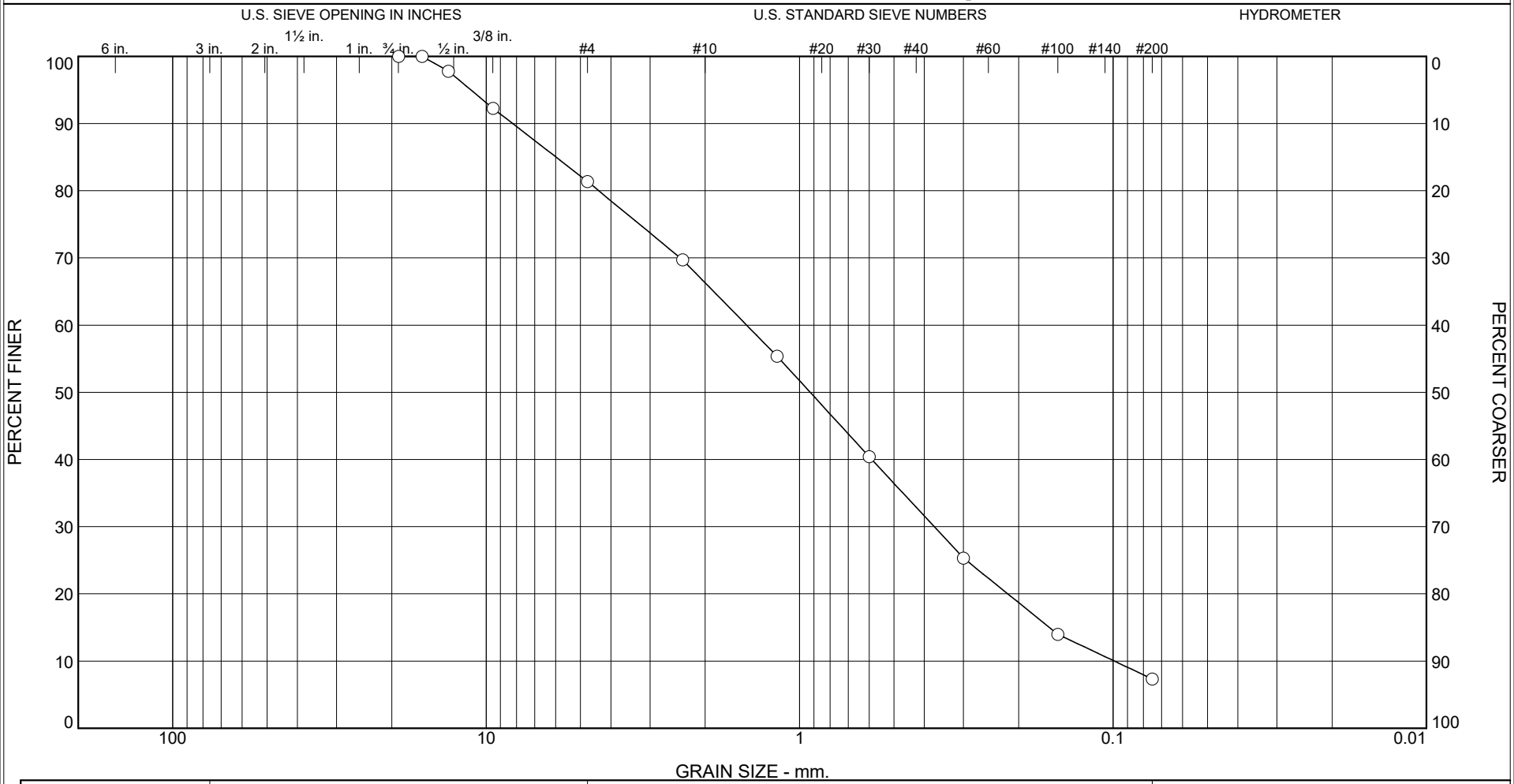
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	17.4	17.4	15.6	33.8	25.6	75.0			7.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0962	0.1559	0.2122	0.3666	0.5789	0.9017	1.4254	4.0928	5.4891	7.4057	10.4025

Fineness Modulus	C_u	C_c
3.16	14.82	0.98

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
0.0	0.0	18.6	15.1	33.4	25.6	7.3

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-06 Depth: 0.8m - 1.2m Sample Number: SS2	Nov 1, 2023		Nov 24, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-06
Depth: 0.8m - 1.2m **Sample Number:** SS2
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 24, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
487.50	171.30	19mm	0.00	0.00	100.0	0.0
		16mm	0.00	0.00	100.0	0.0
		13.2mm	7.00	0.00	97.8	2.2
		9.5mm	17.50	0.00	92.3	7.7
		#4	34.40	0.00	81.4	18.6
		#8	36.90	0.00	69.7	30.3
		#16	45.30	0.00	55.4	44.6
		#30	47.30	0.00	40.4	59.6
		#50	47.70	0.00	25.3	74.7
		#100	35.90	0.00	14.0	86.0
		#200	21.00	0.00	7.3	92.7

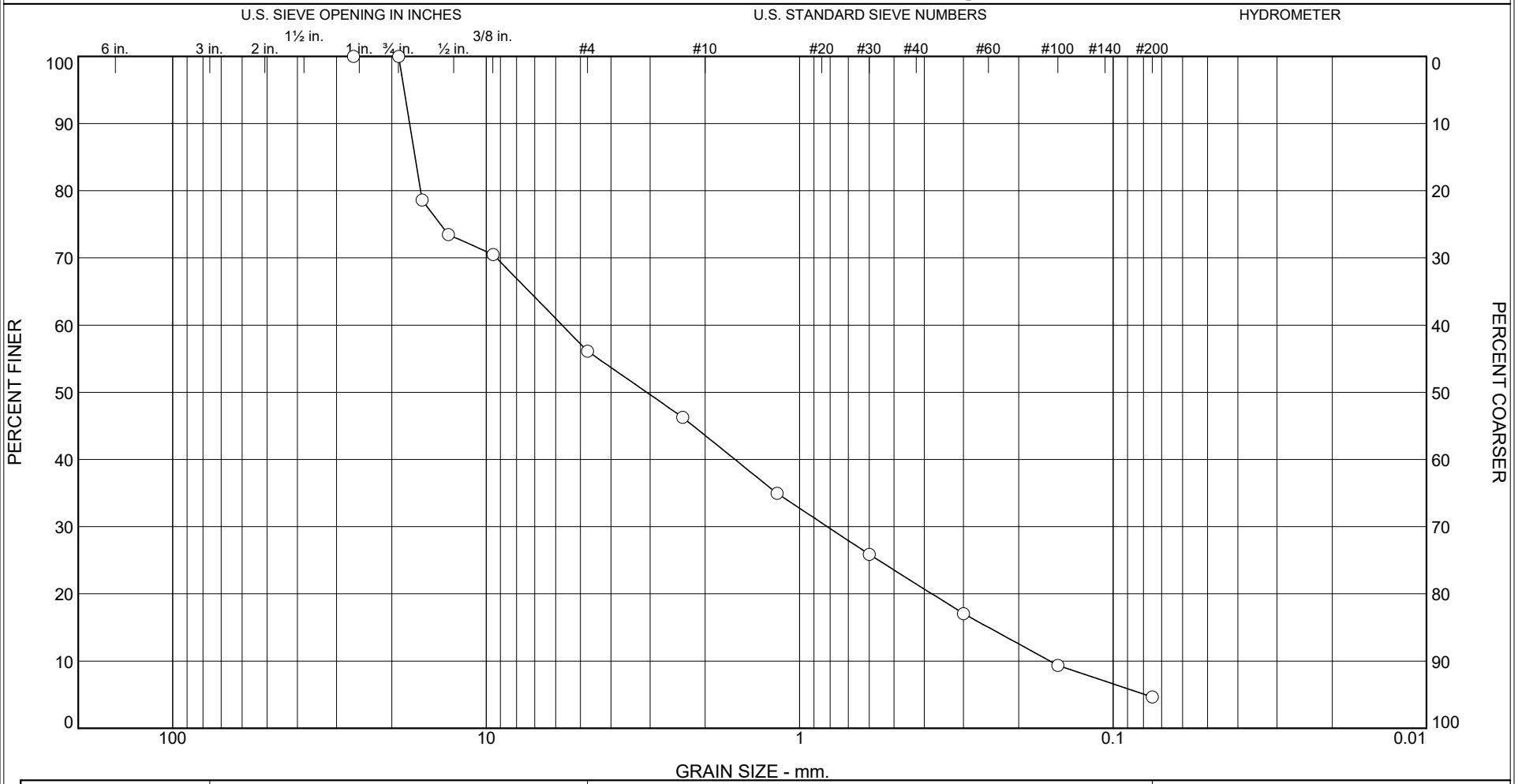
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	18.6	18.6	15.1	33.4	25.6	74.1			7.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0990	0.1597	0.2166	0.3718	0.5886	0.9254	1.4758	4.3749	5.9850	8.2303	11.1856

Fineness Modulus	C_u	C_c
3.22	14.90	0.95

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
0.0	0.0	43.9	12.5	22.1	16.8	4.7

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-06 Depth: 2.3m - 2.9m Sample Number: SS5	Nov 1, 2023		Nov 23, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-06
Depth: 2.3m - 2.9m **Sample Number:** SS5
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 23, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
390.50	169.40	26.5mm	0.00	0.00	100.0	0.0
		19mm	0.00	0.00	100.0	0.0
		16mm	47.30	0.00	78.6	21.4
		13.2mm	11.40	0.00	73.5	26.5
		9.5mm	6.50	0.00	70.5	29.5
		#4	31.80	0.00	56.1	43.9
		#8	21.80	0.00	46.3	53.7
		#16	25.00	0.00	35.0	65.0
		#30	20.10	0.00	25.9	74.1
		#50	19.50	0.00	17.1	82.9
		#100	17.00	0.00	9.4	90.6
		#200	10.40	0.00	4.7	95.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	43.9	43.9	12.5	22.1	16.8	51.4			4.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0789	0.1589	0.2494	0.3782	0.8158	1.6070	3.0752	5.7243	16.1800	16.8431	17.5334	18.2520

Fineness Modulus	C_u	C_c
4.40	36.03	0.73

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-11-01

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-09-SS02	0.8 to 1.4	649.27	630.25	221.93	19.02	4.7%
	BH23-09-SS04	2.3 to 2.9	1595.47	1508.82	349.56	86.65	7.5%

REMARKS:

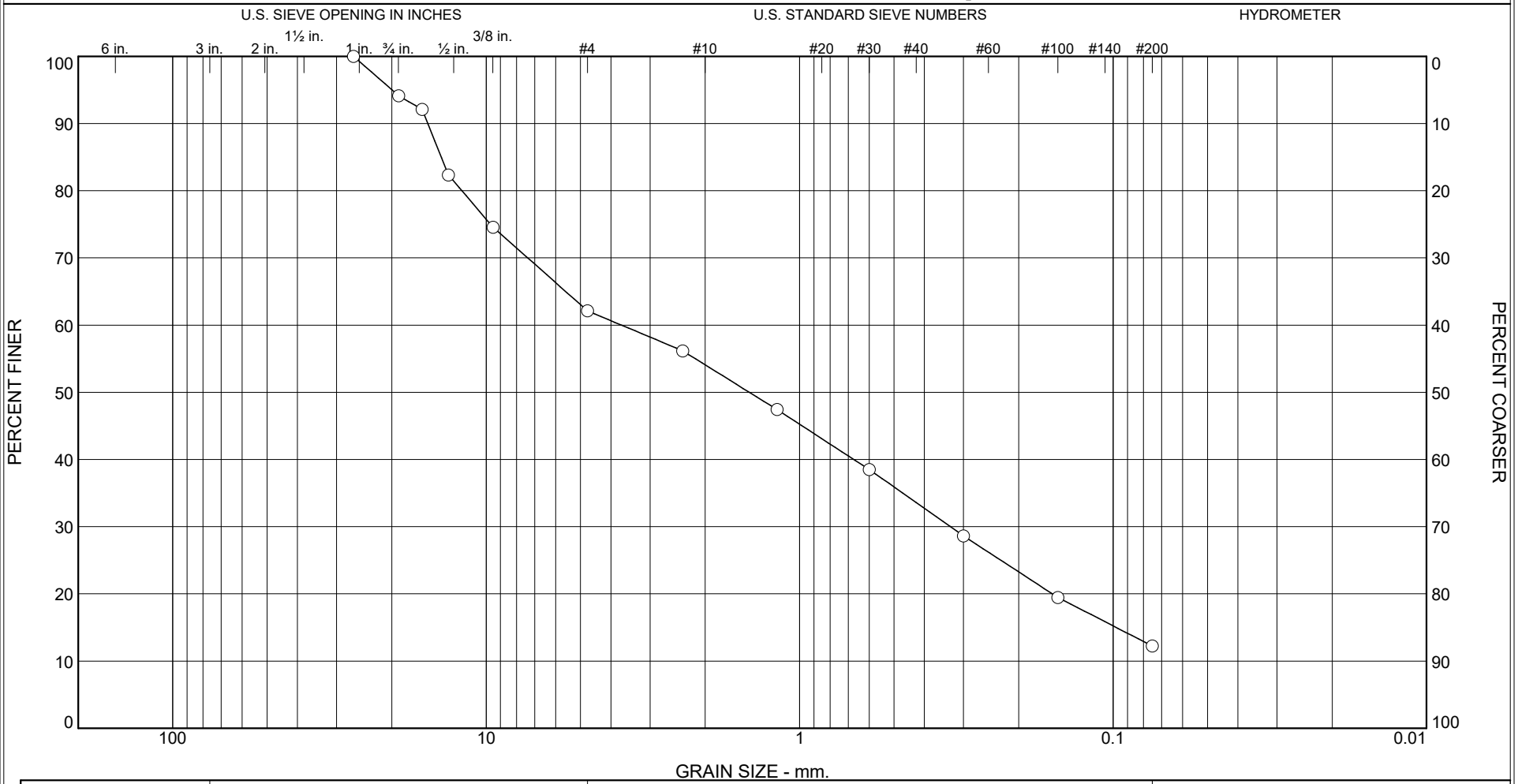
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	Silt
○	0.0	5.8	32.1	8.0	20.5	21.4	12.2

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-09 Depth: 0.8m - 1.4m Sample Number: SS2	Nov 1, 2023		Nov 24, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-09
Depth: 0.8m - 1.4m **Sample Number:** SS2
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 24, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
630.30	221.90	26.5mm	0.00	0.00	100.0	0.0
		19mm	24.00	0.00	94.1	5.9
		16mm	8.20	0.00	92.1	7.9
		13.2mm	39.90	0.00	82.3	17.7
		9.5mm	31.80	0.00	74.6	25.4
		#4	50.80	0.00	62.1	37.9
		#8	24.30	0.00	56.2	43.8
		#16	35.70	0.00	47.4	52.6
		#30	36.40	0.00	38.5	61.5
		#50	40.40	0.00	28.6	71.4
		#100	37.40	0.00	19.5	80.5
		#200	29.50	0.00	12.2	87.8

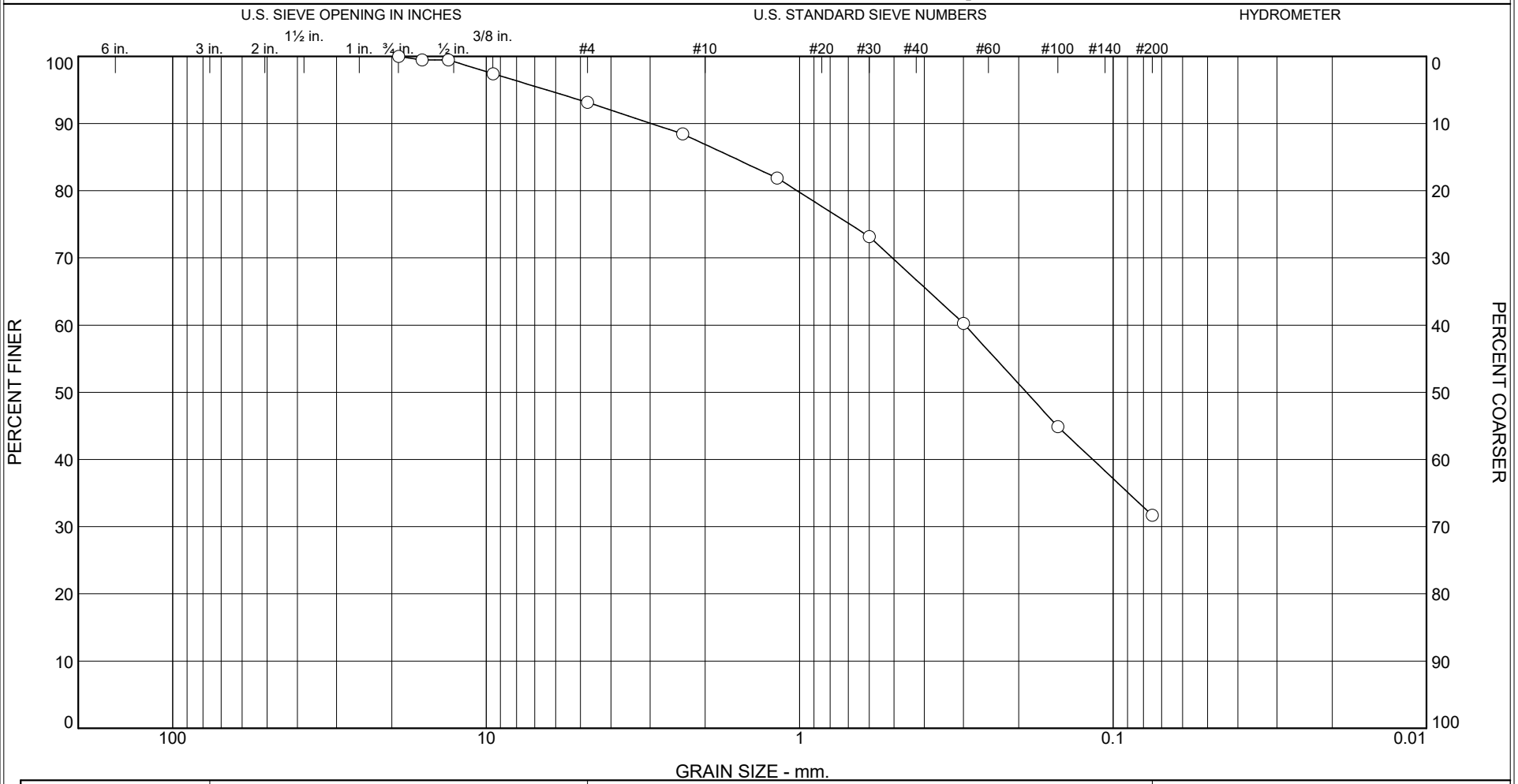
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	5.8	32.1	37.9	8.0	20.5	21.4	49.9			12.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0977	0.1562	0.3304	0.6715	1.4468	3.7020	11.9547	13.9082	15.3472	19.9667

Fineness Modulus
3.79

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	Silt
○	0.0	0.0	6.8	6.3	20.2	35.0	31.7

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-09 Depth: 2.3m - 2.9m Sample Number: SS4	Nov 1, 2023		Nov 24, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** T. Linley

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-28

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-09
Depth: 2.3m - 2.9m **Sample Number:** SS4
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 24, 2023
Tested by: S. Campbell **Checked by:** T. Linley

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
1508.80	349.60	19mm	0.00	0.00	100.0	0.0
		16mm	6.30	0.00	99.5	0.5
		13.2mm	0.00	0.00	99.5	0.5
		9.5mm	23.80	0.00	97.4	2.6
		#4	49.20	0.00	93.2	6.8
		#8	54.70	0.00	88.4	11.6
		#16	75.90	0.00	81.9	18.1
		#30	101.00	0.00	73.2	26.8
		#50	150.00	0.00	60.2	39.8
		#100	178.20	0.00	44.9	55.1
		#200	152.80	0.00	31.7	68.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.8	6.8	6.3	20.2	35.0	61.5			31.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.1161	0.1891	0.2968	1.0188	1.6396	2.9739	6.4160

Fineness Modulus
1.61

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-11-01

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-10-SS01	0.2 to 0.8	1337.19	1259.02	375.09	78.17	8.8%

REMARKS:

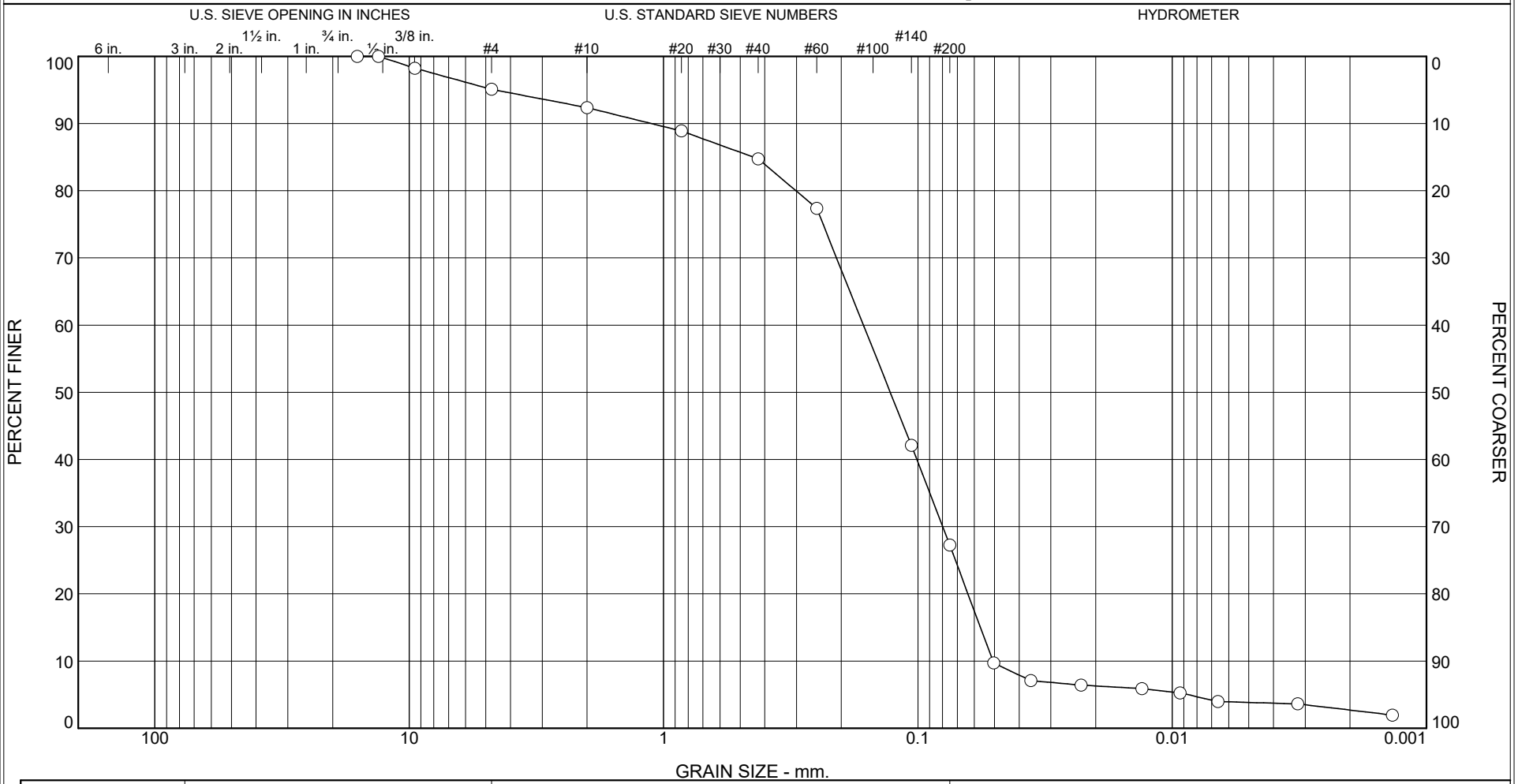
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.9	2.7	7.7	57.4	24.6	2.7

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-10 Depth: 0.2m - 0.8m Sample Number: SS1	Nov 1, 2023		Nov 28, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: T. Linley **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-29

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-10
Depth: 0.2m - 0.8m **Sample Number:** SS1
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 28, 2023
Tested by: T. Linley **Checked by:** D. Stadnisky

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
1259.00	375.10	16mm	0.00	0.00	100.0	0.0
		13.2mm	0.00	0.00	100.0	0.0
		9.5mm.	15.70	0.00	98.2	1.8
		#4	27.70	0.00	95.1	4.9
		#10	24.10	0.00	92.4	7.6
69.10	0.00	#20	2.60	0.00	88.9	11.1
		#40	3.10	0.00	84.7	15.3
		#60	5.50	0.00	77.4	22.6
		#140	26.40	0.00	42.1	57.9
		#200	11.10	0.00	27.3	72.7

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 92.4
Weight of hydrometer sample =69.1
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4
Meniscus correction only = -1.0
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.8	11.0	7.4	0.0131	10.0	14.7	0.0503	9.7	90.3
2.00	21.8	9.0	5.4	0.0131	8.0	15.0	0.0360	7.1	92.9
5.00	21.8	8.5	4.9	0.0131	7.5	15.1	0.0228	6.4	93.6
15.00	22.2	8.0	4.5	0.0131	7.0	15.1	0.0131	5.9	94.1
30.00	22.3	7.5	4.0	0.0131	6.5	15.2	0.0093	5.3	94.7
60.00	22.4	6.5	3.0	0.0131	5.5	15.4	0.0066	4.0	96.0
250.00	23.3	6.0	2.7	0.0129	5.0	15.5	0.0032	3.6	96.4
1440.00	22.3	5.0	1.5	0.0131	4.0	15.6	0.0014	2.0	98.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.9	4.9	2.7	7.7	57.4	67.8	24.6	2.7	27.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0087	0.0506	0.0567	0.0636	0.0799	0.1009	0.1284	0.1638	0.3018	0.4436	1.1177	4.6164

Fineness Modulus	C_u	C_c
1.00	3.23	0.77

TULLOCH ENGINEERING

CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories | Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-0821 DATE SAMPLED: 2023-11-01

PROJECT: Blind River Water Intake SOURCE: Boreholes

DATE TESTED: 2023-11-20 TESTED BY: J.Draper

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH23-12-SS02	0.8 to 1.4	844.34	804.13	230.85	40.21	7.0%
	BH23-12-SS04	2.3 to 2.9	1138.69	1005.07	255.92	133.62	17.8%
	BH23-12-SS06	4.6 to 5.2	97.48	83.44	13.67	14.04	20.1%

REMARKS:

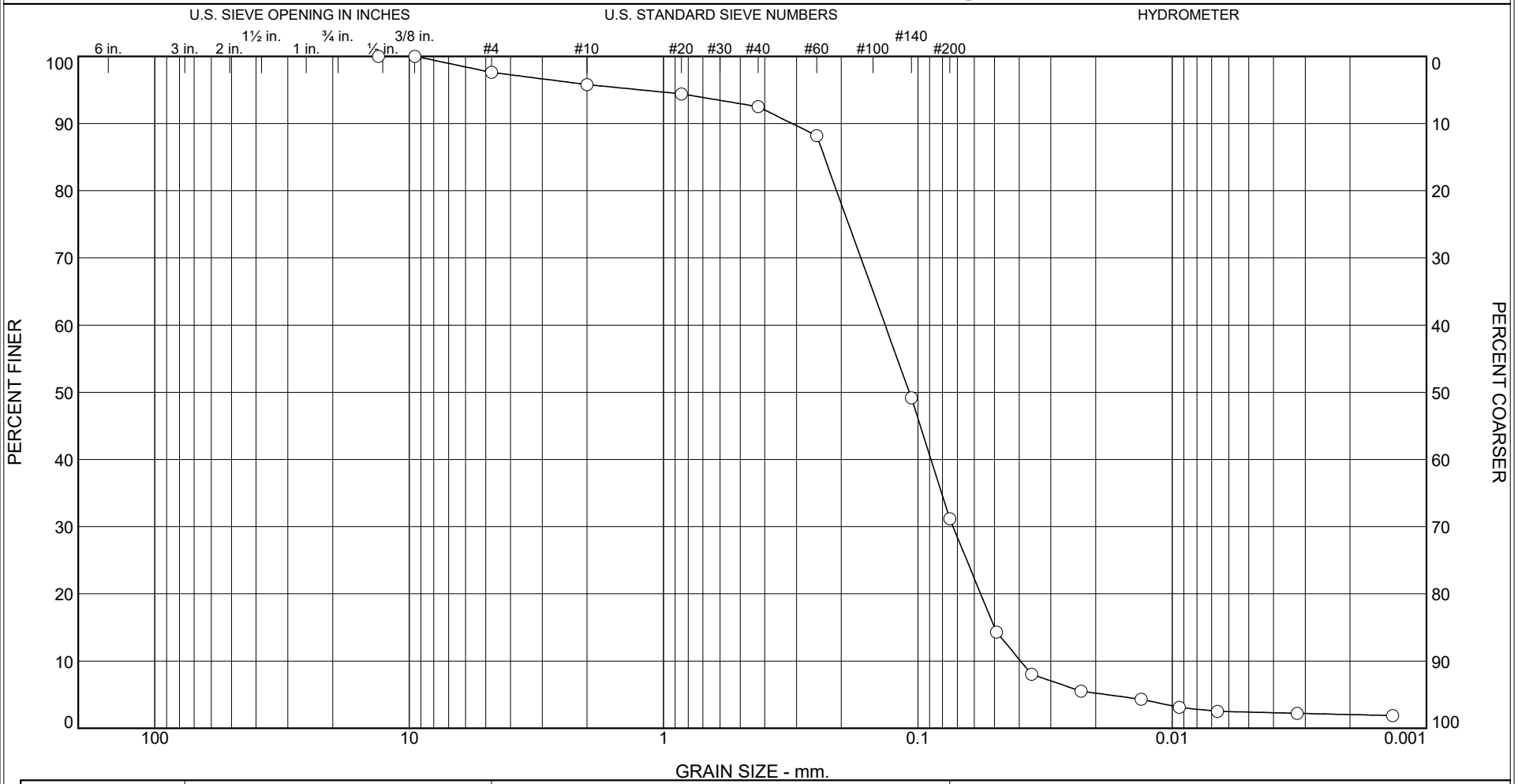
CLIENT: Town of Blind River

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 Fax: (705) 945-5092 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	1.8	3.3	61.3	29.2	2.0

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-12 Depth: 0.8m - 1.4m Sample Number: SS2	Nov 1, 2023		Nov 28, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: T. Linley **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-29

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-12
Depth: 0.8m - 1.4m **Sample Number:** SS2
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 28, 2023
Tested by: T. Linley **Checked by:** D. Stadnisky

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
804.10	230.90	13.2mm	0.00	0.00	100.0	0.0
		9.5mm.	0.00	0.00	100.0	0.0
		#4	13.70	0.00	97.6	2.4
		#10	10.40	0.00	95.8	4.2
75.60	0.00	#20	1.10	0.00	94.4	5.6
		#40	1.50	0.00	92.5	7.5
		#60	3.40	0.00	88.2	11.8
		#140	30.80	0.00	49.2	50.8
		#200	14.20	0.00	31.2	68.8

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 95.8
Weight of hydrometer sample =75.6
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4
Meniscus correction only = -1.0
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.0	15.0	11.4	0.0131	14.0	14.0	0.0491	14.3	85.7
2.00	22.0	10.0	6.4	0.0131	9.0	14.8	0.0357	8.0	92.0
5.00	22.0	8.0	4.4	0.0131	7.0	15.1	0.0228	5.5	94.5
15.00	22.1	7.0	3.4	0.0131	6.0	15.3	0.0132	4.3	95.7
30.00	22.3	6.0	2.5	0.0131	5.0	15.5	0.0094	3.1	96.9
60.00	22.4	5.5	2.0	0.0131	4.5	15.6	0.0066	2.5	97.5
250.00	23.4	5.0	1.8	0.0129	4.0	15.6	0.0032	2.2	97.8
1440.00	22.4	5.0	1.5	0.0131	4.0	15.6	0.0014	1.9	98.1

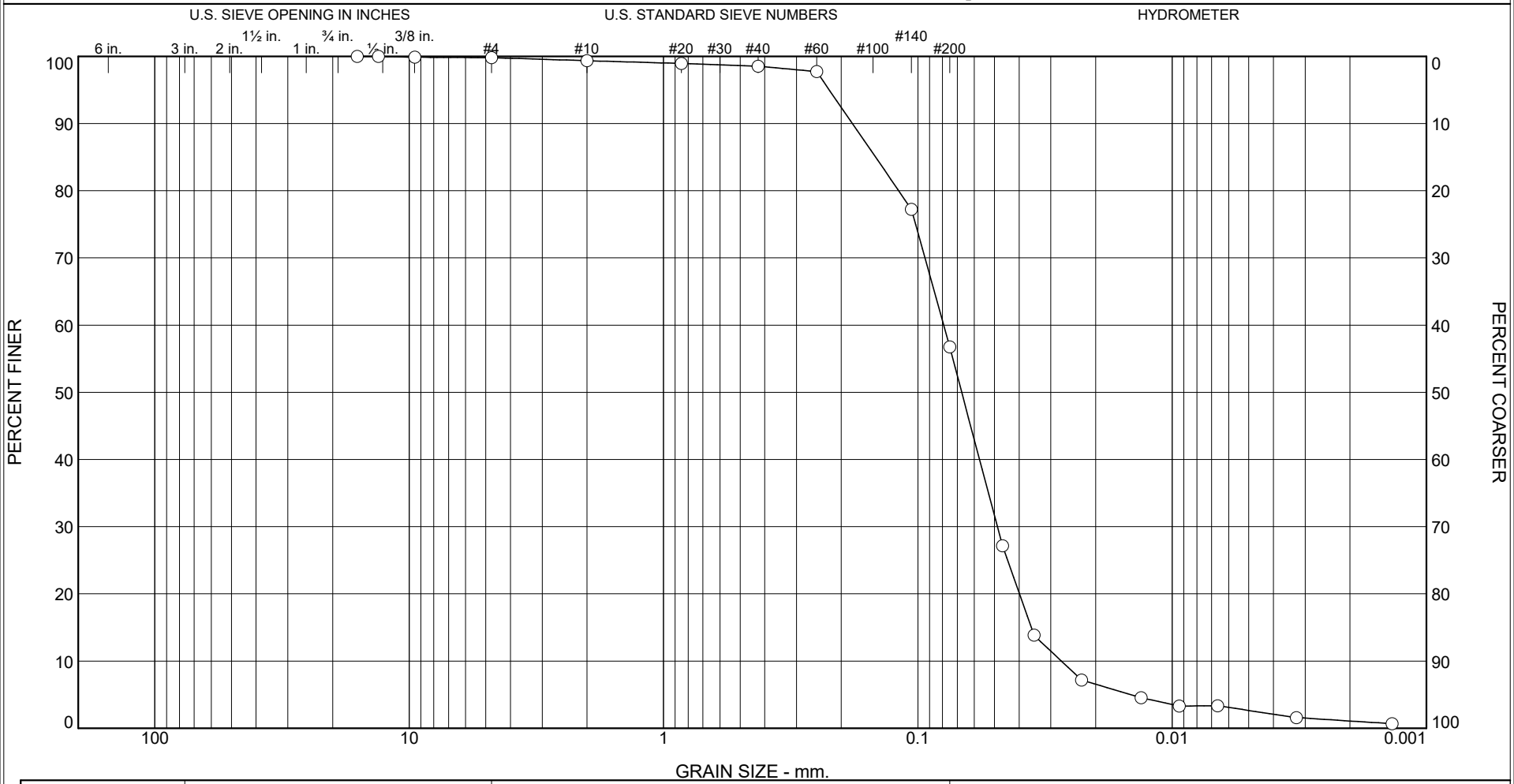
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.4	2.4	1.8	3.3	61.3	66.4	29.2	2.0	31.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0181	0.0395	0.0500	0.0566	0.0728	0.0889	0.1080	0.1345	0.2088	0.2331	0.3123	1.2273

Fineness Modulus	C_u	C_c
0.63	3.41	1.00

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.5	0.8	41.8	55.6	1.1

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-12 Depth: 2.3m - 2.9m Sample Number: SS4	Nov 1, 2023		Nov 28, 2023

Client Town of Blind River

Project Blind River Water Intake

Project No. 23-0821 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: T. Linley **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-29

Client: Town of Blind River
Project: Blind River Water Intake
Project Number: 23-0821
Location: BH-23-12
Depth: 2.3m - 2.9m **Sample Number:** SS4
Date Sampled: Nov 1, 2023 **Date Tested:** Nov 28, 2023
Tested by: T. Linley **Checked by:** D. Stadnisky

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
1005.10	255.90	16mm	0.00	0.00	100.0	0.0
		13.2mm	0.00	0.00	100.0	0.0
		9.5mm.	1.00	0.00	99.9	0.1
		#4	0.50	0.00	99.8	0.2
		#10	3.40	0.00	99.3	0.7
73.70	0.00	#20	0.30	0.00	98.9	1.1
		#40	0.30	0.00	98.5	1.5
		#60	0.60	0.00	97.7	2.3
		#140	15.20	0.00	77.2	22.8
		#200	15.20	0.00	56.7	43.3

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 99.3
Weight of hydrometer sample =73.7
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4
Meniscus correction only = -1.0
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.9	24.0	20.4	0.0131	23.0	12.5	0.0465	27.2	72.8
2.00	21.9	14.0	10.4	0.0131	13.0	14.2	0.0349	13.8	86.2
5.00	21.9	9.0	5.4	0.0131	8.0	15.0	0.0227	7.2	92.8
15.00	22.0	7.0	3.4	0.0131	6.0	15.3	0.0133	4.5	95.5
30.00	22.3	6.0	2.5	0.0131	5.0	15.5	0.0094	3.3	96.7
60.00	22.4	6.0	2.5	0.0131	5.0	15.5	0.0066	3.3	96.7
250.00	23.1	4.5	1.2	0.0129	3.5	15.7	0.0032	1.6	98.4
1440.00	22.4	4.0	0.5	0.0131	3.0	15.8	0.0014	0.7	99.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.5	0.8	41.8	43.1	55.6	1.1	56.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0146	0.0273	0.0358	0.0399	0.0486	0.0572	0.0672	0.0792	0.1190	0.1467	0.1809	0.2230

Fineness Modulus	C_u	C_c
0.20	2.91	1.10

TULLOCH ENGINEERING

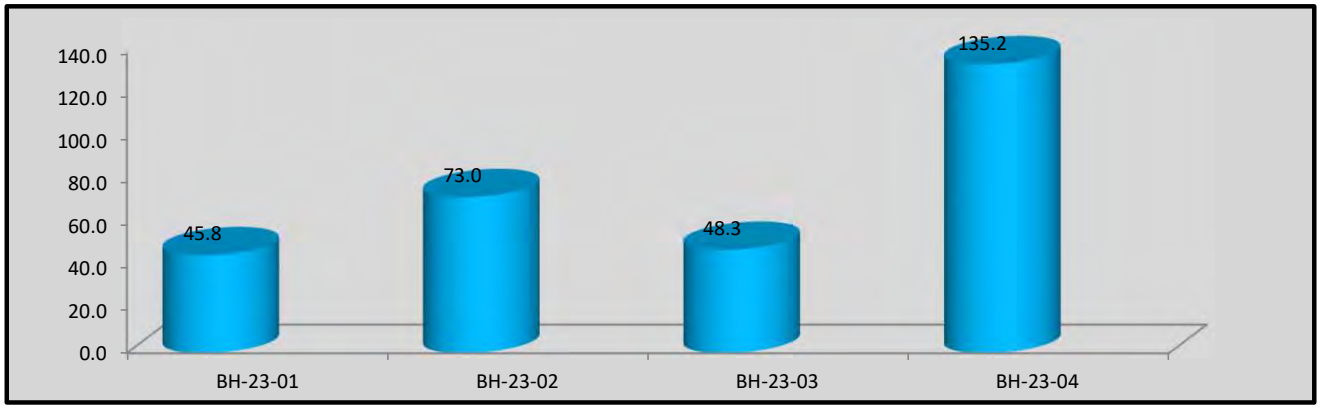
CSA A283 Certified Laboratory for Concrete Testing
CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories / Conseil canadien des laboratoires indépendants

Rock Core Compressive Strength Report

PROJECT: Blind River Water Intake
CONTRACT: 23-0821
DATE SAMPLED: Oct 30-31/23
RUN BY: J.Draper
DATE TESTED: Nov 22/23
SOURCE: Boreholes

Sample Location	Run #	Distance from top of run (cm)	Height (mm)	Diameter (mm)	L/D Ratio	Correction Factor	Peak Load (lbs)	Compressive Stength (Mpa)
BH-23-01	7	40	94.76	47.38	2	1.000	18140	45.8
BH-23-02	5	24	94.66	47.33	2	1.000	28860	73.0
BH-23-03	7	94	94.70	47.35	2	1.000	19110	48.3
BH-23-04	5	53	94.72	47.36	2	1.000	53530	135.2



TESTMARK Laboratories Ltd.
Committed to Quality and Service

CERTIFICATE OF ANALYSIS

Client:	Laura Meneghetti	Work Order Number:	520089
Company:	Tulloch Engineering - Sault Ste. Marie	PO #:	
Address:	71 Black Road Unit 8 Sault Ste. Marie, ON, P6B 0A3	Regulation: Project #:	Information not provided 23-0821
Phone/Fax:	(705) 949-1457 / (705) 949-9606	DWS #:	
Email:	Laura.Meneghetti@tulloch.ca	Sampled By:	Laura Meneghetti
Date Order Received:	11/24/2023	Analysis Started:	11/25/2023
Arrival Temperature:	8 C	Analysis Completed:	12/1/2023

WORK ORDER SUMMARY

ANALYSES WERE PERFORMED ON THE FOLLOWING SAMPLES. THE RESULTS RELATE ONLY TO THE ITEMS TESTED.

Sample Description	Lab ID	Matrix	Type	Comments	Date Collected	Time Collected
BH-23-06 SS04	1955638	Soil	None		11/1/2023	
BH-23-12 SS03	1955639	Soil	None		11/1/2023	

METHODS AND INSTRUMENTATION

THE FOLLOWING METHODS WERE USED FOR YOUR SAMPLE(S):

Method	Lab	Description	Reference
Anions Soil (A5)	Garson	Determination of Anions in Soil	Modified from SW846-9056A
Cond Soil (R12)	Garson	Determination of conductivity in soil (1:2)	Modified from EPA SW846-9050A
Moisture (A99)	Garson	Determination of Percent Moisture	In-House
pH Soil (A2.0)	Garson	Determination of soil pH by Ion Selective Electrode	Modified from EPA SW-846 9045D
RedOx - Soil (T06)	Mississauga	Determination of RedOx Potential of Soil	Modified from APHA-2580B
Resistivity Soil (R12)	Garson	Determination of Resistivity in Soil (1:2)	Modified from Carter 18.3
Sulphide/S (R98)	Garson	Determination of Sulphide in Soil	In-House

REPORT COMMENTS

RedOx - Soil (A6): Hold time exceeded for methods BEFORE receipt date/time.

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520089

This report has been approved by:

Brad Halvorson, B.Sc.
Laboratory Director

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520089

WORK ORDER RESULTS

Sample Description	BH - 23 - 06 SS04		BH - 23 - 12 SS03		
Sample Date	11/1/2023 12:00 AM		11/1/2023 12:00 AM		
Lab ID	1955638		1955639		
Anions (Soil)	Result	MDL	Result	MDL	Units
Bromide	<0.2	0.2	<0.2	0.2	µg/g
Chloride	4.3	0.4	89.8	0.4	µg/g
Fluoride	0.38	0.02	0.09	0.02	µg/g
Nitrate (as N)	0.17	0.06	0.70	0.06	µg/g
Nitrite (as N)	<0.04	0.04	<0.04	0.04	µg/g
Sulphate	11.2	0.4	15.7	0.4	µg/g

Sample Description	BH - 23 - 06 SS04		BH - 23 - 12 SS03		
Sample Date	11/1/2023 12:00 AM		11/1/2023 12:00 AM		
Lab ID	1955638		1955639		
General Chemistry	Result	MDL	Result	MDL	Units
% Moisture	0.3	0.1	13.5	0.1	%
Conductivity	47	1	215	1	µS/cm
pH	6.48	N/A	6.26	N/A	pH
RedOx (vs. S.H.E.)	350 [350]	N/A	383	N/A	mV
Resistivity	21300	N/A	4650	N/A	ohm-cm
Sulphide	<0.2	0.2	<0.3	0.3	µg/g

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520089

LEGEND

Dates: Dates are formatted as mm/dd/year throughout this report.

MDL: Method detection limit or minimum reporting limit.

[ ]: Results for laboratory replicates are shown in square brackets immediately below the associated sample result for ease of comparison.

Organic Soil Analysis: Data reported for organic analysis in soils samples are corrected for moisture content.

Quality Control: All associated Quality Control data is available on request.

LCL: Lower Control Limit.

UCL: Upper Control Limit.

QAQCID: This is a unique reference to the quality control data set used to generate the reported value. Contact our lab for this information, as it is traceable through our LIMS.

Field Data: Reports containing Field Parameters represent data that has been collected and provided by the client. Testmark is not responsible for the validity of this data which may be used in subsequent calculations.

Sample Condition Deviations: A noted sample condition deviation may affect the validity of the result. Results apply to the sample(s) as received.

ICPMS Dustfall Insoluble: The ICPMS Dustfall Insoluble Portion method analyzes only the particulate matter from the Dustfall Sampler which is retained on the analysis filter during the Dustfall method.

Regulation Comparisons: Disclaimer: Please note that regulation criteria are provided for comparative purposes, however the onus on ensuring the validity of this comparison rests with the client.

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520089

QUALITY CONTROL DATA

THIS SECTION REPORTS QC RESULTS ASSOCIATED WITH THE TEST BATCH; THESE ARE NOT YOUR SAMPLE RESULTS.
QAQC details include only values where sufficient sample data allowed measurement.

Anions (Soil)

Blank: LRB-6 (Blank) (6)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Bromide	0.2	µg/g	0	<0.2	0.6	20231128.A5C
Chloride	0.4	µg/g	0	<0.4	1.2	20231128.A5C
Fluoride	0.02	µg/g	0	<0.02	0.6	20231128.A5C
Nitrate (as N)	0.2	µg/g	0	<0.2	0.6	20231128.A5C
Nitrite (as N)	0.1	µg/g	0	<0.1	0.18	20231128.A5C
Sulphate	0.4	µg/g	0	<0.4	6	20231128.A5C

Positive Control: LFB-5 (0.1/0.02/0.002 mg/g equiv) (5)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Bromide	N/A	%	80	115	120	20231128.A5C
Chloride	N/A	%	80	107	120	20231128.A5C
Fluoride	N/A	%	80	111	120	20231128.A5C
Nitrate (as N)	N/A	%	80	111	120	20231128.A5C
Nitrite (as N)	N/A	%	80	118	120	20231128.A5C
Sulphate	N/A	%	80	102	120	20231128.A5C

Positive Control: LFB-7 (0.2/0.1/0.02 mg/g equiv) (7)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Bromide	N/A	%	80	91.1	120	20231128.A5C
Chloride	N/A	%	80	102	120	20231128.A5C
Fluoride	N/A	%	80	99.9	120	20231128.A5C
Nitrate (as N)	N/A	%	80	101	120	20231128.A5C
Nitrite (as N)	N/A	%	80	86.6	120	20231128.A5C
Sulphate	N/A	%	80	98.1	120	20231128.A5C

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520089

Sample Replicate: % RPD (8)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Fluoride	N/A	%	0	14.3	35	20231128.A5C
Sulphate	N/A	%	0	4.5	35	20231128.A5C

General Chemistry

Calibration Check: Lab Control Sample (2)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Conductivity	N/A	%	475	519	525	20231127.TM-G.R12B

Method Blank: Method Blank (1)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Conductivity	1	µS/cm	0	<1	5	20231127.TM-G.R12B

Positive Control: LCS (pH 8) (2)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
pH	N/A	pH	7.8	7.93	8.2	20231127.TM-G.R2B

Positive Control: LFB-7 (7)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Sulphide	0.05	µg/g	0.24	0.288	0.36	20231201.R98B

Positive Control: LRB-6 (Blank) (6)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Sulphide	0.02	µg/g	0	<0.02	0.06	20231201.R98B

Positive Control: ORP Control 240 (7)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
RedOx (vs. S.H.E.)	N/A	mV	220	243	260	20231130.TM-M.A6B

Sample Replicate: % RPD (3)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
pH	N/A	pH	0	0.05	0.3	20231127.TM-G.R2B

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520089

Sample Replicate: % RPD (8)						
Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Conductivity	N/A	%	0	12.3	10	20231127.TM-G.R12B

Sample Replicate: % RPD (9)						
Parameter	MDL	Units	LCL	Result	UCL	QAQCID
RedOx (vs. S.H.E.)	N/A	%	0	0	10	20231130.TM-M.A6B

THIS INDEX SHOWS HOW YOUR SAMPLES ARE ASSOCIATED TO THE CONTROLS INCLUDED IN THE IDENTIFIED BATCHES.

Sample Description	Lab ID	Method	QAQCID	Prep QAQCID
BH - 23 - 06 SS04	1955638	Anions Soil (A5)	20231128.A5C	
BH - 23 - 06 SS04	1955638	Cond Soil (R12)	20231127.TM-G.R12B	
BH - 23 - 06 SS04	1955638	Moisture (A99)	20231125.TM-G.A99B	
BH - 23 - 06 SS04	1955638	pH Soil (A2.0)	20231127.TM-G.R2B	
BH - 23 - 06 SS04	1955638	RedOx - Soil (T06)	20231130.TM-M.A6B	
BH - 23 - 06 SS04	1955638	Resistivity Soil (R12)	20231129.TM-G.R12B	
BH - 23 - 06 SS04	1955638	Sulphide/S (R98)	20231201.R98B	
BH - 23 - 06 SS04	1955638r	RedOx - Soil (T06)	20231130.TM-M.A6B	
BH - 23 - 12 SS03	1955639	Anions Soil (A5)	20231128.A5C	
BH - 23 - 12 SS03	1955639	Cond Soil (R12)	20231127.TM-G.R12B	
BH - 23 - 12 SS03	1955639	Moisture (A99)	20231125.TM-G.A99B	
BH - 23 - 12 SS03	1955639	pH Soil (A2.0)	20231127.TM-G.R2B	
BH - 23 - 12 SS03	1955639	RedOx - Soil (T06)	20231130.TM-M.A6B	
BH - 23 - 12 SS03	1955639	Resistivity Soil (R12)	20231129.TM-G.R12B	
BH - 23 - 12 SS03	1955639	Sulphide/S (R98)	20231201.R98B	

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

APPENDIX G

NOTICE TO READER

NOTICE TO READER

This Report has been prepared by TULLOCH Engineering Inc. ('TULLOCH') for the sole and exclusive use of the Town of Blind River (the 'Client') to support the New Water Intake and Huron Street Reconstruction (the 'Development') in Blind River, Ontario (the 'Site'). The Report shall not be used for any other purpose, or provided to, relied upon or used by any third party without the express written consent of TULLOCH.

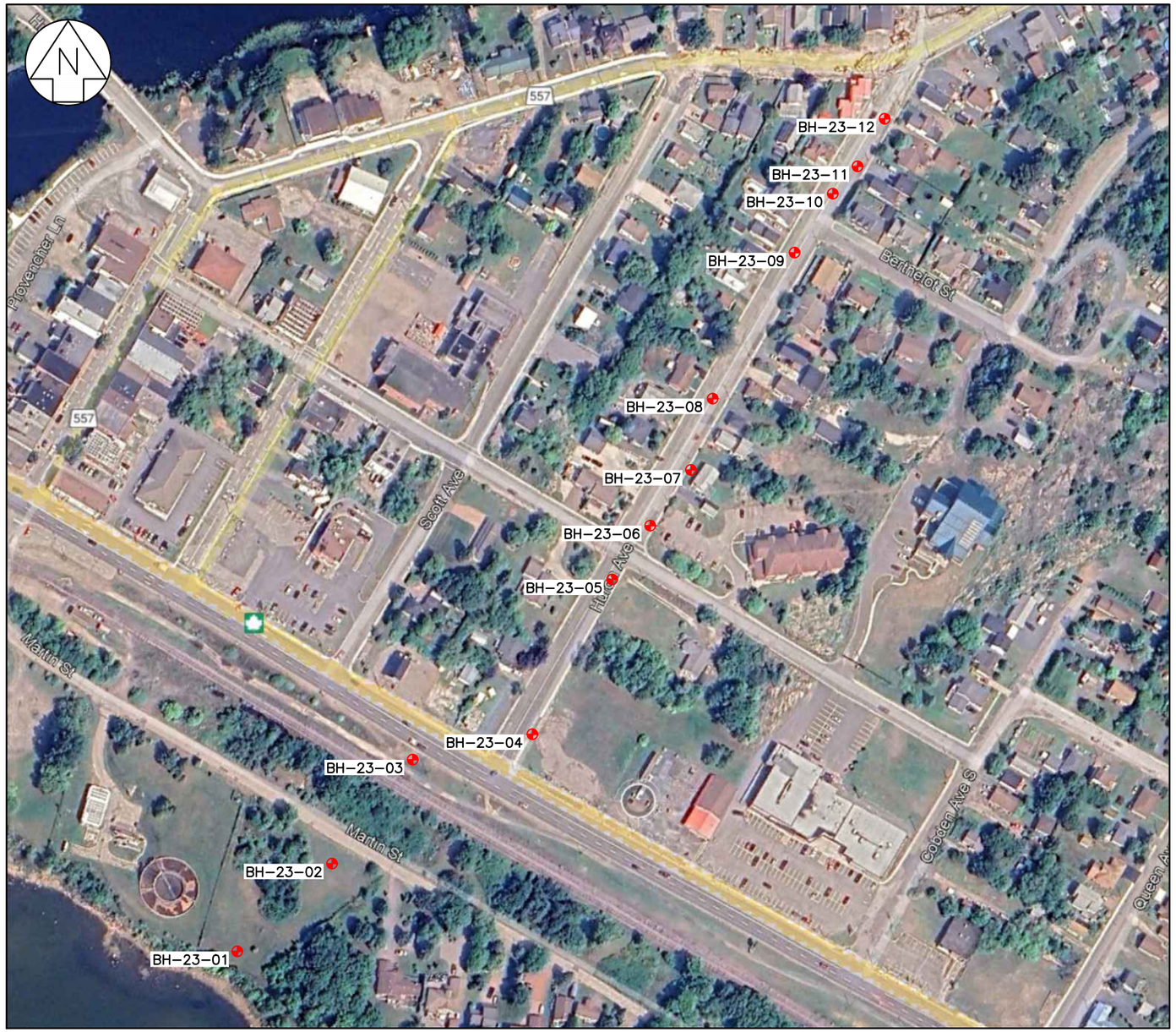
A limited number of boreholes were advanced at the Site; and as such, the information collected and presented herein applies to the borehole locations only. The subsurface conditions between boreholes can change and accordingly any use of the data contained in this Report should take into consideration the nature of the materials and potential variation between test pit locations.

This Report contains opinions, conclusions and recommendations made by TULLOCH using professional judgment and reasonable care for the purpose of pavement design for the Development. Use of or reliance on this report by the Client is subject to the following conditions:

a) the report being read in the context of and subject to the terms of the Engineering Services Agreement for the Work, including any methodologies, procedures, techniques, assumptions and other relevant terms or conditions specified or agreed therein;
b) the report being read in its entirety. TULLOCH is not responsible for the use of portions of the report without reference to the entire report;
c) the conditions of the site may change over time or may have already changed due to natural forces or human intervention, and TULLOCH takes no responsibility for the impact that such changes may have on the accuracy or validity of the observations, conclusions and recommendations set out in this report;
d) the classification of soils and rocks in this report is based on commonly accepted methods. However, the classification of geologic materials and the boundaries between subsurface layers involves judgement. Boundaries between different soils layers may also be transitional rather than abrupt. TULLOCH does not warrant or guarantee the exactness of these descriptions and boundaries.
e) the subsurface conditions must be verified by a qualified geotechnical engineer during construction to ensure that the borehole data presented herein is representative of the actual site conditions so that the design recommendations contained herein remain valid; and
f) the report is based on information made available to TULLOCH by the Client or by certain third parties; and unless stated otherwise in the Agreement, TULLOCH has not verified the accuracy, completeness or validity of such information, makes no representation regarding its accuracy and hereby disclaims any liability in connection therewith.

This report has been prepared with the degree of care, skill and diligence normally provided by engineers in the performance of comparable services for projects of similar nature. The scope of this report includes foundation engineering design only and it specifically excludes investigation, detection, prevention and assessment of the presence of subsurface contaminants. No conclusions or inferences should be drawn regarding contamination at the site including but not limited to molds, fungi, spores, bacteria, viruses, soil gases such as Radon, PCBs, petroleum hydrocarbons, inorganic and volatile organic compounds, polycyclic aromatic hydrocarbons and or any by products thereof.

HAMILTON STREET EXCESS SOILS REPORT FIGURES (DRAFT) – MARCH 28, 2024



BOREHOLE LOCATION PLAN

PROJECT LOCATION

COORDINATES		
NAME	EASTING	NORTHING
BH-23-01	349 247	5 116 261
BH-23-02	349 299	5 116 307
BH-23-03	349 344	5 116 361
BH-23-04	349 409	5 116 373
BH-23-05	349 454	5 116 455
BH-23-06	349 475	5 116 484
BH-23-07	349 498	5 116 513
BH-23-08	349 511	5 116 551
BH-23-09	349 557	5 116 629
BH-23-10	349 578	5 116 660
BH-23-11	349 592	5 116 674
BH-23-12	349 607	5 116 699

NOTES:

1. CO–ORDINATES ARE IN UTM ZONE 17T (NAD83 CSRS).

LEGEND:

BH–23–01 BOREHOLE LOCATION

No.	DATE	BY	ISSUES / REVISIONS
0	2024-01-10	LM	ISSUED FOR USE

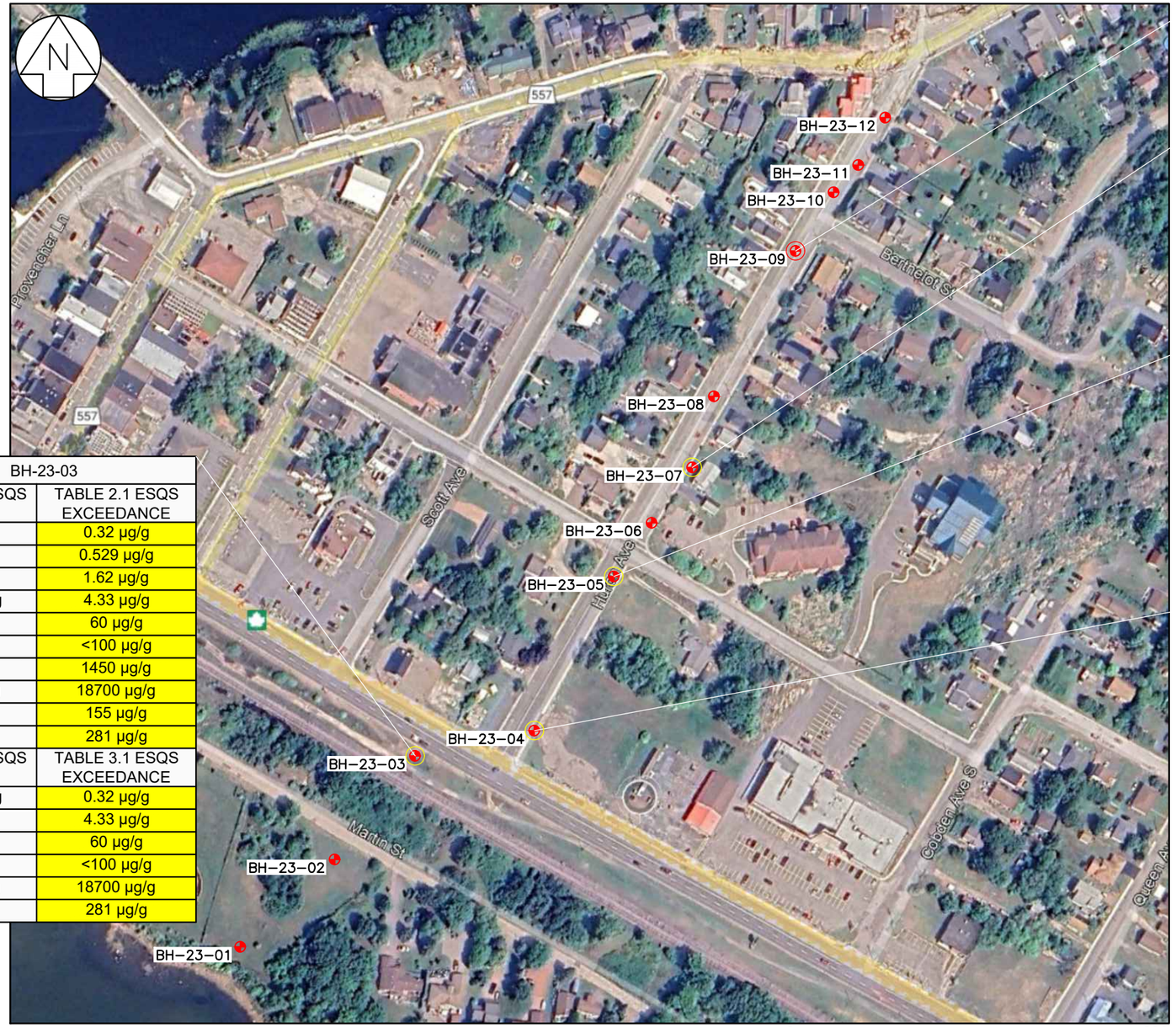
TULLOCH

DRAWING: BOREHOLE LOCATION PLAN

PROJECT: **BLIND RIVER WATER INTAKE EXCESS SOILS INVESTIGATION**

DRAWN BY:	CHECKED BY:	PROJECT No. :
C. MANN	R. MORRISON	23-0821
DESIGNED BY:	APPROVED BY:	DRAWING No. / REVISION No.
C. MANN	R. MORRISON	S1 / 0
SCALE:	DATE:	
AS NOTED	2024-03-08	

P:\2023\230821 Blind River Water Intake\Environmental Due Diligence\Drawings\230821_Siteplan.dwg



BOREHOLE LOCATION PLAN

0 200
METERS

STATION ID	BH-23-03	
PARAMETER	TABLE 2.1 ESQS LIMIT	TABLE 2.1 ESQS EXCEEDANCE
BENZENE	0.02 µg/g	0.32 µg/g
ETHYLBENZENE	0.05 µg/g	0.529 µg/g
TOLUENE	0.2 µg/g	1.62 µg/g
XYLENE	0.091 µg/g	4.33 µg/g
SOIL PHC F1	25 µg/g	60 µg/g
SOIL PHC F2	10 µg/g	<100 µg/g
SOIL PHC F3	240 µg/g	1450 µg/g
SOIL PHC F4	2800 µg/g	18700 µg/g
COPPER	140 µg/g	155 µg/g
LEAD	120 µg/g	281 µg/g
PARAMETER	TABLE 3.1 ESQS LIMIT	TABLE 3.1 ESQS EXCEEDANCE
BENZENE	0.034 µg/g	0.32 µg/g
XYLENE	3 µg/g	4.33 µg/g
SOIL PHC F1	25 µg/g	60 µg/g
SOIL PHC F2	26 µg/g	<100 µg/g
SOIL PHC F4	3300 µg/g	18700 µg/g
LEAD	120 µg/g	281 µg/g

STATION ID	BH-23-09	
PARAMETER	TABLE 2.1 ESQS LIMIT	TABLE 2.1 ESQS EXCEEDANCE
SOIL PHC F2	10 µg/g	<20 µg/g

STATION ID	BH-23-07	
PARAMETER	TABLE 2.1 ESQS LIMIT	TABLE 2.1 ESQS EXCEEDANCE
SOIL PHC F2	10 µg/g	<30 µg/g
SOIL PHC F3	240 µg/g	<300 µg/g
PARAMETER	TABLE 3.1 ESQS LIMIT	TABLE 3.1 ESQS EXCEEDANCE
SOIL PHC F2	26 µg/g	<30 µg/g

STATION ID	BH-23-05	
PARAMETER	TABLE 2.1 ESQS LIMIT	TABLE 2.1 ESQS EXCEEDANCE
SOIL PHC F2	10 µg/g	<50 µg/g
SOIL PHC F3	240 µg/g	<500 µg/g
SOIL PHC F4	2800 µg/g	5600 µg/g
PARAMETER	TABLE 3.1 ESQS LIMIT	TABLE 3.1 ESQS EXCEEDANCE
SOIL PHC F2	26 µg/g	<50 µg/g
SOIL PHC F4	3300 µg/g	5600 µg/g

STATION ID	BH-23-04	
PARAMETER	TABLE 2.1 ESQS LIMIT	TABLE 2.1 ESQS EXCEEDANCE
SOIL PHC F2	10 µg/g	<50 µg/g
SOIL PHC F3	240 µg/g	<500 µg/g
PARAMETER	TABLE 3.1 ESQS LIMIT	TABLE 3.1 ESQS EXCEEDANCE
SOIL PHC F2	26 µg/g	<50 µg/g

NOTES:

1. CO–ORDINATES ARE IN UTM ZONE 17T (NAD83 CSRS).

LEGEND:

BH–23–01 BOREHOLE LOCATION

BH–23–01 SOIL EXCEEDS O. REG. 406/19 TABLE 2.1 ESQS RESIDENTIAL/PARKLAND LAND USE

BH–23–01 SOIL EXCEEDS O. REG. 406/19 TABLE 2.1 ESQS RESIDENTIAL/PARKLAND LAND USE AND TABLE 3.1 INDUSTRIAL/COMMERCIAL

No.	DATE	BY	ISSUES / REVISIONS
0	2024-01-10	LM	ISSUED FOR USE

TULLOCH

DRAWING: SOIL EXCEEDANCES

PROJECT: **BLIND RIVER WATER INTAKE EXCESS SOILS INVESTIGATION**

DRAWN BY:	CHECKED BY:	PROJECT No. :	
C. MANN	R. MORRISON	23-0821	
DESIGNED BY:	APPROVED BY:	DRAWING No.	REVISION No.
C. MANN	R. MORRISON	S2	0
SCALE: AS NOTED	DATE: 2024-03-08		

P:\2023\230821 Blind River Water Intake\Environmental Due Diligence\Drawings\230821_Siteplan.dwg

ENBRIDGE THIRD PARTY REQUIREMENTS IN VICINITY OF NATURAL GAS FACILITIES STANDARD 2024.01.31

Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard

STANDARD

2024-01-31
ST-1E-30A8-8E30.1.2.1
Enbridge Inc.

Table of Contents

Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard

1 Introduction

This document is intended for anyone involved in planning or carrying out work in the vicinity of Enbridge Gas Distribution and Storage's (GDS) network. It summarizes the requirements to be followed and specifies the technical requirements aimed at protecting GDS's facilities, and by extension, ensuring public and worker safety.

Within this document, "third party" refers to an individual or organization that is not employed by, or performing work under, contract to GDS. These requirements are applicable to work done by individuals such as homeowners, landowners, other utility companies, excavators, constructors, and contractors.

Third parties must follow the regulations and legislation applicable to their work in addition to these requirements. It is understood that all legal provisions applicable to work carried out around natural gas facilities take precedence over this document.

The terms "gas lines", "gas pipelines", and "mains" used throughout this document apply equally to natural gas mains and service lines, as well as any other component of GDS's natural gas systems found on public or private land.

All work in the vicinity of gas facilities must adhere to the requirements set forth in this document. Work includes, but is not limited to, any ground disturbance in the vicinity of facilities or equipment crossing. Ground disturbance includes, but is not limited to, activities associated with excavation, directional drilling, blasting, piling, compaction, boring, ploughing, grading, backfilling, and hand digging.

A locate of the facilities must be requested at least five business days prior to beginning any work. Locates are required before ground disturbance takes place.

2 Terms and Definitions

The following is a list of terms found in this document and their definitions.

applicant: The owner of the proposed work.

blaster: The person or persons responsible for setting the charges and performing the blast.

blasting, surface: An operation involving the excavation of rock foundations for various types of structures, grade construction for highways or railroads, or canals (trenches) for water supply or collection purposes.

blasting, tunnel: Operations involving the piercing of below-ground (generally horizontal) opening in rock.

compaction: Any vibration-generating operation that will result in a potential increase of the density of soils or controlled backfill materials. The means to increase the density may be static or dynamic.

constructor: A person who undertakes a project for an owner and includes an owner who undertakes all or part of a project by himself or by more than one employer (as defined by Occupational Health & Safety Act).

contractor or excavator: Any individual, partnership, corporation, public agency, or other entity that intends to dig, bore, trench, grade, excavate, hammer into, or break ground with mechanical equipment or explosives in the vicinity of a gas pipeline or related facility.

EGI: Enbridge Gas Inc.

facility: Any Enbridge Gas Distribution, Transmission, Storage pipeline, main, service, regulator station or storage facility and its related components.

Gas Distribution and Storage (GDS): Enbridge Gas Distribution and Storage, Gazifère Inc., Niagara Gas Transmissions Limited, 2193914 Canada Limited.

ground disturbance: Any work, operation, or activity on or under the existing surface resulting in a disturbance or displacement of the soil or ground cover. Ground disturbance can include, but is not limited to: activities associated with excavation, directional drilling, blasting, piling, compaction, boring, ploughing, grading, backfilling, and hand digging.

hand dig: To excavate using either a shovel with a wooden or fiberglass handle, or using hydro vacuum excavation equipment. The use of picks, bars, stakes, or other earth piercing devices are not considered hand digging.

independent engineering consultant: A professional engineer who is registered with the provincial or state professional engineering association and a holder of a certificate of authorization (C of A).

locate service provider: Any entity that performs locates under the terms of a locate service agreement.

pile: Any vertical or slightly slanted structural member introduced or constructed in the soil in order to transmit loads and forces from the superstructure to the subsoil; the structural member can also be used as a component of a retaining wall system.

pile driving: The placement of piles carried out by gravity hammer, vibratory hammer, auger, pressing, screwing, or any combinations of the above methods.

positive identification: Visually locating (daylighting, exposing, digging test holes to determine) the location, depth, and size of a below-grade facility by using either vacuum excavating or hand digging. This includes elevation or alignment changes that can alter the depth or direction of the pipe (e.g., 45° and 90° elbows, fittings, plugs, weldolets, flanges, branch piping, known abandoned facilities, etc.).

pre-Engineering review: A process by which third parties can request a pre-engineering review for any potential conflict analysis.

professional engineer: An engineer registered and licensed with the provincial professional engineering association in the jurisdiction in which the engineer is practicing.

rural: All areas outside urban areas.

temporary support: The support of gas pipelines before or during an excavation to protect the pipeline from its own weight and to minimize deflection stresses.

third party: An individual or organization that is not employed by or performing work under contract to GDS (e.g., homeowners, other utility companies, contractor, excavators, constructors, etc.).

urban: An area with a population of at least 1,000 and a density of 400 or more people per square kilometer.

vital pipeline: A subset of pipelines that are critical to the safe and reliable operation of the natural gas system. Damages to vital mains could result in significant negative impact to public and worker safety or significant customer outages. This subset of mains consists of CER-regulated (Canada Energy Regulator) pipelines, transmission pipelines, and select distribution pipelines.

3 General Requirements

3.1 CER-Regulated Pipelines and Vital Pipelines

The CER regulates natural gas, oil, and commodity pipelines that extend beyond provincial, territorial, or national boundaries. All work in the prescribed area (within 30 m [100 ft] from each side of the CER-regulated pipeline) must be reviewed by the applicable CER-regulated operating company prior to commencing. This review is a regulatory requirement of the CER.

Mains are designated as vital pipelines by GDS. These include, but are not limited to, any pipeline NPS 16 or larger, transmission pipelines, CER-regulated pipelines, all pipelines operated by Storage and Transmission Operations (STO), and select distribution pipelines. The designation of a vital pipeline may change at the discretion of GDS. Vital Pipelines will be identified through locates. In these requirements, special considerations for CER-regulated pipelines and vital pipelines will be highlighted.

All work within 5 m (16 ft) from either side of lines operated by STO must be approved by GDS prior to commencing. For all other vital pipelines, all ground disturbance work within 3 m (10 ft) from either side of the vital pipeline must be approved by GDS prior to commencing. Approval by GDS may include specific conditions that third parties must follow. GDS may require representation on site for any ground disturbance work within the vicinity of vital pipelines and CER-regulated pipelines.

3.2 When Observation Is Required

A GDS representative is required to be on site to ensure the excavation or third-party activity is being safely completed near a pipeline when:

- Excavation with mechanical equipment will occur within 5 m (16 ft) of CER-regulated pipelines and all lines operated by STO.
- Excavation with mechanical equipment may take place within 3 m (10 ft) of vital pipelines and pipeline segments.
  Once the pipeline is exposed, mechanical excavation is then permitted up to 1 m (3.3 ft) from the pipeline.
- It is anticipated that blasting will take place within 30 m (100 ft) of any pipeline.
- Any other situations which requires observation, as deemed necessary by EGI.

3.3 Safe Excavation

Mechanical excavation is not permitted within 5 m (16 ft) of CER-regulated pipelines and 3 m (10 ft) of vital pipelines, unless verified visually. After the exact location of the main is verified visually, mechanical excavation is allowed up to 1.0 m (3.3 ft) from the pipeline. Within 1 m (3.3 ft) of the CER-regulated or vital pipeline, only hand digging or hydro-excavation is allowed.

Mechanical excavation may not begin within 3 m (10 ft) of the pipe until:

- The pipe has been exposed by the excavator, under the supervision of GDS, by hand at the point of crossing, or the pipeline company has located the pipe and confirmed that it is at least 0.6 m deeper than the proposed excavation.
- The excavation is parallel, or the pipe has been exposed by handto confirm the location of the pipe.

For all non-vital pipelines, mechanical excavation is not allowed within 1 m (3.3 ft) of the locate marks of the pipeline, until the exact location of the pipeline has been visually verified. The excavator must expose the pipeline by hand digging or hydro-excavation. Once the pipeline is exposed, mechanical excavation is then permitted up to 0.3 m (1 ft) from the pipeline. Within 0.3 m (1 ft) of any pipeline, only hand digging or hydro-excavation is permitted.

Only handheld compaction equipment may be used within 1 m (3.3 ft) of the sides or top of all gas pipelines. When ground conditions make hand excavation impractical (e.g., frost), the pipeline company may permit excavation to within 1 m (3.3 ft) of the pipeline if the pipeline company considers it safe to do so and directly supervises the excavation.

Spoil from excavation must not be piled on the pipeline or its easement.

3.4 Minimum Cover Requirements

Table 3-1: Minimum Cover Requirements on page 8 defines mains and services cover requirements. In all cases where the depth of cover requirements cannot be met, contact GDS to review depth of the cover requirements.

Table 3-1: Minimum Cover Requirements

Pipeline	Location	Minum Cover m (ft)
Mains	Under traveled surfaces (roads), road crossings	1.2 m (4 ft)
	Right-of-ways	1 m (3.3 ft)
	Highways	1.5 m (5 ft)
	Water crossings, and below drainage and irrigation ditches	1.2 m (4 ft)
Services	Private property	0.5 m (1.6 ft)
	Road crossings	0.9 m (2.9 ft)

3.5 Points of Thrust

Additional precautions may need to be taken when working in the vicinity of points of thrust. Points of thrust occur at pipeline fittings such as elbows (45° or 90°), end caps, weld tees, reducers, closed valves, and reduced port valves. If a point of thrust is identified through the locate process, GDS may require additional time to review the proposed work area. In the event that the excavation involves exposing a point of thrust or exposing an area near a point of thrust, GDS may provide written specific instructions that are to be followed. Failure to follow these instructions can result in significant harm to persons, property, or the environment.

3.6 Repair of Damaged Pipe and Pipe Coating

In all cases where the pipeline or the pipeline coating is damaged by construction activities, GDS must be contacted immediately and the excavation left open until GDS personnel have made the necessary repairs.

3.7 Encroachment

Permanent awnings and roof structures are prohibited above GDS's facilities within public rights-of-way or GDS's rights-of-way. GDS will not accept responsibility for any damages resulting from maintenance or operation of its facilities to encroaching structures within the public or GDS rights-of-way. Examples of encroaching structures include: bus shelters, street benches, and garbage bins.

GDS requires approval for all permanent structures to be built within 7 m (22.9 ft) of GDS's vital pipelines. This requirement is in place to allow GDS sufficient access and working space should an inspection or repair be needed.

3.8 Tree Planting

When planting trees, the gas pipeline in and near the area of excavation must be located to ensure enough clearance is maintained between the pipeline and the tree.

For all vital pipelines (including CER and transmission pipelines), trees or large shrubs must maintain a horizontal clearance between the edge of the root ball or open bottom container to the adjacent edge of the existing pipelines of not less than 3.0 m (10 ft), or as specified in any applicable easement agreement.

For all other pipelines, a minimum horizontal clearance of 1.2 m (4 ft) is recommended between the edge of the root ball or open bottom container and adjacent edge of the existing gas pipeline.

In cases where the recommended clearance cannot be achieved, GDS may specify the installation of a root deflector.

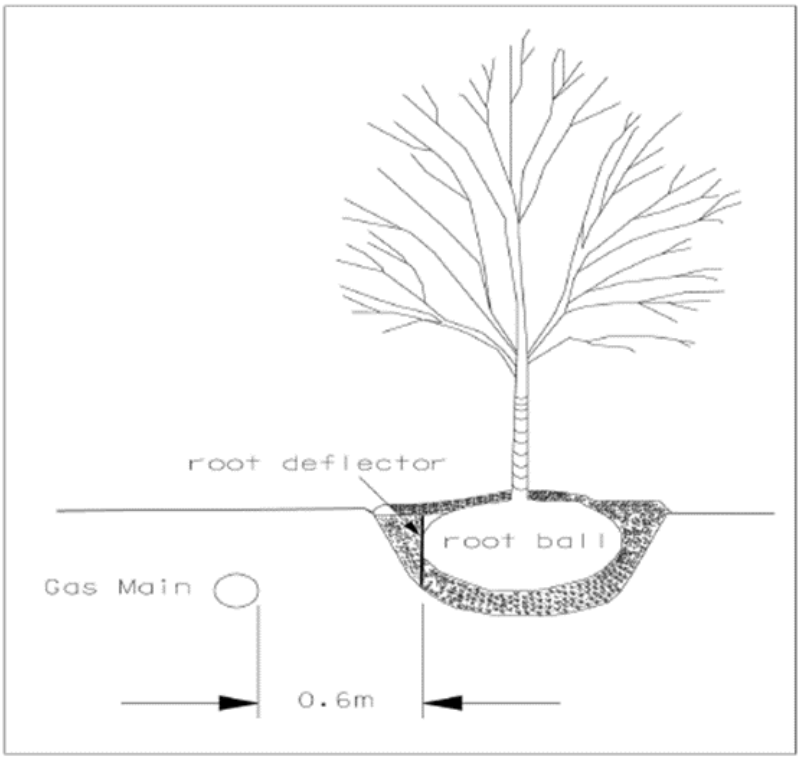
3.8.1 Root Deflectors

A root deflector is a physical barrier placed between tree roots and pipelines to prevent damage to the pipelines. A root deflector can be made from 1/4 in thick rigid plastic, fiberglass, or other non-degradable material. The root deflector is intended to prevent the root tips from attaching to the gas main.

Typically, root deflectors are straight barriers or encircle the tree. If installed as a straight barrier, the root deflector should be installed at a minimum 0.6 m (2 ft) from the pipeline on the tree-side of the pipeline. Also, it should extend parallel to the pipeline in both directions for 1.2 m (4 ft) measured from the centre of the tree trunk.

Root deflectors usually have a collar to keep the top of the deflector at ground level, and extend down to the bottom of the root-ball as shown in Figure 1: Example of a Root Deflector.

Figure 3-1: Example of a Root Deflector



3.9 Sewer and Drain Cleaning

Prior to sewer clearing activity using mechanical cutting or high pressure jetting equipment, the third party should call into Ontario One Call at 1-800-400-2255 for a

cross bore sewer safety inspection. An EGI employee or contractor will attempt to attend the site within two hours to complete the inspection.

4 Minimum Clearance from Other Structures

The following clearances must be maintained between the circumference of the gas pipeline and other underground structures:

Table 4-1: Minimum Clearance Between Gas Pipelines (Less than NPS 16) and Other Underground Structures

Direction	Minimum Clearance m (ft)
Horizontal	0.6 m (2 ft)
Vertical	0.3 m (1 ft)

Table 4-2: Minimum Clearance Between CER-regulated Pipelines and Vital Pipelines and Other Underground Structures

Direction	Minimum Clearance m (ft)
Horizontal	1 m (3.3 ft)
Vertical	0.6 m (2 ft)

Additional clearance or mitigation may be required for installations (such as transit systems or power transformers) that will introduce DC stray current interference or AC fault hazards.

Note

For all pipelines (including vital pipelines), when drilling parallel to the pipeline, a minimum horizontal clearance measured from the edge of the pipeline to the edge of the final bore hole of 1 m (3.3 ft) is required.

5 Pipeline Location Verification

5.1 Surface Road Work

Surface road work applies to ground disturbance on travelled roadways related to the removal of hard-surfaces only. For any ground disturbance work, locates must be obtained prior to commencing and the excavator must ensure accuracy of the locate by reviewing the locate paperwork with the physical locate markings. Surface road work can be completed without the requirement to positively identify EGI pipelines, provided no mechanical equipment will be used within 1 m (3.3 ft) horizontally of the located pipelines. If mechanical excavation is required within 1 m (3.3 ft) of the locate during any surface road work or work that will take place deeper than removal of the hard surface, the excavator must follow rules outlined in 5.2 Subgrade Road Work on page 11 for positive identification requirements.

5.2 Subgrade Road Work

Subgrade road work is any road work exceeding the depth required for removal of the hard surface that enters the sub-surface. The boundary area for the pipeline is the distance that is identified off the locate marks of the pipeline and applicable boundary areas are highlighted in Table 5-1: Boundary Areas on page 11.

Table 5-1: Boundary Areas

Pipeline	Boundary Area
Vital pipelines (≥ NPS 24)	3 m (10 ft)
Vital pipelines (< NPS 24)	2 m (6 ft)
Non-vital pipelines (all sizes)	1 m (3 ft)

Note

Work within the boundary areas must comply with the positive identification requirements set in Table 8-2: Pipeline Location Verification Requirements for Vital Pipelines on page 21 and Table 8-3: Pipeline Location Verification Requirements for All Other Pipelines on page 21.

If these guidelines cannot be complied with, the excavator must submit a variance request work package. No variance will be provided for work within 1 m (3.3 ft) of any pipeline. The variance work package must include, at a minimum, the following information:

- Pre-Engineering design.
- Location of EGI facilities with respect to proposed excavation area (vertical and horizontal offsets).
- Location of proposed excavation area (vertical and horizontal offsets off permanent landmarks).
- Pipeline protection plan.

If a variance is requested, the excavator must also provide a physical barrier (e.g., silt fence), which would denote the boundary of the pipeline, where possible.

8.2 Drilling Parallel to Pipelines on page 20 and Table 8-3: Pipeline Location Verification Requirements for All Other Pipelines on page 21 indicate GDS's minimum requirements for the verification of the pipeline location based on the nature of the work. The frequency and location of test holes may change at the discretion of GDS. Additional test holes may be required to sufficiently confirm the location of the pipeline (e.g., regulator stations).

Note

Non-mechanical equipment must be used when working within 1 m (3.3 ft) of any pipeline. If mechanical equipment is required for use around non-vitals, the pipeline must be positively identified using hand tools or hydro-excavation. Once the non-vital pipeline location has been visually identified through positive identification requirements listed in the 8.2 Drilling Parallel to Pipelines on page 20 and Table 8-3: Pipeline Location Verification Requirements for All Other Pipelines on page 21, mechanical equipment can be used up to 0.3 m (1 ft) of the non-vital pipeline and 1 m (3.3 ft) of a vital pipeline.

When using hydro-vacuum excavation as an alternative to hand digging, see 9 Hydro-Excavation on page 24 for safe operating practices.

6 Operation of Heavy Equipment

6.1 General

Additional precautions are necessary when equipment in excess of the weights listed in Table 5: Vehicle Load Restrictions is operated in the vicinity of buried facilities where no pavement exists or where grading operations are taking place.

Table 6-1: Vehicle Load Restrictions

Pipe Material	Weight/Axle Maximum Allowable Load kg (lb)
Plastic	7,000 kg (15,400 lb)
Steel	10,000 kg (22,046 lb)

Prior to any crossing, the location of the gas main must first be staked out by a GDS representative.

The excavator is responsible for confirming the location and depth of the main. Test hole spacing must not exceed 50 m (160 ft).

6.2 Equipment Moving Across the Pipeline

Crossing locations for heavy equipment must be kept to a minimum.

The crossing locations must be determined by GDS after reviewing:

- The nature of the construction operation.
- The types and number of equipment involved.
- The line and depth of the existing gas main.

The use of equipment is contingent upon the review by GDS. Once the crossing locations have been established, heavy equipment is restricted to crossing at these locations only. It is the responsibility of the third party to inform their personnel of the crossing location restrictions.

Pipelines may require additional protection at crossing locations by constructing berms or installing steel plates over the pipeline.

Unless expressly allowed by the temporary crossing consent, equipment that crosses pipelines must be subject to the following conditions:

- The numbers of crossings back and forth must be kept to a minimum.
- Equipment must not remain stationary on top of a pipeline.
- Equipment must not cross with loaded side boom or other unbalanced loads.
- Equipment must cross perpendicular (not parallel) to the pipeline. The crossing angle for installations must be within 45° to 90° (with preference for as close to perpendicular as possible).
- Equipment must operate at slow speeds when crossing a pipeline in order to minimize loading impact.
- Existing cover over a pipeline must not be reduced; any loss of cover (e.g., due to rutting) must be promptly restored prior to crossing.
- Vibratory compaction equipment must not operate within 1.2 m (4 ft) of a pipeline.

6.3 Equipment Moving Along the Pipeline

Heavy equipment can be operated parallel to existing pipelines provided that a minimum offset of both:

- 1 m (3.3 ft) is maintained on pipeline sizes less than NPS 16.
- 2 m (6.6 ft) on pipeline sizes NPS 16 and larger, unless otherwise directed by GDS.

Only lightweight, rubber-tired equipment may be operated directly over the existing gas pipelines, unless a minimum pipe cover of twice the pipe diameter or 1 m (3.3 ft) (whichever is greater) can be verified. The use of all other equipment is contingent upon review and approval by GDS.

Unless expressly allowed by the temporary crossing consent, equipment moving along pipelines is subject to the following conditions:

- Equipment must operate at slow speeds when moving along a pipeline.
- Existing cover over a pipeline must not be reduced; any loss of cover (e.g., due to rutting) must be promptly restored prior to moving along the pipeline.
- Vibratory compaction equipment must not operate within 1.2 m (4 ft) of a pipeline.

Note

When crossing perpendicular to a pipeline that is smaller than NPS 16 (excluding vital pipelines), the vertical clearance outlined in Table 4-1: Minimum Clearance Between Gas Pipelines (Less than NPS 16) and Other Underground Structures on page 10 may be used as long as all positive identification requirements are also followed.

Note

When crossing perpendicular to a pipeline that is NPS 16 or larger, or crossing any CER-regulated pipelines or vital pipelines, a minimum vertical clearance of 1 m (3.3 ft) is required; 8 Horizontal Directional Drilling on page 19.

7 Support of Gas Pipelines

7.1 General

The support requirements specified in this section are the minimum requirements. GDS must be notified regarding the support of any gas main. GDS has complete discretion in the approval of any support system. Additionally, if a pipeline is to be exposed for longer than one month, approval must be sought from GDS and work must follow the requirements outlined in 3 General Requirements on page 6. Third parties must not depart from these support requirements unless a professional engineer working for or on behalf of the third party has designed an alternative method. Any alternative method must be comparable to these specifications and be, in the opinion of the professional engineer, consistent with good engineering practices. The alternative specification must be documented, approved by a professional engineer and provided to GDS for review prior to the commencement of work. The third party is responsible for the adequate support of the buried gas pipelines exposed during excavation according to this section.

Prior to any crossing, the location of the gas main must first be staked out by a GDS representative.

7.2 Support of Gas Pipelines Perpendicular to Excavation

Temporary support refers to the support of gas pipelines prior to or at the time of excavation to protect the pipeline from deflection due to its own weight while it is exposed. Temporary support must remain in place until the backfill material underneath the pipeline is compacted adequately to restore support of the pipeline.

Before trenching beneath a main or service, temporary support must be erected for pipelines if the unsupported span of pipe in the trench exceeds the length indicated in Table 7-1: Maximum Span without Support Beam on page 15.

Note

For pipelines larger than NPS 16, GDS must be contacted. Contact information can be found in the 12 Contact Information on page 31.

When temporary support is required, Table 7-2: Support Beam Sizes and Maximum Span Between Beam Supports on page 15 indicates the required beam for a given span. The beam must be a continuous length grade No. 1 Spruce-Pine-Fir (S-P-F) or equivalent. For spans exceeding 4.5 m (15 ft), a continuous length timber

beam may not be available. In that case, steel I-beams (or equivalents) can be used as the support beam. Steel beam selection must be certified by a professional engineer and submitted to GDS for review.

Table 7-1: Maximum Span without Support Beam

Pipe Size (NPS)	Steel m (ft)	PE (polyethylene) m (ft)
1/2	2 m (6.6 ft)	1 m (3.3 ft)
3/4 to 1-1/4	2.5 m (8.2 ft)	1.25 m (4.1 ft)
2	3 m (10 ft)	1.5 m (5 ft)
3 to 4	4.5 m (15 ft)	1.75 m (6 ft)
6	6 m (20 ft)	2 m (7 ft)
8	7 m (23 ft)	2 m (7ft)
10	8.5 m (28 ft)	-
12	10 m (33 ft)	-
16	11.5 m (38 ft)	-

Table 7-2: Support Beam Sizes and Maximum Span Between Beam Supports

	Steel	Plastic	
Pipe Size (NPS)	≤ 4.5 m	≤ 2 m	≤ 4.5 m
1/2 to 2	4 × 6	4 × 6	6 × 8
3 to 6	-	6 × 6	8 × 8

Note

In all cases where the support beam size requirements cannot be met, GDS must be contacted to review support beam requirements.

The beam must be placed above the pipe with the ends of the beam resting on firm undisturbed soil. The beam must not bear directly on the gas pipeline. The pipe must be supported from the beam with rope, canvas sling, or equivalent in a manner that will prevent damage to the pipe and coating and eliminate sag. The spacing between the ropes must not exceed 1 m (3.3 ft); see Figure 7-1: Support of Gas Pipelines Crossing Excavations on page 17.

Backfill material underneath the exposed pipeline must be compacted to a minimum of 95% compaction. Sand padding must be placed to a level 150 mm (6 in) below and above the main. For additional details, see 10 Backfilling on page 25.

Perform compaction with the loose lift height not exceeding 200 mm (8 in) or one-quarter of the trench width, whichever is less. Injecting water into the backfill beneath the pipe is not an acceptable method of compaction.

All temporary support on pipelines must be removed before backfilling. Adequate support must remain in place until the backfill material has restored support.

7.3 Support of Pipelines Parallel to Excavation

Two cases exist for pipelines parallel to an excavation:

- Trench < 1.2 m deep
- Trench > 1.2 m deep

In either instance, the pipeline must not be exposed unless it is necessary to provide direct support.

Trench wall support may not be required for excavations provided the pipeline meets all of the following criteria:

- Depth is less than 1.2 m (4 ft).
- the pipeline is at least 0.6 m (2 ft) from the edge of the excavation or outside the 45° line projected upward from the trench bottom; see Figure 7-3: Influence Lines for Gas Pipelines Adjacent to Excavations on page 19.
- Soil is stable (type 1 or 2, see Table 15-1: Soil Types on page 33)

If the pipe does not meet these requirements and the soil is soft clay or sand (soil types 3 and 4), then the excavation must be suitably shored to prevent movement of the pipe. The shoring must remain in place until the backfill material has restored support.

Trench wall support is required for excavations if any one of the following conditions exist:

- Depth is ≥ 1.2 m (4 ft).
- The pipeline is closer to the edge of the excavation than the minimum allowed distance indicated Table 7-3: Minimum Allowed Distance from Main to Excavation on page 16.
- Depth is < 1.2 m (4 ft) and the soil is unstable (type 3 or 4, see Table 15-1: Soil Types on page 33).

Note

Adequate support must remain in place until the backfill material has restored support.

Minimum distances from the edge of the trench to the pipeline in which the excavation influences pipelines are shown in Table 7-3: Minimum Allowed Distance from Main to Excavation on page 16. The pipeline must be supported if these minimum distances cannot be met.

Table 7-3: Minimum Allowed Distance from Main to Excavation

Trench Depth (m)	Soil[a] Type 1 and 2	Soil[a] Type 3 and 4
1.2 m (3.9 ft)	0.9 m (3 ft)	0.9 m (3 ft)
1.5 m (4.9 ft)	0.9 m (3 ft)	0.9 m (3 ft)
1.8 m (5.9 ft)	0.9 m (3 ft)	0.9 m (3 ft)
2.1 m (6.9 ft)	0.9 m (3 ft)	0.9 m (3 ft)
2.4 m (7.9 ft)	0.9 m (3 ft)	0.9 m (3 ft)
2.7 m (8.9 ft)	0.9 m (3 ft)	1 m (3.3 ft)
3 m (9.8 ft)	0.9 m (3 ft)	1.5 m (4.9 ft)
3.3 m (10.8 ft)	0.9 m (3 ft)	1.8 m (5.9 ft)
3.6 m (11.8 ft)	0.9 m (3 ft)	2.2 m (7.2 ft)
3.9 m (12.8 ft)	0.9 m (3 ft)	2.5 m (8.2 ft)
4.2 m (13.8 ft)	0.9 m (3 ft)	3 m (9.8 ft)
4.5 m (14.8 ft)	1 m (3.3 ft)	3.4 m (11.2 ft)

Trench Depth (m)	Soil[a] Type 1 and 2	Soil[a] Type 3 and 4
4.8 m (15.7 ft)	1.5 m (4.9 ft)	3.8 m (12.5 ft)
5.1 m (16.7 ft)	2 m (6.6 ft)	4.1 m (13.5 ft)
5.4 m (17.7 ft)	2.5 m (8.2 ft)	4.6 m (15.1 ft)
5.7 m (18.7 ft)	3 m (9.8 ft)	5 m (16.4 ft)
6 m (19.7 ft)	3.4 m (11.2 ft)	5.5 m (18 ft)

a. As defined in the Occupational Health and Safety Act.

For pipelines where the trench bottom is below the water table, the trench must be suitably shored as per the trench wall support requirements.

Any pipeline that is exposed for a length greater than indicated in Table 7-1: Maximum Span without Support Beam on page 15 requires a field assessment.

For steel and polyethylene pipelines within the minimum distances given in Table 7-3: Minimum Allowed Distance from Main to Excavation on page 16, support must remain in place until backfill material restores support.

Figure 7-1: Support of Gas Pipelines Crossing Excavations

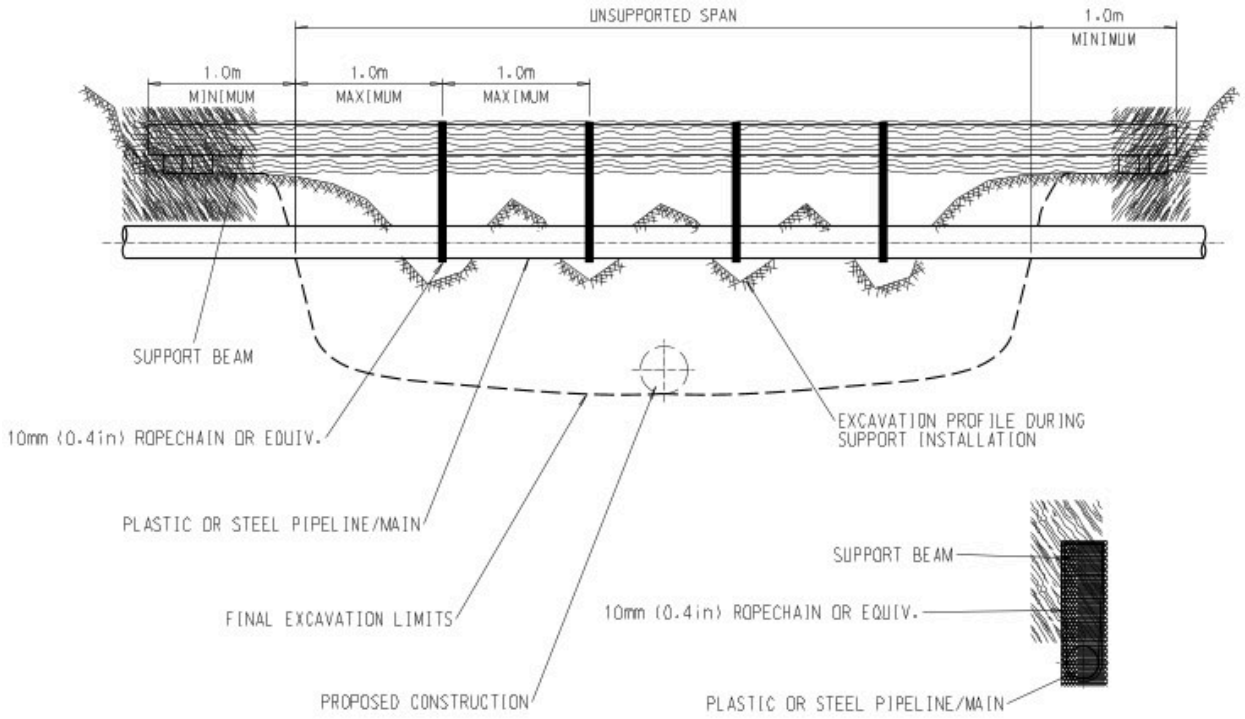
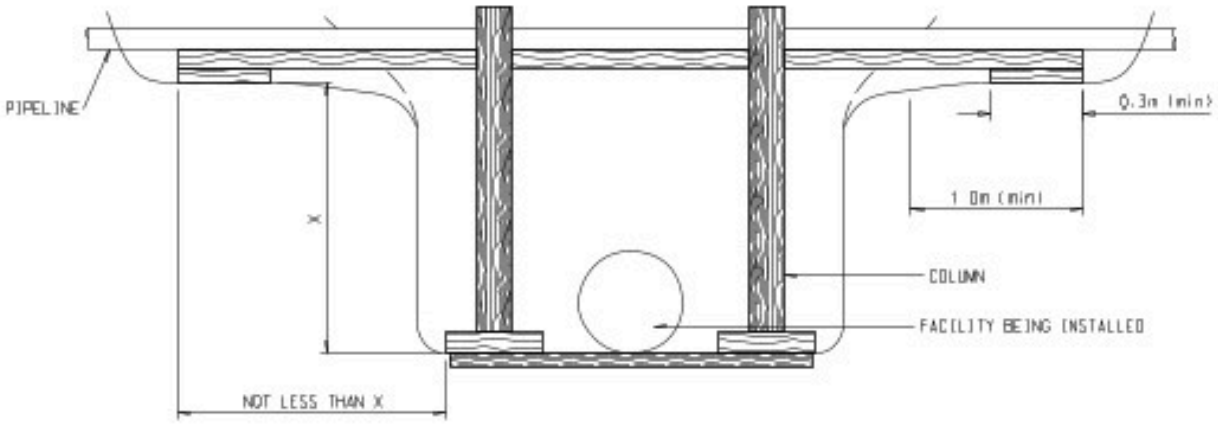


Figure 7-2: Typical Temporary Supports for Pipelines Crossing the Trench – Span Exceeds 4.5 m



NOTES:
1. LAMINATED 4X6 TIMBER BEAM REQUIRED BENEATH ALL NPS 1/2 - NPS 2.
2. LAMINATED 6X6 TIMBER BEAM REQUIRED BENEATH ALL NPS 3 - NPS 6.
3. LAMINATED 8X8 TIMBER BEAM REQUIRED BENEATH ALL NPS 8 - NPS 12.
4. COLUMN SIZE SHALL MATCH LAMINATED TIMBER BEAM REQUIREMENT.
5. COLUMN TO BE SPACED AS SPECIFIED BY PIPELINES AND STATIONS OPERATIONS ENGINEERING.
6. PLASTIC PIPE AND COATING ON STEEL PIPE TO BE PROTECTED FROM SUPPORTS AND STRAPPINGS WITH A PIECE OF RUBBER TIRE OR EQUIVALENT.
7. PLASTIC PIPE MUST BE SUITABLY STRAPPED O PREVENT MOVEMENT OFF THE BEAM.
8. ADDITIONAL SUPPORTS WILL BE REQUIRED AT MECHANICAL COUPLINGS OR VALVES.

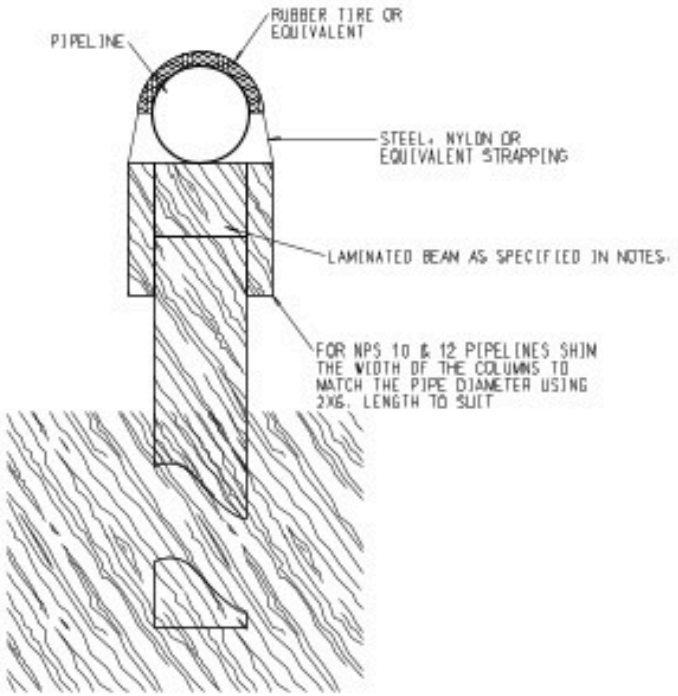
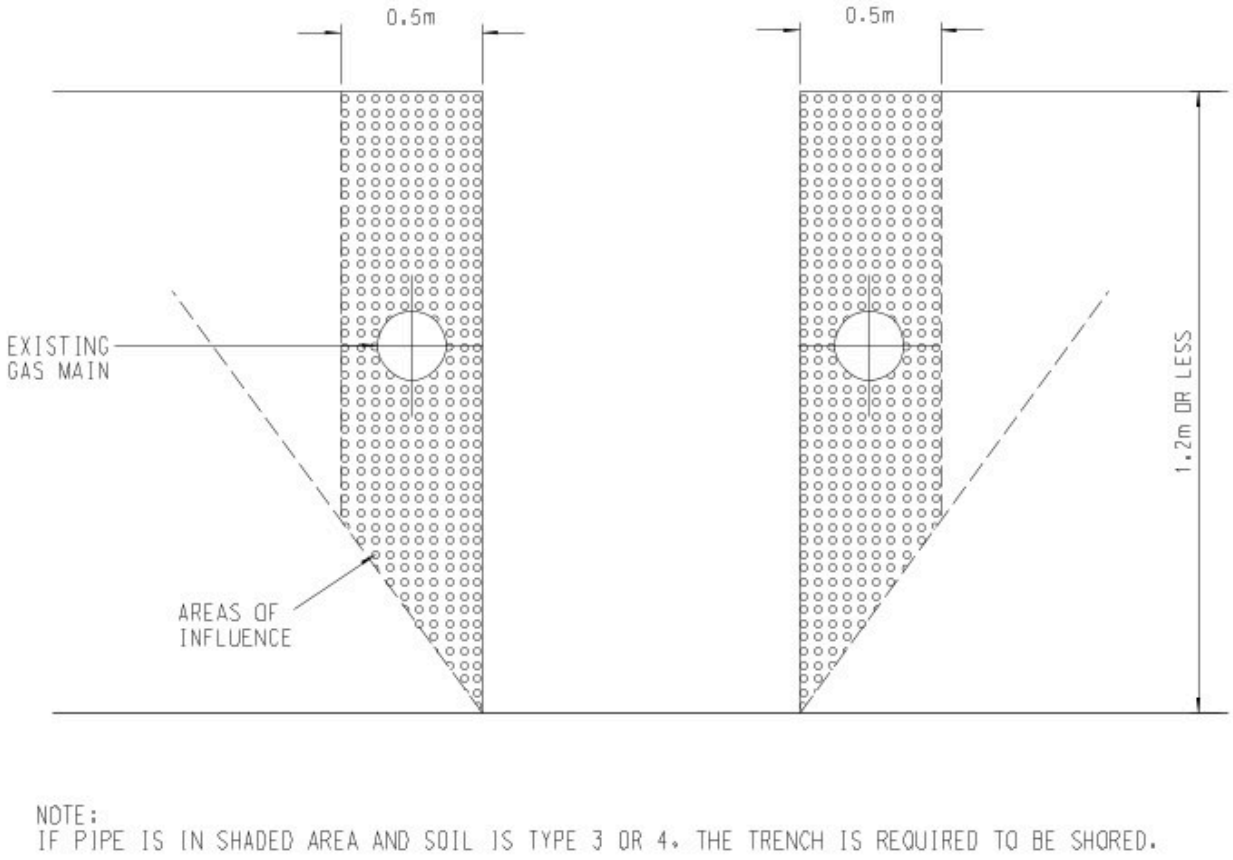


Figure 7-3: Influence Lines for Gas Pipelines Adjacent to Excavations



8 Horizontal Directional Drilling

8.1 General

Horizontal directional drilling (HDD) or directional boring is a steerable trenchless method of installing underground facilities. Trenchless technology is used where utilities being crossed are positively identified to confirm location.

For installations using any other type of drilling or augering equipment in the vicinity of gas facilities, GDS must be contacted.

In all cases, positive identification holes are required to visually verify the drill head's location (including depth) relative to the measurement of the tracking equipment. For positive identification hole requirements, see Figure 8-2: Pipeline Location Verification and Clearance Requirements for HDD for crossing all pipelines (including Vital Pipelines) on page 24. For pipeline location verification and clearance requirements for all horizontal directional drilling see Table 8-1: Pipeline Location Verification and Clearance Requirements for HDD for all Pipelines (including Vital Pipelines) on page 20.

If these guidelines cannot be complied with, a variance request work package must be submitted. No variance will be provided for work within 1 m (3.3 ft) of any pipeline. The variance work package must include, at a minimum, the following information:

- Pre-Engineering design.
- Location of EGI facilities with respect to proposed installation area (vertical and horizontal offsets).
- Location of proposed installation area (vertical and horizontal offsets off permanent landmarks).
- Pipeline protection plan.

If a variance is requested, a physical barrier (e.g., silt fence) must also be provided, which would denote the boundary of the pipeline, where possible.

Table 8-1: Pipeline Location Verification and Clearance Requirements for HDD for all Pipelines (including Vital Pipelines)

Location of Work Relative to Pipeline[a]	Required Verification of Pipe Location by Hand Digging or Hydro-Excavation
Crossing below pipeline (HDD)	All sides of pipeline (including below pipeline) exposed to 1.0 m (3.3 ft) from the pipeline's sidewalls. Additional positive identification hole at 2.0 m to 4.0 m (6.6 ft to 13.1 ft) prior to the daylight hole at the crossing, to verify depth and trajectory of drill head and backreamer.
Crossing above pipeline (HDD)	Top of pipeline and all sides exposed to 1.0 m (3.3 ft) or 1.0 m (3.3 ft) below the proposed installation. Additional positive identification hole at 2.0 m to 4.0 m (6.6 ft to 13.1 ft) prior to the positive identification hole at the crossing, to verify depth and trajectory of drill head and backreamer.

a. See Figure 8-2: Pipeline Location Verification and Clearance Requirements for HDD for crossing all pipelines (including Vital Pipelines) on page 24.

8.2 Drilling Parallel to Pipelines

When the proposed route is parallel to a natural gas pipeline at a perpendicular distance of 3 m (10 ft) or less, positive identification must be performed at intervals

of no more than 10 m (33 ft) along the drilling path so that the precise location of the drilling head and backreamers (if any) can be verified visually. These excavations must be sufficiently wide to see the entire width of the drilling head, backreamers, and structures from entry point to exit point.

Note

The location of the pipeline must be visually confirmed as per the requirements set out in Table 8-2: Pipeline Location Verification Requirements for Vital Pipelines on page 21 and Table 8-3: Pipeline Location Verification Requirements for All Other Pipelines on page 21.

Note

For all pipelines (including vital pipelines), when drilling parallel to the pipeline, a minimum horizontal clearance of 1 m (3.3 ft) is required.

Table 8-2: Pipeline Location Verification Requirements for Vital Pipelines

Location of Work Relative to Pipeline[a]	Required Verification of Pipe Location by Hand Digging or Hydro-excavation
Work parallel to pipe, within 1 m (3.3 ft)	Spacing of test holes must not exceed 4.5 m (15 ft)
Work parallel to pipe, between 1 m (3.3 ft) and boundary area of pipeline based on size	Spacing of test holes must not exceed 4.5 m (15 ft)[b]
Crossing below pipeline (open excavation)	Top and sides of pipeline, and 0.6 m (2 ft) below the pipeline
Crossing above pipeline (open excavation)	Top and sides of pipeline, or 0.6 m (2 ft) below the proposed installation

a. Test holes must expose top and sides of pipeline

b. For work parallel to pipe, between 1 m (3.3 ft) and boundary area of pipeline based on size, for rural applications, test holes must be completed for any change in direction of the pipeline every 23 m (75 ft).

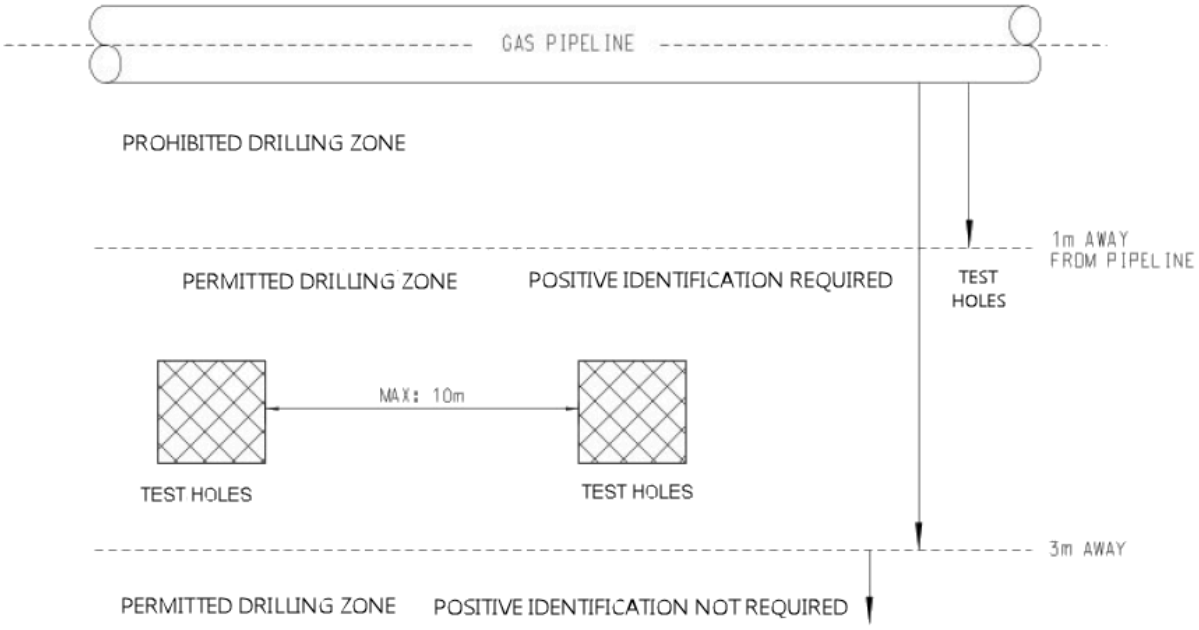
Table 8-3: Pipeline Location Verification Requirements for All Other Pipelines

Location of Work Relative to Pipeline	Required Verification of Pipe location by hand digging or hydro-excavation
Work parallel to pipe, inside of boundary area (1 m [3.3 ft])	Spacing of test holes must not exceed 4.5 m (15 ft)
Crossing below pipeline (open excavation)	For less than NPS 12: Top of pipeline and all sides of the pipeline, or 0.3 m (1 ft) below the pipeline For NPS 12 and larger: Top of pipeline and all sides of the pipeline, or 0.6 m (2 ft) below the pipeline
Crossing above pipeline (open excavation)	For less than NPS 12: Top of pipeline and all sides of the pipeline,or 0.3 m (1 ft) below the proposed installation For NPS 12 and larger: Top of pipeline and all sides of the pipeline, or 0.6 m (2 ft) below the proposed installation

No drilling installation may be performed within a distance of 1 m (3.3 ft) or less from either side of the pipeline. This buffer zone must be clearly designated and

marked off around the work area. This prohibited zone may be widened in some cases.

Figure 8-1: Drilling Parallel to Pipelines



8.3 Drilling Across Pipelines

When the proposed drill path crosses a GDS pipeline, the pipeline must be exposed to the desired depth of the crossing to ensure that the natural gas pipeline is not affected and that the required clearance is maintained during all drilling operations. All minimum clearances must be measured from the outer edge of the drill, including backreamers (if any), to the outer circumference of the pipeline.

To ensure that the directional drilling operation will not result in damage to the pipeline, the following positive identification hole requirements must be followed:

- A positive identification hole must be created that is sufficiently wide enough to see the drill head and backreamer entering the excavation at a minimum of 1 m (3.3 ft) before crossing the pipeline. See Figure 8-2: Pipeline Location Verification and Clearance Requirements for HDD for crossing all pipelines (including Vital Pipelines) on page 24 positive identification hole 1.
- A second positive identification hole must be created prior to reaching the pipeline such that the precise location of the drill head and backreamer (if any) can be verified visually. The positive identification hole must be sufficiently wide to measure the depth and trajectory of the drill head and backreamer.

See Figure 8-2: Pipeline Location Verification and Clearance Requirements for HDD for crossing all pipelines (including Vital Pipelines) on page 24 positive identification hole 2.

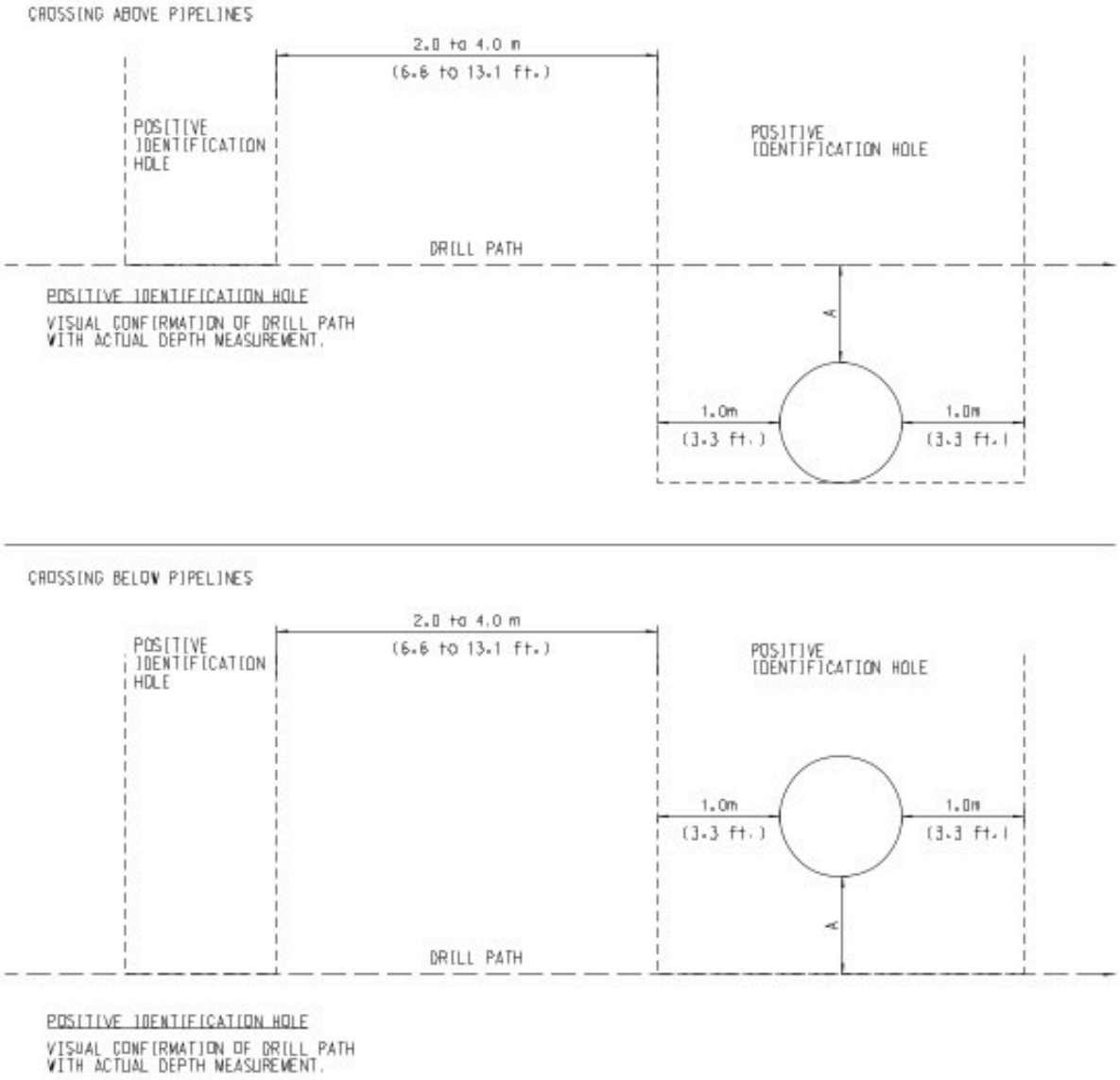
When drilling across pipelines that are smaller than NPS 16 (excluding vital pipelines), the vertical clearance, measured from the edge of the pipeline to the edge of the final bore hole, may follow the vertical clearance outlined in Table 4-1: Minimum Clearance Between Gas Pipelines (Less than NPS 16) and Other Underground Structures on page 10 as long as all positive identification requirements are also followed.

When drilling across pipelines that are NPS 16 or larger, or crossing any CER-regulated pipelines or vital pipelines, a minimum vertical clearance, measured from the edge of the pipeline to the edge of the final bore hole, of 1 m (3.3 ft.) is required.

Note

The location of the pipeline must be visually confirmed as per the requirements set out in Table 8-2: Pipeline Location Verification Requirements for Vital Pipelines on page 21 and Table 8-3: Pipeline Location Verification Requirements for All Other Pipelines on page 21. For specified minimum clearances, see 4 Minimum Clearance from Other Structures on page 10.

Figure 8-2: Pipeline Location Verification and Clearance Requirements for HDD for crossing all pipelines (including Vital Pipelines)



9 Hydro-Excavation

9.1 General

Hydro-excavation, also known as hydrovac, is the non-destructive process in which pressurized water is utilized as a method of excavation through loosening and suction of soil, rocks, and other earth materials. Hydro-excavation machines are an alternative to hand digging to locate and expose pipelines.

9.2 Hydro-Excavation Requirements

The following requirements must be met at all times when excavating with hydro-excavation technology:

- Spinning tip nozzles must be used for hydrovac excavations with water pressures that must not exceed the maximum water pressure of 17,236 kPa (2,500 psi) during excavation. Pressure measures must be permanently monitored using a calibrated device mounted on either the hydro-excavation machine (truck and pump), or the wand when using a spinning tip nozzle.
- The wand must never remain motionless during excavation. The wand must never point to the plant at any time.
- A distance of 20 cm (8 in) between the end of the pressure wand nozzle and the plant or subsoil must be maintained. The nozzle must never be inserted into the subsoil while excavating above the plant.
- Hydro-excavation equipment and nozzles must have been specifically designed for use above buried gas lines or other reasonably expected underground gas plants.
- A device capable of stopping the excavation on demand must be installed, such as an approved automatic electronic shut-off or valve on the wand.
- If heated water is used during excavation, the temperature and pressure of the water must not exceed 100 °F (38 °C) and 17,250 kPa (2,500 psi), respectively.
- The excavator must contact the gas utility if any damage to a gas plant occurs while using hydro-excavation technology or any other method of excavation.

10 Backfilling

The gas pipeline must be inspected by GDS for damages before backfilling the excavation. It is the third party's responsibility to ensure that the gas pipeline is not undermined or endangered in any way. If any damage occurs, GDS must be contacted immediately.

The following principles must be followed:

- The backfill does not harm the pipe or coating throughout the installation process and while in service.
- The use of native material (especially with respect to anode installation) and minimize haul out must be maximized.
- A reliable and stable installation must be created and the use of dams included when appropriate.

The Company permits the use of any compacting device that:

- Will compact backfill sufficiently to eliminate any settlement of the pipe or ground surface.
- Will not cause any deformation or damage to the pipe or coating.
- Will not cause any damage to any adjacent building, structure or utility.
- Will not cause any damage to any tree, shrub, tended lawn, or ground cover.

When backfilling where the finished grade has not been established, sufficient soil must be placed over the trench to allow for settlement.

Backfilling must be done in such a manner as to prevent any rocks from being placed at or near the surface of the pipe. Native excavated material must be used

as backfill unless otherwise directed by GDS. Where native material is unsuitable, 150 mm (6 in) of approved earth or sand padding must be placed over the pipe for protection, to a minimum depth of 300 mm (12 in). Each layer must be compacted thoroughly by manual tamping. Topsoil must not be used for backfilling.

Aggregate backfill must be replaced in 200 mm (8 in) layers. Each layer must be thoroughly compacted by pneumatic tampers or an equivalent method acceptable to GDS to ensure no settlement. The final layer must be smoothed down with a grader (or a rake for small scale projects) and must be tamped flush or slightly higher than the surrounding ground surface in order to prevent ponding of water and accommodate any future soil subsidence over the trench line.

Backfilling a flooded trench is not allowed. The third party is responsible for the removal of water from the trench, before backfilling. If backfilling on a slope, the backfill must first be placed from the bottom of the slope, then the filling should continue by building upwards. This prevents large voids in the backfill that can occur when the backfill is dumped from the top of a slope.

Backfill and compaction within road allowances must be completed in accordance with the local governing authority.

Unshrinkable fill or other engineered backfill material must be installed only when requested by the municipalities, local governing authority, or as directed by GDS. The approved unshrinkable fill must be batched at a ready-mix plant with a specified maximum compressive strength of 0.7 MPa at 28 days and minimum slump of 150 mm (6 in). After curing, it must be excavatable using hand tools and must meet any governing agency requirements. The pipe and valve assemblies must be sand padded before placement of unshrinkable fill. The third party must ensure that placement of the unshrinkable fill does not displace sand padding or directly contact the pipeline.

If the bulk backfill material contains rocks, stones, or frozen material, pipelines must be padded with padding material to a minimum depth of 150 mm (6 in) over the pipe and fittings. If the location requires the backfill material to be tamped, the padding material must also be tamped.

The final covering of gas pipelines must adhere to municipal requirements.

11 Blasting and Pile Driving

11.1 General

Blasting and pile driving activities in the vicinity of GDS facilities require prior approval by GDS. The Blasting and Pile Driving Form, provided by GDS, must be submitted by the owner of the proposed work for all blasting and pile-driving operations. The request must be submitted a minimum of four weeks prior to the beginning work to allow sufficient time for review.

11.2 Blasting

Before any blasting operation in the vicinity of a gas pipeline can occur, the hazards to the GDS facility must be evaluated. Responsibility for the design of the blast and any resultant damage is borne entirely by the party using the explosives.

A recognized independent blasting consultant must be retained at the applicant's expense to perform an evaluation of the blast design. The independent blasting consultant must be an independent engineering consultant specialized in blasting. A copy of the stamped consultant's validation report must be submitted to GDS for review if blasting is to occur within 30 m (100 ft) of GDS facilities.

If in the opinion of GDS or an independent blasting consultant, blasting cannot be carried out without affecting the facility's integrity, alternatives must be considered, including the replacement or relocation of the affected facility at the applicant's expense. In these situations, additional time must be allowed to obtain the necessary permits and to complete the necessary construction work. In the event a third party is affected as a result of the blasting operations, all expenses associated therewith incurred by GDS must also be at the applicant's expense.

Ontario: The third party must comply with the Ontario Provincial Standard Specification (OPSS 120 – General Specification for the Use of Explosives) in addition to GDS's blasting requirements.

Quebec: The third party must comply with Quebec's Acts regarding explosives (CQLR c E-22 and CQLR c E-22, r 1) and Safety Code (CQLR c S-2.1, r 4), in addition to GDS's blasting requirements.

11.2.1 Surface and Tunnel Blasting Application Process

For subsurface blasting application requirements, refer to the Surface Blasting section of the Blasting and Pile Driving Form.

For tunnel blasting application requirements, refer to the Surface Blasting section of the Blasting and Pile Driving Form in addition to the Tunnel Blasting section.

To assist with the preparation of the form, locates must be requested to determine the location of the facilities.

11.2.2 Guidelines for Blasting

The information provided in this section is not to be construed as an exhaustive list of performance specifications, but rather a guide for conducting blasting in the vicinity of GDS's facilities. The third party is responsible for ensuring that all blasting work is performed in a good and workmanlike manner in accordance with all applicable laws, codes, by-laws, and regulations.

The third party will be held liable for and indemnify GDS in relation to any and all damage directly or indirectly caused or arising as a result of blasting operations carried out by the applicant, its employees, contractors, or those for whom the applicant is responsible by law. Prior to blasting operations, a site meeting must be arranged with an authorized representative of the applicant and a GDS representative to confirm the location of GDS's facilities and details of the proposed blast.

GDS's pipelines must not be excavated prior to blasting. If excavation is unavoidable, then the pipeline must be properly supported according to GDS's requirements as stated in 7 Support of Gas Pipelines on page 14.

The third party must take suitable precautions to protect the exposed pipeline from fly-rock .

Explosives must be of a type that cannot propagate between holes or be desensitized due to compression pressures. Explosives must not be left in the drill hole overnight.

If a surface blast islocated less than 10 m (33 ft) from pipeline; creates its first blast hole at a depth equal to the top of the pipeline; andthe depth of subsequent blast holes exceeds one half of the horizontal distance to the closest portion of the pipeline, then the required independent blasting consultant's report must specifically address the impact of these conditions. This is not applicable for tunnel blasting operations. The blasting consultant is responsible for the monitoring of blasting vibrations with a portable seismograph capable of transmitting data instantaneously (e.g., via email or cellular) to the required reviewer in the vicinity of GDS's facilities is mandatory to confirm that predicted vibration levels are respected. On a daily basis, a copy of the seismographic report must be provided to GDS.

Peak particle velocity (PPV) must be limited to 50 mm/s (2 in/s) and maximum amplitude must be limited to 0.15 mm (0.006 in).

11.2.3 Post Blasting

A leak survey must be completed at the end of each day of blasting. Upon completion of daily blasting operations and within 30 days after the final blasting, GDS will conduct a leak survey of the pipeline at the third party's expense. Leak surveys will also be completed at the end of each day of blasting. Damage that has resulted from the blasting will be repaired at the third party's expense. A summary of all blasting operations including blasting logs, vibration control, seismograph reports, and other pertinent information must be provided to GDS by the third party daily and at the completion of blasting operations.

11.3 Pile Driving

General pile installation or compaction activities in the vicinity of GDS's facilities must be evaluated by GDS prior to beginning. Any resultant damage as a result of these activities will be borne entirely by the third party undertaking the proposed work.

If in the opinion of GDS, the particular pile installation or compaction operation cannot be carried out without affecting the pipeline or facility integrity, the following must be considered:

- Risk analysis or mitigation program for the proposed operation.
- Alternative construction methods.
- Relocation or replacement of the facility.

All costs incurred will be covered by the third party undertaking the proposed work and final approval for the work will be granted by GDS.

Piles installed using an auger must satisfy the locating and clearance requirements listed in 5 Pipeline Location Verification on page 10 and 4 Minimum Clearance from Other Structures on page 10, respectively. GDS must provide approval for the installation of piles within 3 m (10 ft) of a vital pipeline.

The third party is responsible for all costs related to customer interruption as well as costs incurred because of work delays. In the event a third party is affected as a result of the pile installation or compaction operations, all expenses associated therewith incurred by GDS will be passed to the third party.

11.3.1 Pile Driving Application Process

The application to pile drive or do compaction work must be sent to GDS via the Blasting and Pile Driving Form.

This work must be completed under the supervisor of qualified personnel. Vibration results must be provided to GDS on a daily basis.

11.3.2 Pile Installation and Compaction Work

The information provided in this section is not to be construed as an exhaustive list of performance specifications, but rather a guide for conducting pile installation and compaction work in the vicinity of GDS's facilities. The third party is responsible for ensuring that all pile installation and compaction work is performed in accordance with all applicable laws, codes, by-laws, and regulations.

Operations must not be permitted within a standoff distance of 3.0 m (10 ft) from the pipeline or other natural gas facility, unless approved by GDS.

Prior to pile installation or compaction work, a site meeting with an authorized representative of the third party and a GDS representative (for the Damage Prevention contact, see 12 Contact Information on page 31) must be arranged by the third party, to confirm the location of GDS's facilities and the details of the proposed work.

It is recommended that during the design phase, pile installation or compaction work drawings be sent to Markups for review (see 12 Contact Information on page 31).

The pipeline should not be excavated prior to the piling or compaction operation. If excavation of the pipeline is necessary, then it must be properly supported in accordance with 7 Support of Gas Pipelines on page 14.

The following situations require the opinion of an independent professional engineer:

- Compaction of soils or backfill rated at 10,000 ft-lbs (13,600 Nm) or higher at a stand-off distance of 6 m (20 ft) or less from the pipeline.
- Pile driving at a stand-off distance of 10 m (33 ft) or less from the pipeline facility.
- High-energy dynamic compaction for the rehabilitation of soils at a stand-off distance of 30 m (100 ft) or less from the pipeline.

- Type 4 soil as defined in Article 226 of the Occupational Health and Safety Act and Regulations for Construction Projects (see Table 15-1: Soil Types on page 33).

For these situations, the appropriate number of seismographs to monitor vibrations is mandatory. The seismographs must be portable with the capability of transmitting data instantaneously (e.g., via email or cellular). This control will confirm the intensity of the vibrations generated by the pile installation or compaction work as projected. Furthermore, reports of recorded intensities must be provided on a regular basis or at the request of GDS.

The peak particle velocity (PPV) measured on the pipeline, or at the closest point of the related structure with respect to the work, must not exceed 50 mm/s (2 in/s). Furthermore, the maximum displacement for the vertical or horizontal component corresponding to the above stated vibration intensity must not exceed 50 mm (2 in) at any given length of the pipeline in question.

If the PPV or displacement limit is surpassed, all operations must stop notwithstanding any delays or costs incurred by the third party or owner of the proposed work. GDS requires that the cause of these higher vibrations or displacements be investigated. GDS may arrange for a leak survey to be conducted. GDS Engineering must approve resumption of operations. Should a situation with low energy compaction operations with a soil cover of less than 1.5 m (5 ft) above the pipeline at a stand-off distance of 3 m (10 ft) or less from a pipeline be encountered, GDS may require the opinion of an independent engineering consultant.

In addition, if a Type 3 soil (see Table 15-1: Soil Types on page 33) is present on site, GDS may require the opinion of an independent engineering consultant.

The use of an auger may be required in order to avoid the use of piles.

All operations must comply with the Provincial Occupational Health and Safety Act and Regulations for Construction Projects, other applicable laws and regulations, as well as all applicable GDS specifications, standards, and guidelines.

11.3.3 Post Pile Driving Process

The third party must send GDS the items that follow within five business days of the completion of the pile installation via pile driving or compaction operations:

- A summary of all operations.
- Pile driving and compaction logs.
- Vibration control records.
- Seismograph records.

On completion of each day’s work, and approximately 30 days after all work is completed, GDS will arrange to conduct a leak survey of the facility. If damage to GDS’s facilities is found, it will be repaired by the third party. An invoice will be sent to the third party responsible for the work.

12 Contact Information

Location	Contact
Enbridge Gas Inc 500 Consumers Road North York, ON M2J 1P8	Markups: Mark-Ups@enbridge.com Ontario One Call Locates: 1-800-400-2255 Damage Prevention: 1-866-922-3622 Emergency: 1-866-763-5427 and 1-877-969-0999
Enbridge Gas Inc Storage and Transmission Operations Locates (Dawn) 3332 Bentpath Line P.O. Box 1180 Dresden, ON N0P 1M0	Ontario One Call Locates: 1 (800) 400-2255 Locates: 1-800-265-5260 ext 5102236 Stacey.Smith@enbridge.com Locates: 1-800-265-5260 ext 5102184 Janice.Langstaff@enbridge.com
Enbridge Gas Inc Storage and Transmission Operations Locates (Tecumseh) 3501 Tecumseh Road, Mooretown, Ontario N0N 1M0	Field Operations: 519-312-0176 jay.moore@enbridge.com Field Operations: 519-862- 6004 jason.japp@enbridge.com Tecumseh Control Room: 519-862-6012 Emergency: 1-800-255-1431
Gazifère 706 Boulevard Greber Gatineau, QC J8V 3P8	Locates: 1-800-663-9228 Planning Dept.: 1-819-776-8804 Emergency: 1-819-771- 8321, press 1

Note

The website www.clickbeforeyoudig.com gives access to the damage prevention centres in Canada, and allows locate requests to be made for each province.

13 References

- IS_F_172 Blasting and Pile Driving Form

14 Document Governance

For document control and maintenance purposes, the following tables capture important information related to this document.

Control and Maintenance

Category	Value
Owned By	Pipeline Engineering
Review Interval	Every three years
MOC-Related	No

Revision History

Table 14-1: January 2024 Release

Release Date	Version	Project Number	RFC Number	Prepared By	Approved By
2024-01-31	1.2.1	n/a	5399	Derek Brecht, Engineer Pipeline Engineering	Todd Piercey, Manager, Pipeline Engineering
Doc ID		**Scope**	**Document & Section**		**Summary of Changes**
ST-1E-30A8-8E30		GDS	Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard		Revised Figure 8-1.

Table 14-2: September 2021 Release

Release Date	Version	Project Number	RFC Number	Prepared By	Approved By
2021-09-29	1.1.1	n/a	4983	Hooman Zahedi, Supervisor, Pipeline Engineering	Todd Piercey, Manager, Pipeline Engineering
Doc ID		**Scope**	**Document & Section**		**Summary of Changes**
ST-1E-30A8-8E30		GDS	Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard		Corrected typo in 11.2 Blasting

Table 14-3: June 2021 Release

Release Date	Version	Project Number	RFC Number	Prepared By	Approved By
2021-06-30	1.1.0	n/a	4922	Hooman Zahedi, Supervisor, Pipeline Engineering	Todd Piercey, Manager, Pipeline Engineering
Doc ID		**Scope**	**Document & Section**		**Summary of Changes**
ST-1E-30A8-8E30		GDS	Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard		Revise tree clearance restrictions in section 3.8.

Table 14-4: April 2021 Release

Release Date	Version	Project Number	RFC Number	Prepared By	Approved By
2021-04-28	1.0.0	6513-20	None	Emily Varga, EIT I, Pipeline Engineering	Todd Piercey, Manager Pipeline Engineering

Doc ID	Scope	Document & Section	Summary of Changes
ST-1E-30A8-8E30	GDS	Third-Party Requirements in the Vicinity of Natural Gas Facilities Standard	Initial version.

15 Soil Types

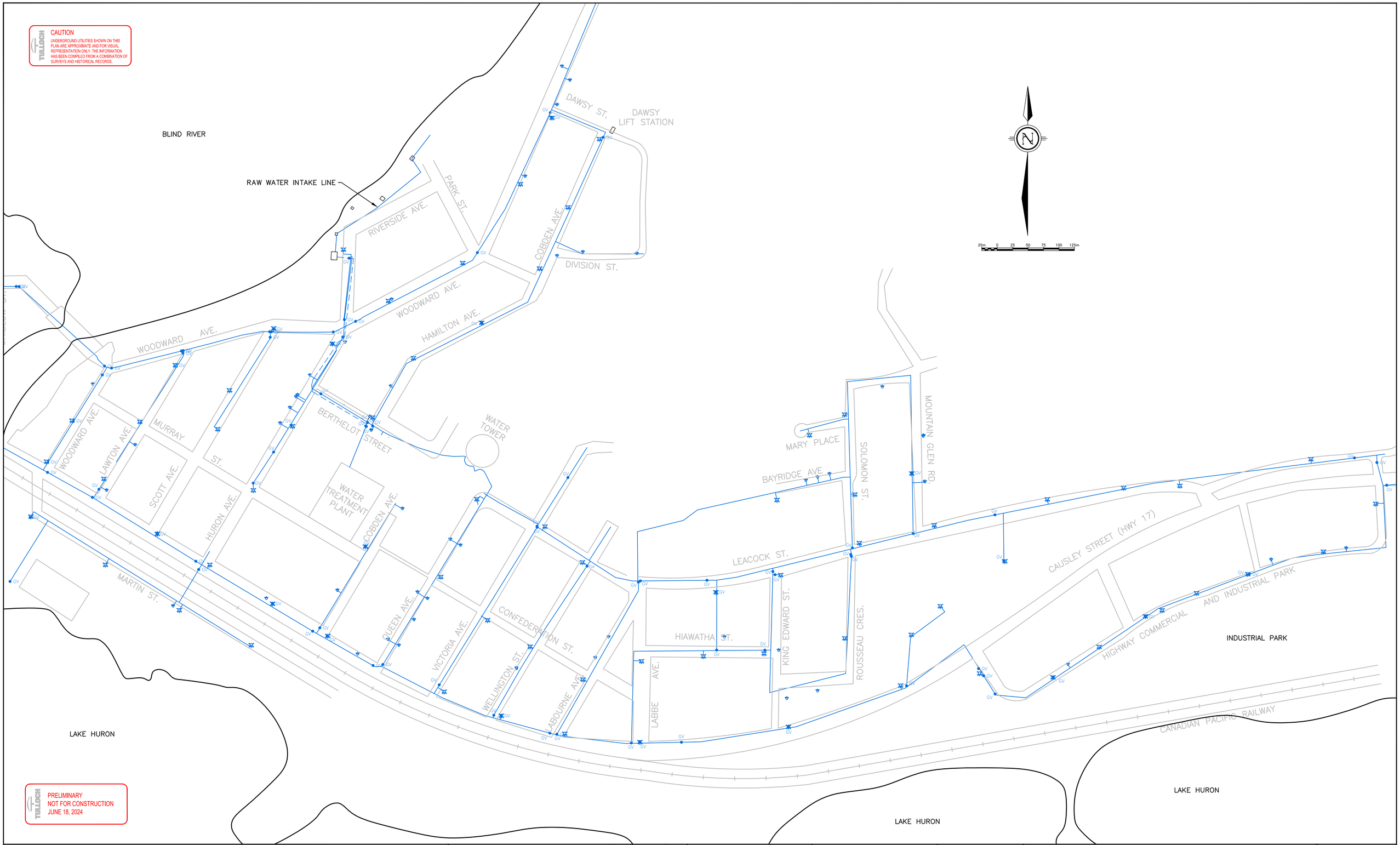
Table 15-1: Soil Types

Type	Definition
Type 1	• Hard, very dense, and only able to be penetrated with difficulty by a small sharp object. • Low natural moisture content and a high degree of internal strength. • No signs of water seepage. • Can be excavated only by mechanical equipment.
Type 2	• Very stiff, dense, and can be penetrated with moderate difficulty by a small sharp object. • Low to medium natural moisture content and a medium degree of internal strength. • Damp appearance after it is excavated.
Type 3	• Stiff-to-firm and compact-to-loose in consistency or is previously-excavated soil. • Exhibits signs of surface cracking. • Exhibits signs of water seepage. • If dry, may run easily into a well-defined conical pile. • Low degree of internal strength.
Type 4	• Soft to very soft and very loose in consistency, very sensitive, and upon disturbance is significantly reduced in natural strength. • Runs easily or flows, unless it is completely supported before excavating procedures. • Almost no internal strength. • Wet or muddy. • Exerts substantial fluid pressure on its supporting system.

TOWN OF BLIND RIVER WATER DISTRIBUTION MAPPING, DRAWING 20-1627-G3, June 18th, 2024

CAUTION

UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE AND FOR VISUAL REPRESENTATION ONLY. THE INFORMATION HAS BEEN COMPILED FROM A COMBINATION OF SURVEYS AND HISTORICAL RECORDS.



PRELIMINARY
NOT FOR CONSTRUCTION
JUNE 18, 2024

LEGEND

- APPOXIMATE WATERMAIN
- RAW WATER SUPPLY MAIN
- SURVEYED GATE VALVE — GV
- SURVEYED WATER SHUT–OFF
- SURVEYED FIRE HYDRANT
- APPROXIMATE ROAD ALLOWANCES

Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations

REVISIONS	No	DATE	BY

TULLOCH

Blind River

INFRASTRUCTURE SYSTEMS WATER DISTRIBUTION TOWN OF BLIND RIVER

TOWN SITE – EAST OF RIVER

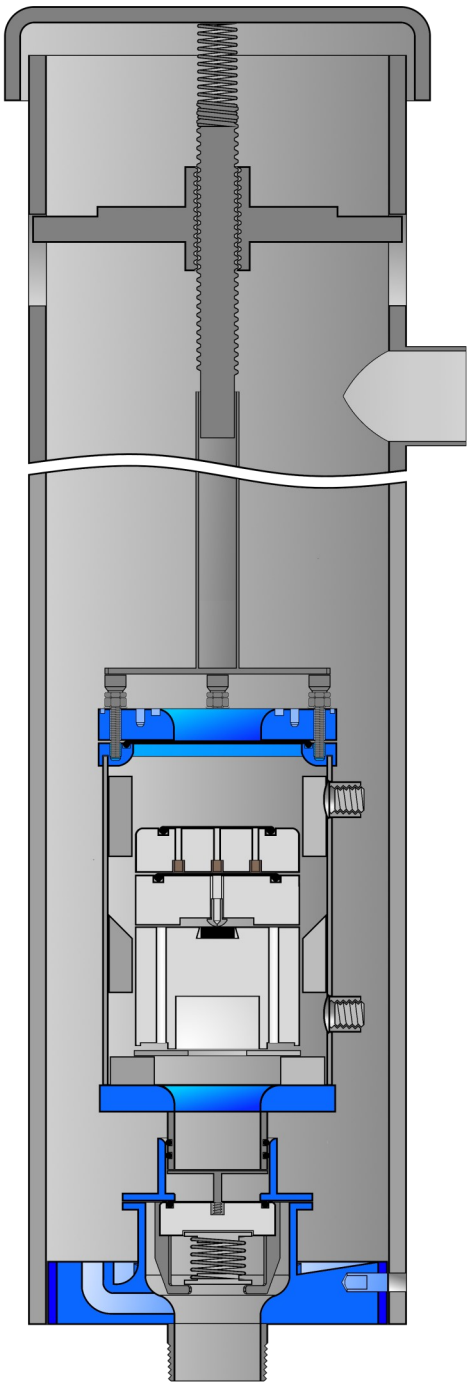
Scale	1:2500
Dr. DAS	Ch. CLK
Date	AUGUST 2021
Dwg. No.	REV.
20–1627–G3	0

INTERNATIONAL VALVE: VENT-TECH DIRECT BURY VALVE SERIES C

International Valve Marketing, LLC
483 Heartland Drive, Unit C
Sugar Grove, IL 60554
Telephone: (630)-466-0300
Facsimile: (630)-466-0302
Website: www.internationalvalve.com

Vent-Tech Direct Bury Valve —363 psi (25 Bar)

Series C—Combination Air Valve for Potable Water



GENERAL SPECIFICATION

- The Original Flat Float Design—with over 30 improvements.
- Integral protection from water hammer and surge.
- Optimized for Low Pressure Sealing. Less than 3 psi.
- Pressurized Air Release

ISO 9001: 2015 CERTIFIED

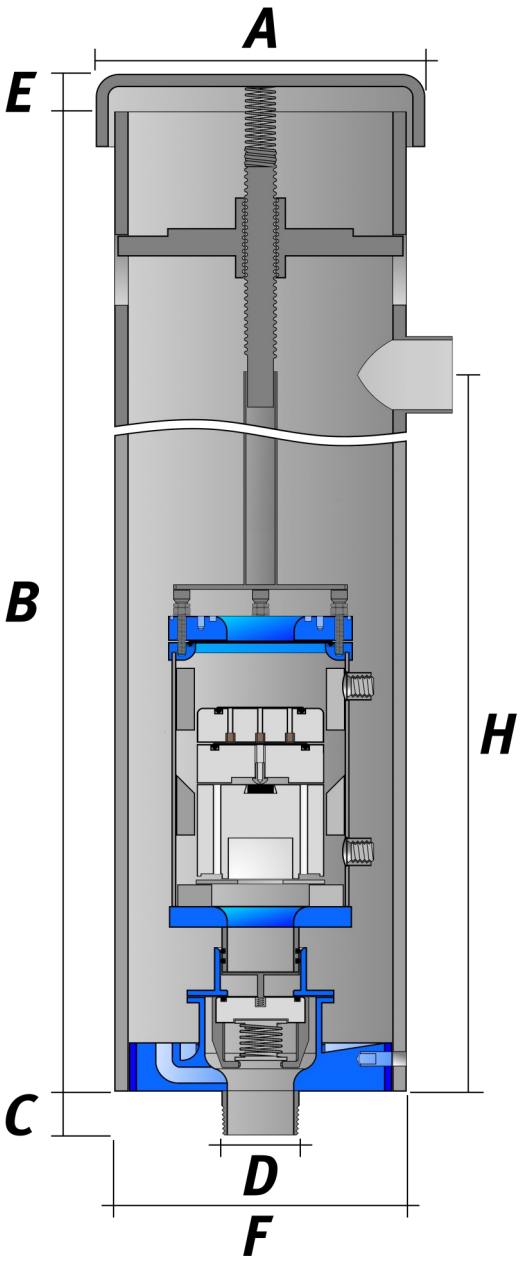
CLASSIFIED C UL US WATER QUALITY

VALVES ANSI/NSF 61 ALSO CLASSIFIED IN ACCORDANCE WITH ANSI/NSF 372 MH61807

- Stainless Steel Body and Flanges
- Made in the U.S.A.
- ISO 9001: 2015 Certified QMS
- UL Inspected Facility
- 10-Year Warranty
- 50-Year Targeted Design Life

Model DBV: Series C—Dimensions

363 psi (25 Bar) Male NPT Threaded



The Vent-Tech Model DBV clean water Direct Bury combination air and vacuum valve with anti-surge functionality combines over 20 years of manufacturing experience with advanced Patented flow designs.

The Model DBV was engineered to continue expanding and improving the technological advances of the flat float air/vacuum valve while providing a system designed to replace other complex and expensive manhole constructions. Because all maintenance and repair work for this system can be done from the surface confined space entry, acc. to OSHA regulations is eliminated and all the dangers related to manhole access can be avoided.

- Medium: Potable Water
- Max. Op. Pressure: 363PSI (25 Bar)
- Height: Customizable to end user requirements
- Operating Range: **MINIMUM:** < 3 psi (< 0.2 Bar); DESIGN: 363 psi (25 Bar)
  TEST: 1.5 x Rated Design Pressure
- Service Tap Port: Included
- Drain Port: Included
- Options: Series C—Full Combination
  Series B—Biased for controlled air out
  Series V—No Air in / Air out only
  Series N—No air out
  Optional side port for efficient flow of air in and out of the DBV system.
- Valve Operation: High Volume air evacuation while pipeline fills
  No air admitted
  Discharge of air/gas from pressurized pipeline
  Surge abatement for high velocity start up conditions, column separation and fluid oscillation
- Valve Maintenance: Can be done while system is under pressure
  Can be done above ground and on-site.
  Can be done by a single worker.

Valve Part Number	Nom. Valve Size	Pressure Rating	Top Lid Dia.	DBV Height				Nipple Length	Body Dia.	Nozzle Dia. .	Anti-Surge Orifices†			Air Release Thru Anti-Surge Orifices ‡	Vacuum Relief Capacity §
											Count	Size	Single Hole Equivalent		
	D		A	B	C	E	H	C	F						
	inch NPT	psi	inch	inch	inch	inch	inch	inch	inch	mm	each	mm	mm	max. scfm	min. scfm
01DBV25TC	1	< 3.0 - 363	4 3/4		1 3/4	2		1 3/4	4 3/4	1.05	3	2.4	4.2	52	149
02DBV25TC	2	< 3.0 - 363	6 1/2		1 3/4	2		2	6 1/2	1.2	4	4.5	9	271	676

† A minimum of 3 separate wear protected orifices. Quantity and sizes of orifices are customizable. Please contact factory for additional information.
‡ At pressure of 145 psig.
§ Cubic feet per minute (ft3/min) at 70° Fahrenheit,14.7 psi absolute and 5.08 psi differential.

LEVEL 2 TYPE B PEDESTRIAN CROSSOVER SYSTEM

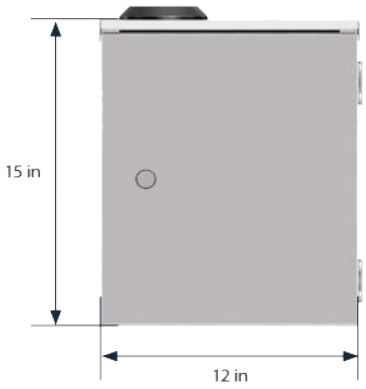
STINSON ITS

TAPCO Safe travels.

Solar-Powered Rectangular Rapid Flashing Beacon: Side-of-Pole Control Cabinet

55W/48Ah SIDE-OF-POLE CONTROL CABINET

HOUSING	NEMA 3R type aluminum
SOLAR PANEL	65 watt
BATTERY	12V, up to 50Ah
BATTERY LIFESPAN	3 to 5 years, field replaceable
MOUNTING OPTIONS	Various sizes of round, square and wood posts
MOUNTING HARDWARE	Stainless steel hardware
WARRANTY	3-year limited battery warranty 5-year limited system warranty 10-year limited solar panel warranty



Front View

Side View


Angle View

130 Creditstone Road
Concord, ON
L4K 1P2

Tel: 1-800-561-6639
Fax: 905-669-3537

3909-84 Avenue, Unit 10
Leduc, AB
T9E 8M5

Tel: 1-780-612-0844

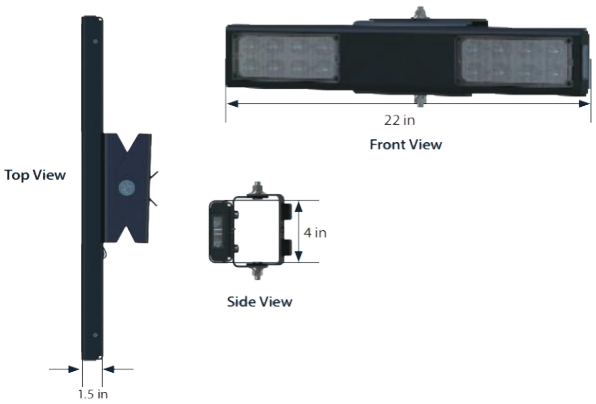
stinsonits.ca

STINSON ITS

RECTANGULAR RAPID FLASHING BEACON: RRFB-XL2™

LIGHT BAR HOUSING	Black powder coated aluminum
VEHICLE LED MODULES	7” x 3“, 2 arrays of 8 amber LEDs spaced 7” apart, SAE J595 class 1 certified
PEDESTRIAN LED MODULES	1³/⁴” x ¹/²”, side-viewable, flash simultaneously with vehicle LED (optional, one or both sides)
FLASH PATTERN	WW + S (combination wig-wag and simultaneous flash)
DIMMABLE	Automatically controlled via included photocell sensor
MOUNTING HARDWARE	Various options available
WIND LOAD RATING	Up to 120 mph (193 km/h)*
OPERATING TEMPERATURE RANGE	-40°F to 122°F (-40°C to 50°C)

**Dependent upon pole size and system arrangement*



RRFB-XL2™

BLINKERBEAM® WIRELESS RADIO

XAV2-LED PUSH BUTTON

BULLDOG PUSH BUTTON

BLINKERBEAM® WIRELESS COMMUNICATION

FREQUENCY	900 MHz FHSS (Frequency Hopping Spread Spectrum)
RANGE	900 feet (radio site survey recommended)
CONNECTIVITY	Crosswalk and optional advanced warning LEDs activate concurrently

ACTIVATIONS

PUSH BUTTON	ADA push button, typical (<120 millisecond)
USER-ACTUATED	XAV2-LED or Bulldog
PASSIVE DETECTION	Wireless bollards
AUTONOMY	24-day minimum

130 Creditstone Road
Concord, ON
L4K 1P2

Tel: 1-800-561-6639
Fax: 905-669-3537

3909-84 Avenue, Unit 10
Leduc, AB
T9E 8M5

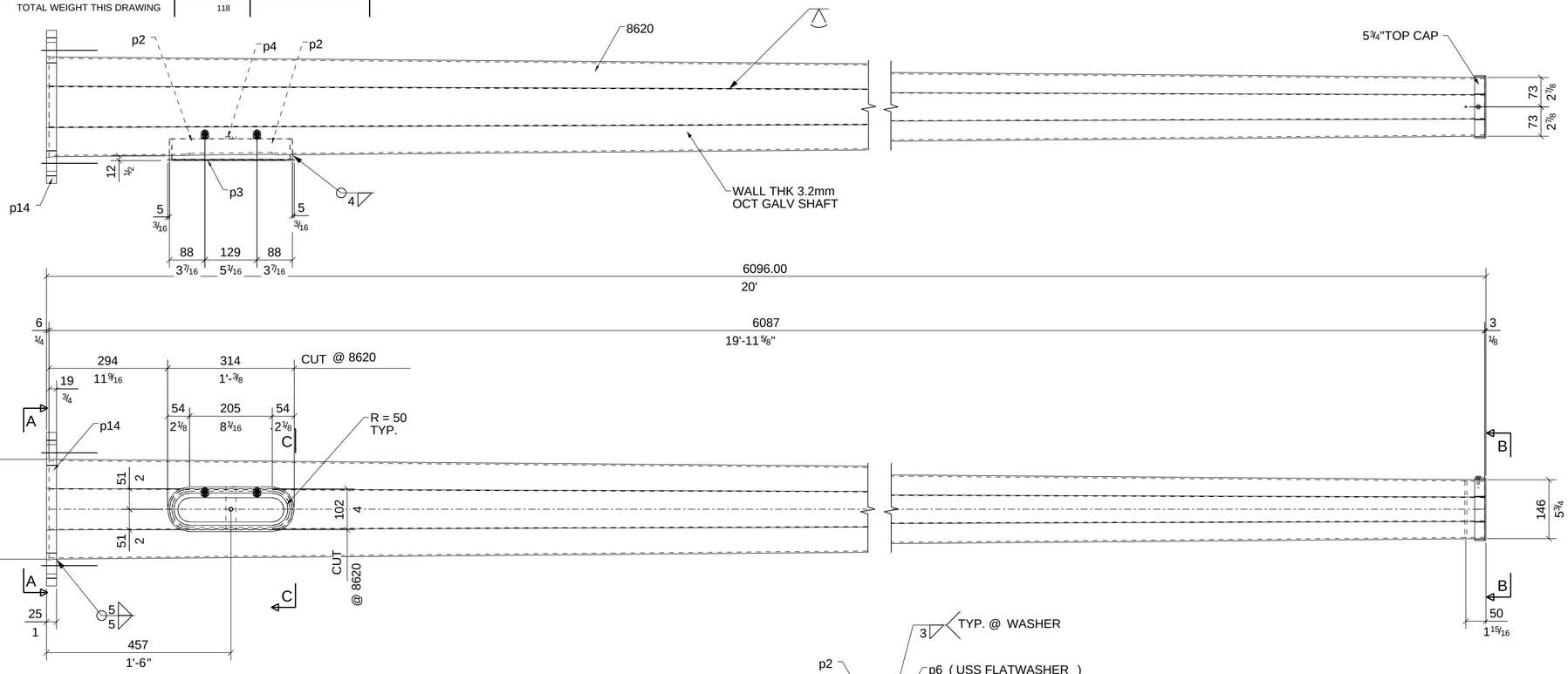
Tel: 1-780-612-0844

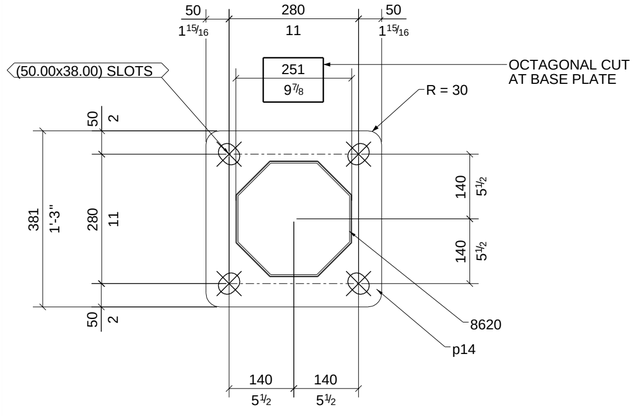
stinsonits.ca

BILL OF MATERIAL

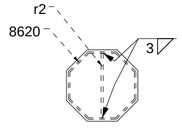
MARK	QTY	DESCRIPTION	LENGTH	WEIGHT (Kg)	REMARKS
8620	1	TRAFFIC POLE			
8620	1	OCTGON247.65-146.05	6087	97	350W
p2	2	FL6X51	355	2	300W
p3	1	PL3X111	314	0	300W
p4	1	FL6X25	111	0	ALUMINUM
p6	2	USS FLATWASHER BOI		0	
p7	2	1/4" SS LOCK WASHER BOI		0	
p8	4	1/4" SS FLAT WASHER BOI		0	
p12	1	5-3/4"OCT TOP CAP BOI		0	300W
p14	1	PL25X380	381	18	300W
r2	1	RB4.7	140	0	300W
w4	2	1/4"NCX1" SS CAP SCREW BOI		0	
w5	4	1/4"NC SS HEX NUT BOI		0	
w7	2	1/4"BRASS CUP WASHER BOI		0	
w17	1	1/4"NCX1"SS HHMB CAP SCRBOI		0	
		TOTAL WEIGHT THIS DRAWING		118	

REV	DESCRIPTION	DATE
0	For Fabrication	10/10/2017
A	For Approval	10/06/2017

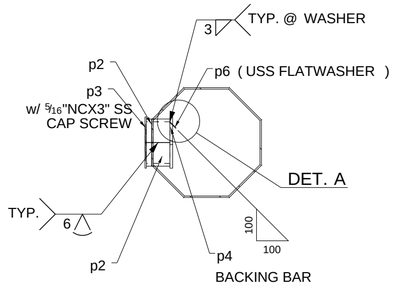




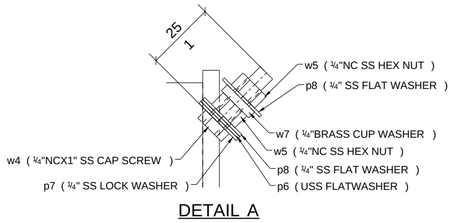
A - A



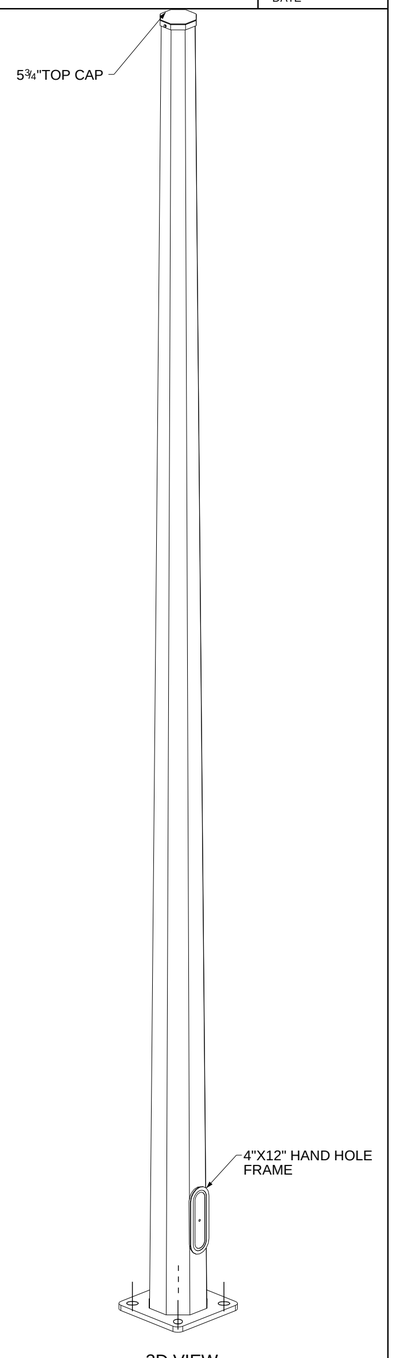
B - B



C - C



DETAIL A



3D VIEW

NOTES:

1. All steel to be in accordance with CSA G40.21 grade 350W, grade 300W for plates
2. All welding shall be done in accordance with CSA W59.1 and is to be undertaken by fabricator qualified in accordance with CSA w47.1.
3. All steel to be galvanized after fabrication in accordance with ASTM A123.
4. Design wind pressure of 535 Pa
5. Maximum EPA at pole top not to exceed 2.0m2
6. Pole designed to meet CSA S6-14

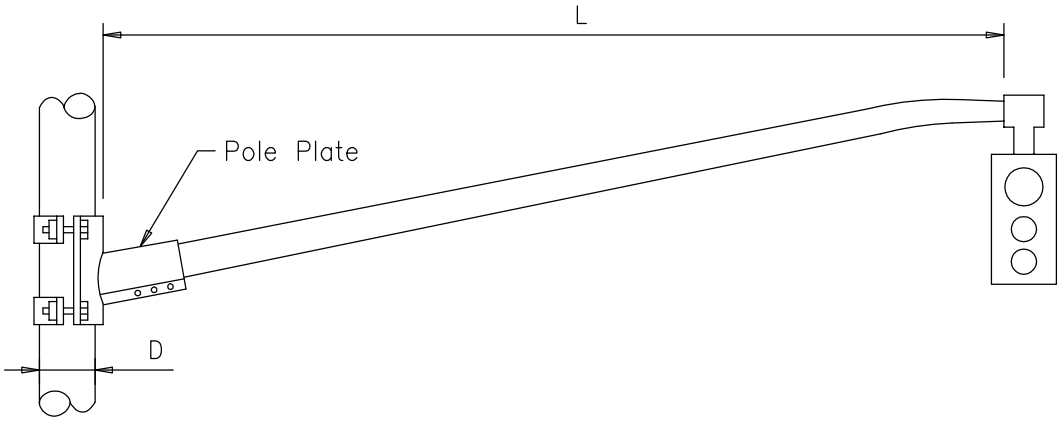
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN mm. DO NOT SCALE DRAWING

Sold by: TRAFFIC HARDWARE + DESIGN

DESCRIPTION	POLE		
PROJECT NAME	8500/8600 SERIES TRAFFIC POLES		
DRAWN BY		JOB No.	DRG No.
DATE DRAWN	10/06/2017		8620

Tella Structures

GALVANIZED STEEL POLE PLATES



Arm Length 'L'	Pole Diameter or Across Flats 'D'				
		4.25" – 6"		6.25" – 8"	8.25" – 10"
4'–0"		4TR56		4TR78	4TR81
6'–0"		4TR56		4TR78	4TR81
8'–0"		4TR56		4TR78	4TR81
10'–0"		5TR56		5TR78	5TR81
12'–0"		5TR56		5TR78	5TR81
15'–0"		5TR56		5TR78	5TR81
18'–0"		6TR56		6TR78	6TR81
20'–0"				6TR78	6TR81
22'–0"				6TR78	6TR81

Notes:

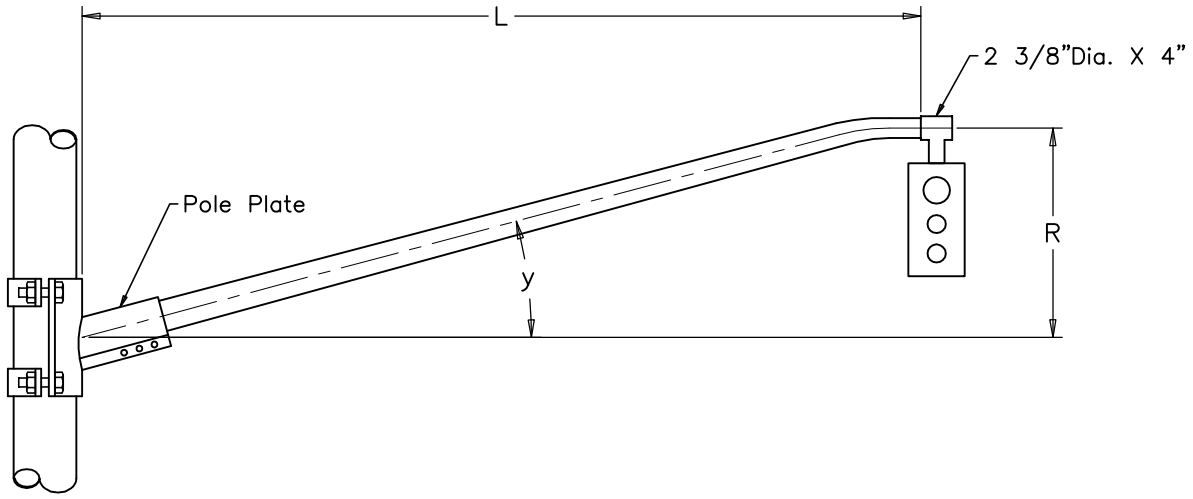
1. Pinch Bolts, Two Backing Bars and Pole Clamping Hardware included,
2. Backing Bars for 4TR81, 5TR81 and 6TR81 are Round Unless Requested Otherwise,

Traffic Hardware + Design
1641 Trinity Drive,
Mississauga, Ontario
Office: 905-670-3444 Cell: 289-259-3558
www.traffichardware.com paul.fleming@traffichardware.com

RRR– Galvanized Steel Pole Plates

TRAFFIC SIGNAL ARMS, SINGLE MEMBER ALUMINUM

SERIES 4000



Catalogue No.	Length (L)	Rise (R)	Angle (y)	Dia. at Base
SMA–4004	4'–0"	1'–9"	25°	4"
SMA–4006	6'–0"	2'–0"	25°	4"
SMA–4008	8'–0"	2'–9"	25°	4"
SMA–4010	10'–0"	2'–0"	15°	5"
SMA–4012	12'–0"	2'–9"	15°	5"
SMA–4015	15'–0"	3'–6"	15°	5"
SMA–4018	18'–0"	3'–0"	10°	6"
SMA–4020	20'–0"	3'–6"	10°	6"
SMA–4022	22'–0"	3'–9"	10°	6"
SMA–4025	25'–0"	3'–9"	10°	6"

Notes:
1. Aluminum Alloy 6063–T6,
2. Rotary Polish Finish,
3. Length "L" is Nominal,

RRR– Tapered Aluminum Traffic arms

Traffic Hardware + Design
1641 Trinity Drive,
Mississauga, Ontario
Office: 905-670-3444 Cell: 289-259-3558
www.traffichardware.com paul.fleming@traffichardware.com

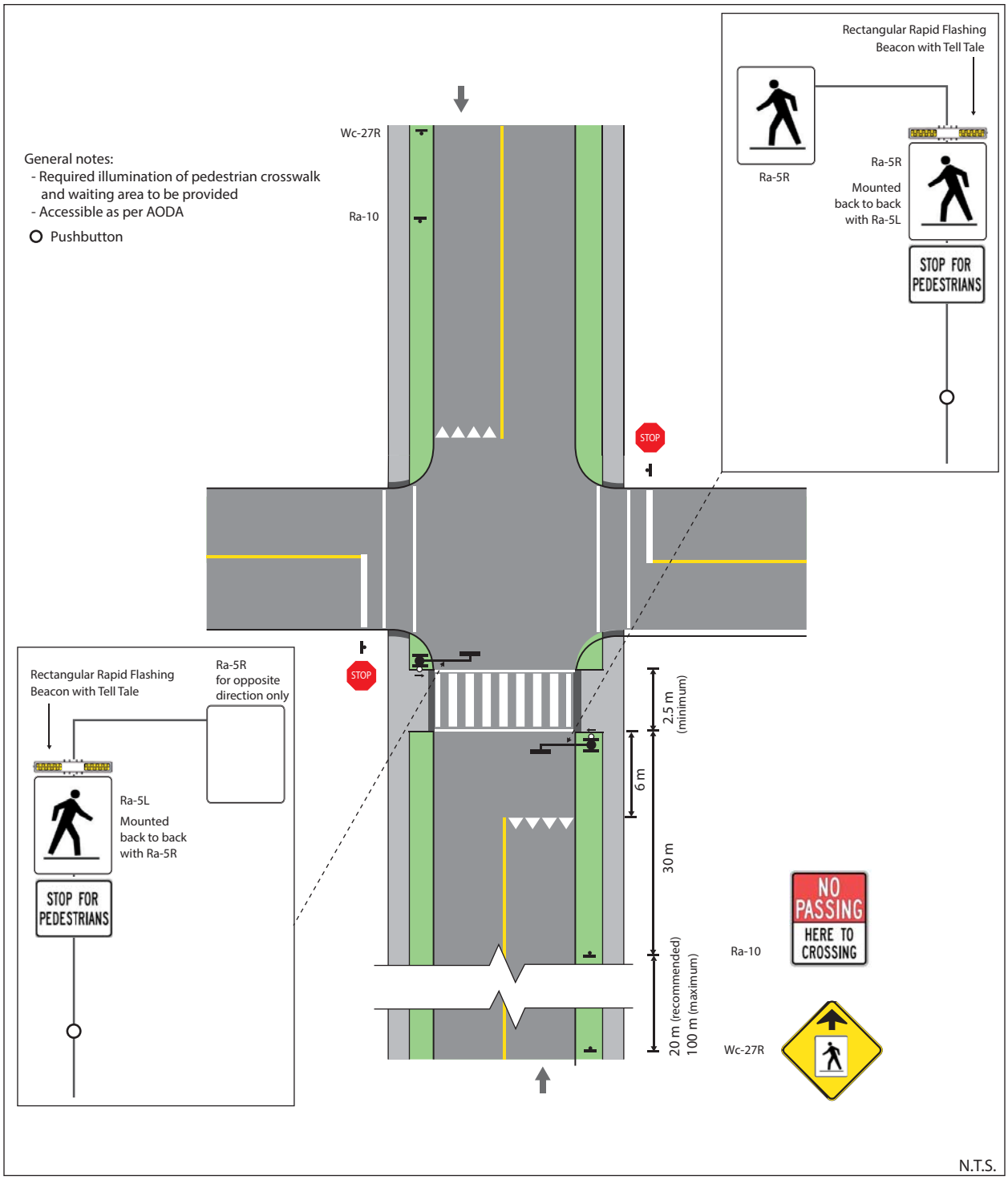


Figure 27: Pedestrian Crossover Level 2 Type B – Intersection (2-way)

In addition, on multilane approaches an advanced stop bar allows pedestrians to see vehicles in the median lane without visibility being blocked by vehicles stopped in the curb lane. Figure 10 demonstrates the pedestrian visibility with Advanced Stop bar.

6.2.4.3 Yield to Pedestrian Line

A yield to pedestrian line is used to indicate the point at which a vehicle approaching a crosswalk must yield to pedestrians in the crosswalk. A yield to pedestrian line is a mandatory component for Level 2 PXOs.

The pavement markings for a yield to pedestrian line consist of retro reflective white triangles of size 300 to 600 mm base and 450 to 900 mm height with a clear spacing of 75 to 300 mm marked as shown in Figure 11.[14] The apex of the triangle faces the direction of travel.

The yield to pedestrian line must be located at a distance of 6.0 m in advance of the crosswalks in the direction of travel.

This pavement marking must not be used for locations with traffic signal or stop control. A stop bar should be used for these applications.

6.2.4.4 Standard Crosswalk Markings

Crosswalk markings define and delineate the path of pedestrians to cross the roadway. Standard crosswalk markings must be provided at all signal control and stop controlled pedestrian crossing treatments.

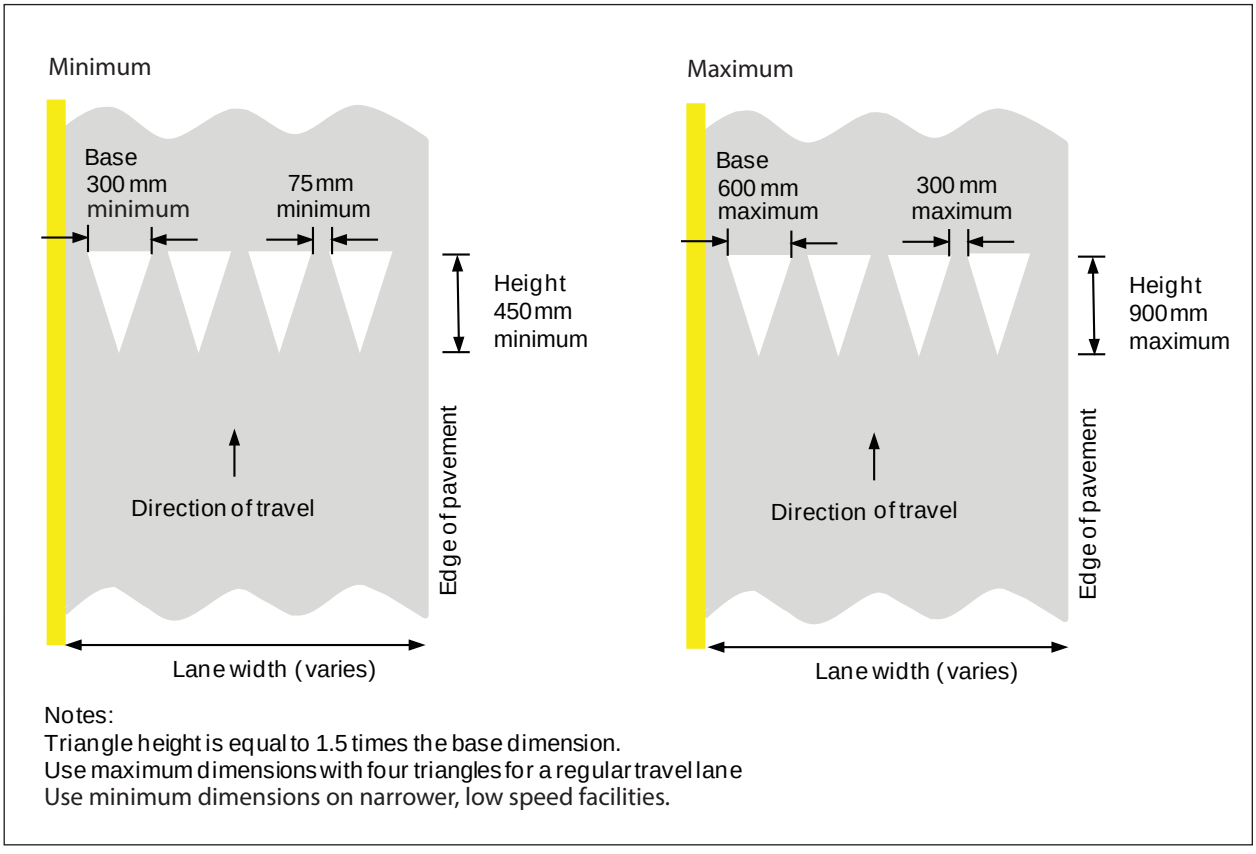


Figure 11: Specifications for Yield to Pedestrian Line

ISSUED FOR TENDER
NOT FOR CONSTRUCTION
JUNE 18, 2024

TOWN OF BLIND RIVER

NEW WATER INTAKE & HURON STREET RECONSTRUCTION
PHASE I

KEY PLAN

LIST OF DRAWINGS

No.	Rev.	DRAWING DESCRIPTION
C1	0	LEGENDS AND GENERAL NOTES
C2	0	REMOVALS PLAN
C3	0	PLAN & PROFILE 10+180 to 10+350
C4	0	PLAN & PROFILE 10+350 to 10+500
C5	0	PLAN & PROFILE 10+500 to 10+600
C6	0	PLAN & PROFILE MURRAY AND BERTHELOT STREET
C7	0	PAVEMENT MARKINGS
C8	0	TYPICAL SECTIONS AND DETAILS
C9	0	STRUCTURE & RESTRAINT SCHEDULES

Blind River

TULLOCH

PROJECT No. 23-0821

LEGEND – EXISTING

INDEX CONTOUR (0.5m INTERVAL)	143
INTERMEDIATE CONTOUR (0.1m INTERVAL)	
PROPERTY LINE	
SURVEY MONUMENT	SIB
EDGE OF ASPHALT	
EDGE OF GRAVEL	
CONCRETE SIDEWALK	
PAVING STONES	
GATE	
DITCH LINE	
EDGE OF WATER	
WOOD OUTLINE	
AERIAL HYDRO	HCA
AERIAL BELL	BCA
AERIAL BELL & HYDRO	B&H
UNDERGROUND GAS	G
UNDERGROUND BELL	BCU
UTILITY POLE	B&H
UTILITY ANCHOR	AN
MAINTENANCE HOLE	MH
CATCH BASIN	CB
TERMINAL BOX	TB
FIRE HYDRANT	
WATER VALVE	WV
WATERMAIN	W
SANITARY SEWER	SAN
STORM SEWER	ST

LEGEND – REMOVALS

ASPHALT	
CONCRETE CURB	
CONCRETE GUTTER	
CONCRETE SIDEWALK	
PAVING STONE SIDEWALK	
WATERMAIN	W
FIRE HYDRANT	
GATE VALVE	WV
WATER SHUTOFF	
STORM SEWER	ST
SANITARY SEWER	SAN
MAINTENANCE HOLE	MH
CATCH BASIN	CB

LEGEND – PROPOSED

CENTRELINE	
ASPHALT	
GUTTER LINE	
CURB OUTLINE	
CONC. SIDEWALK	
DROP CURB	
ASPHALT APRON/DRIVEWAY	
GRAVEL DRIVEWAY	
CONC. WALKWAY/STEP	
TOPSOIL/SOD	
WATERMAIN	
RAW WATER LINE	
GATE VALVE	WV
CURB STOP	
ELBOWS, TEES & COUPLERS	
FIRE HYDRANT	
AIR RELEASE VALVE	AV
SANITARY SEWER	
SAN. MAINTENANCE HOLE	SAMH
STORM SEWER	
CATCH BASIN	CB
ST. MAINTENANCE HOLE	STMH
GRADING LIMITS	

LEGEND – PROFILE

EXISTING GRADE	
INFERRED ROCK	
PROPOSED GRADE	
GRANULARS	
WATERMAIN	
RAW WATER LINE	
SANITARY SEWER	
STORM SEWER	

WATERMAIN INSTALLATION NOTES:

1. WATERMAIN AND RAW WATER LINE SHALL BE INSTALLED ACCORDING TO OPSS.MUNI 441.
2. THE CONTRACTOR SHALL LOCATE THE EXISTING WATERMAINS, DISTRIBUTION AND RAW WATER INTAKE, AND SUPPLY THE NECESSARY MANUFACTURER APPROVED COUPLERS TO MAKE THE CONNECTIONS.
3. THE 250mmØ WATERMAIN SHALL BE INSTALLED WITH A MINIMUM OF 1.8m OF COVER. 300mmØ TWIN RAW WATER LINE SHALL BE INSTALLED BELOW THE WATERMAIN.
4. PROVIDE INSULATION PROTECTION IN AREAS <2.1m COVER, AT THE DIRECTION OF THE ENGINEER. INSTALL 25mm THICKNESS OF DOW HI LOAD-60 ABOVE WATERMAIN OR WATER SERVICE FOR EACH 300mm OF COVER REQUIRED (OR PART THEREOF) TO ACHIEVE MINIMUM 2.1m EQUIVALENT COVER.
5. MAINTAIN MINIMUM CLEAR SEPARATION OF 2.5m HORIZONTAL BETWEEN SEWERS AND WATERMAIN. WHERE WATERMAIN SEPARATION TO SANITARY SEWER IS LESS THAN 2.5m HORIZONTALLY, INVERT OF WATERMAIN SHALL BE LOCATED A MINIMUM OF 0.5m ABOVE THE CROWN OF THE SANITARY SEWER. SUCH SEPARATION SHALL BE IN-SITU MATERIAL OR COMPACTED BACKFILL.
- WHERE VERTICAL SEPARATION CANNOT BE OBTAINED, THE SEWER SHALL BE CONSTRUCTED OF MATERIALS AND JOINTS THAT ARE EQUIVALENT TO WATERMAIN STANDARDS OF CONSTRUCTION WITH THE LENGTH OF WATER PIPE TO BE CENTERED ON THE CROSSING.
6. WATERMAIN PIPE SHALL BE AWWA C900 PVC CLASS 235 DR18 AND BE CERTIFIED TO CSA 137.3. FITTINGS SHALL BE PVC CONFORMING TO AWWA C907.
7. A CONTINUOUS RWU No. 12 SOLID COPPER HMWPE TRACING WIRE SHALL BE INSTALLED WITH PVC WATERMAIN, VALVES AND HYDRANT LEADS AND BROUGHT TO THE SURFACE AND STRAPPED TO THE BARREL OF EACH HYDRANT.
8. ALL JOINTS INCLUDING CONNECTIONS, CAPS, VALVES, TEES AND BENDS SHALL BE RESTRAINED BY MECHANICAL JOINTS.
9. INSTALL JOINT RESTRAINTS SHALL BE IN ACCORDANCE WITH THE RESTRAINED LENGTH TABLES. JOINT RESTRAINTS ON NEW PVC SHALL BE UNI-FLANGE SERIES 1390 OR APPROVED EQUIVALENT. ON EXISTING CAST IRON CLASS 250 PIPE USE NSF CERTIFIED CLAMP.
10. FIRE HYDRANTS SHALL BE NEW, MUELLER HYDRANT OR M67 McAVITY BRIGADIER. HYDRANTS MUST BE ABLE TO RECEIVE STORZ FITTINGS FOR FIRE HOSES. FINAL ELEVATION SHALL BE 100mm - 150mm ABOVE FINISHED GRADE. ALL JOINTS BETWEEN WATERMAIN AND HYDRANT TO BE MECHANICALLY RESTRAINED. INSTALL ACCORDING TO OPSD 1105.010. ANODES SHALL BE ZINC ANODES Z-24-48. ANODES SHALL BE CADWELDED TO ALL IRON FITTINGS ACCORDING TO OPSD 1109.011.
11. GATE VALVES SHALL BE MUELLER EQUIPPED WITH VALVE OPERATOR TO OPSD 1101.020. VALVE BOXES SHALL BE MUELLER FOR PVC PIPES. ANODES SHALL BE ZINC ANODES Z-24-48. ANODES SHALL BE CADWELDED TO ALL IRON FITTINGS ACCORDING TO OPSD 1109.011.
12. REPLACE ALL WATER SERVICES TO THE LOT LINES OR LIMITS IDICATED WITH 19mmØ OR 50mmØ TYPE K COPPER LINE UNLESS SPECIFIED OTHERWISE, COMPLETE WITH CIRCLE MAIN STOP AND CURB STOP, PER OPSD 1104.010. CATHODIC PROTECTION PER OPSD 1109.010. HORIZONTAL GOOSENECKS.
13. EMBEDMENT AND COVER OF WATERMAIN ACCORDING TO OPSS 441 & OPSD 802.010. EMBEDMENT MATERIAL TO BE GRANULAR "A" OR 19mm CLEAR STONE TO SPRING LINE OF PIPE. COVER MATERIAL TO BE GRANULAR 'A' OR 19mmØ CLEAR STONE. BACKFILL TO SUBGRADE WITH SUITABLE NATIVE MATERIAL.
14. NO CONNECTION TO THE MUNICIPAL DISTRIBUTION SYSTEM SHALL BE MADE UNTIL THE NEW WATERMAIN HAS PASSED REQUIRED TESTING. THE CONNECTION OF NEW WATERMAIN TO EXISTING WATERMAIN SHALL BE COMPLETED BY THE CONTRACTOR AND APPROVED BY THE ALGOMA PUBLIC HEALTH UNIT AND THE TOWN OF BLIND RIVER.

SANITARY SEWER NOTES:

1. SANITARY SEWERS SHALL BE INSTALLED IN IN ACCORDANCE WITH OPSS 401, 402 AND 410.
2. SANITARY SEWER PIPE SHALL BE DR35 PVC PIPE MATERIAL IN ACCORDANCE WITH OPSS 1841.
3. EMBEDMENT AND COVER OF SEWER - OPSD 802.010 & 802.013. GRANULAR "A" OR 19mm CLEARSTONE TO SPRING LINE OF PIPE. COVER MATERIAL TO BE GRANULAR 'A' OR 19mmØ CLEAR STONE. BACKFILL TO SUBGRADE WITH SUITABLE NATIVE MATERIAL.
4. MAINTENANCE HOLES SHALL BE 1200mmØ - OPSD 701.010.
5. ALL MAINTENANCE HOLES SHALL HAVE TYPE A-CLOSED COVER - (OPSD 401.010), MAINTENANCE HOLE STEPS (OPSD 405.020) AND FROST STRAPS (OPSD 701.100).
6. THE CONTRACTOR MUST MAINTAIN SANITARY SEWER SERVICES TO ALL BUILDINGS AT ALL TIMES FOR THE DURATION OF CONSTRUCTION.
7. MAINTAIN MINIMUM CLEAR SEPARATION OF 2.5m HORIZONTAL AND 0.5m VERTICAL BETWEEN SANITARY SEWER AND WATERMAIN UNLESS OTHERWISE NOTED ON THE DRAWINGS.
8. SANITARY SEWER BEDDING FOR FLEXIBLE PIPE SHALL BE AS PER OPSD 802.01. (GRANULAR 'A' OR 19mm CLEAR STONE BEDDING) COVER MATERIAL TO BE GRANULAR 'A' AND BACKFILL IS TO BE SUITABLE APPROVED NATIVE MATERIAL. BEDDING AND BACKFILL TO BE COMPACTED TO MINIMUM 98% STANDARD PROCTOR DENSITY.
9. SEWER SERVICE SHALL BE MINIMUM 150mmØ, DR35 PVC PIPE MATERIAL, INSTALL IN ACCORDANCE WITH OPSD 1006.010.
10. THE CONTRACTOR SHALL LOCATE THE EXISTING SANITARY SEWERS AND SUPPLY NECESSARY MANUFACTURER APPROVED COUPLERS TO MAKE THE CONNECTIONS AT PROPERTY LINE.

STORM SEWER NOTES:

1. STORM SEWERS SHALL BE CONSTRUCTED TO OPSS.MUNI 410.
2. STORM SEWER PIPE AND FITTINGS SHALL BE ADS-N-12 WT IB HDPE STORM SEWER PIPE, OR PVC CLASS 165 DR25 CLASS 135 WHERE SPECIFIED, OR EQUIVALENT - OPSS 1841
3. EMBEDMENT AND COVER OF STORM SEWER - OPSD 802.010 & 802.013. GRANULAR "A" OR 19mm CLEARSTONE TO SPRING LINE OF PIPE. COVER MATERIAL TO BE GRANULAR 'A' OR 19mmØ CLEAR STONE. BACKFILL TO SUBGRADE WITH SUITABLE NATIVE MATERIAL.
4. STORM SEWER STRUCTURES TO BE CONSTRUCTED TO OPSS 407
5. CATCH BASINS SHALL BE 600mm X 600mm - OPSD 705.010, FRAMES & GRATES OPSD 400.020. MINIMUM SUMP OF 600mm. FROST STRAPS PER OPSD 701.100 FOR MULTIPIECE STRUCTURES.
6. MAINTENANCE HOLE CATCH BASIN SHALL BE 1200mm Ø - OPSD 700.010, FRAMES & GRATES OPSD 400.020. MINIMUM SUMP OF 300mm. FROST STRAPS PER OPSD 701.100, STEPS PER OPSD 405.020.
7. CONNECT EXISTING ROOF DRAINS AND WEEPING TILES WITH 100mmØ NON-PERFORATED SUBDRAINS OPSS.MUNI 405.

EROSION & SEDIMENT CONTROL NOTES:

1. ALL REQUIRED SILTATION AND EROSION CONTROL MEASURES TO BE IN PLACE PRIOR TO CONSTRUCTION TO PREVENT EROSION AND THE MIGRATION OF SEDIMENT DURING CONSTRUCTION. ALL SILTATION AND EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL GROUND COVER IS RE-ESTABLISHED TO THE ORIGINAL CONDITION OR BETTER AS DETERMINED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND INSTALLING ALL REQUIRED EROSION & SEDIMENT CONTROL MEASURES BASED ON THEIR CONSTRUCTION ACTIVITIES. THE MEASURES LISTED ON THESE DRAWINGS ARE THE MINIMUM REQUIRED, HOWEVER ADDITIONAL MEASURES MAY BE NECESSARY.
3. ALL SEDIMENT CONTROL MEASURES ARE TO BE INSPECTED WEEKLY AND AFTER EACH SIGNIFICATION PRECIPITATION EVENT AND MAINTAINED, REPAIRED OR REPLACED AS NECESSARY. THE CONTRACTOR OR CONTRACTOR'S REPRESENTATIVE SHALL MAINTAIN A WEEKLY REPORT ON SEDIMENT CONTROL MEASURES INCLUDING ALL CORRECTIVE ACTION TAKEN DURING THE REPORTING PERIOD TO ENSURE CONTROL MEASURES ARE WORKING EFFECTIVELY. IF THE SEDIMENT AND EROSION CONTROL MEASURES ARE NOT FUNCTIONING PROPERLY, THE CONTRACTOR WILL SUSPEND CONSTRUCTION UNTIL THE ISSUES ARE ADDRESSED.
4. WHEN POSSIBLE, THE CONTRACTOR SHALL MINIMIZE EARTHWORKS DURING WET WEATHER CONDITIONS.
5. SILT FENCING TO BE INSTALLED AT THE BOTTOM OF ALL FILL SLOPES AND DOWN GRADIENT OF ANY STOCKPILED MATERIAL WHEN THERE IS THE POSSIBILITY OF SEDIMENT MIGRATING TO ADJACENT PROPERTIES.
6. SOILS PRONE TO EROSION WILL BE RESTORED AS SOON AS POSSIBLE BY SEEDING AND IF NECESSARY SEEDING AND MULCHING OR INSTALLING EROSION CONTROL BLANKET.
7. WHEN WORK IS COMPLETED AND AREAS ARE STABILIZED AS DEEMED ACCEPTABLE BY THE ENGINEER, TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED FROM THE WORK SITE.
8. LIGHT DUTY SILT FENCE BARRIER TO BE INSTALLED IN ACCORDANCE WITH OPSS 805 AND OPSD 219.110.
9. STRAW BALE CHECK DAMS TO BE INSTALLED IN ACCORDANCE WITH OPSS 805 AND OPSD 219.180.
10. THE CONTRACTOR SHALL KEEP DUST TO A MINIMUM BY USE OF DUST SUPRESSANT AS PER OPSS 506.
11. FILTER FABRIC TO BE PLACED UNDER GRATES ON ALL CATCH BASINS TO TRAP SEDIMENT. SILT TRAPS ARE TO BE CLEANED REGULARLY AND ARE NOT TO BE REMOVED UNTIL ALL CONSTRUCTION ACTIVITY IS COMPLETE. FILTER FABRIC FOR SILT CONTROL TO BE TERRAFIX 270R OR APPROVED EQUIVALENT.
12. 12. STREET SWEEPING, CATCHBASIN CLEANING AND DUST CONTROL ARE THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE KEPT UNDER CONTROL OF ALL ROADWAYS TO THE SATISFACTION OF THE ENGINEER AND THE TOWN OF BLIND RIVER.

KEY PLAN

ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK
DATE	REV.	REVISION	BY	APP'D

CLIENT:

Blind River

CONSULTANT:

TULLOCH

PROJECT TITLE:

NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:

LEGENDS AND GENERAL NOTES

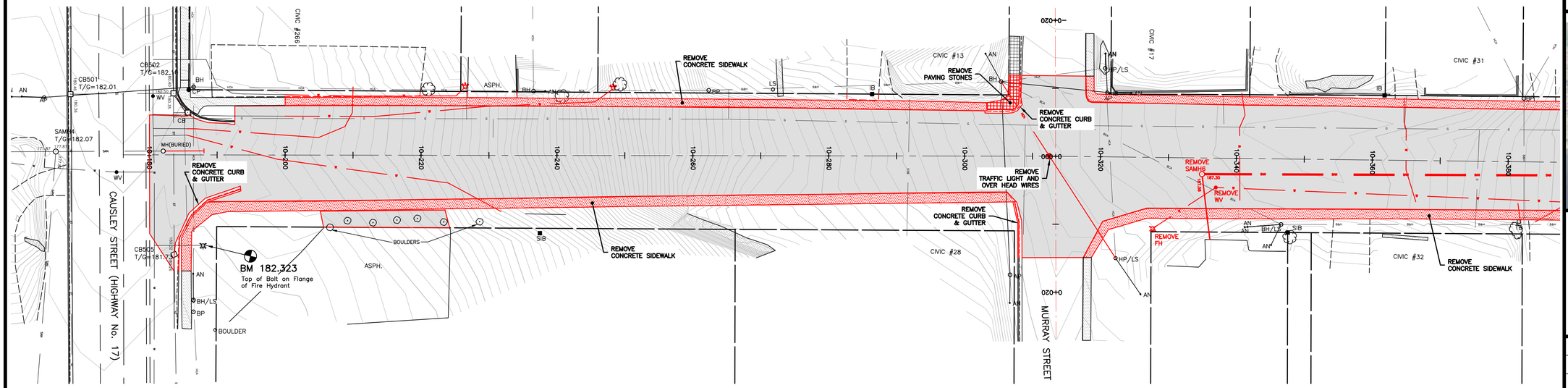
DAS	DAS	CLK	CLK
DRAWN	DESIGNED	CHECKED	APPROVED
		JUN. 18, 2024	
SCALE		DATE	

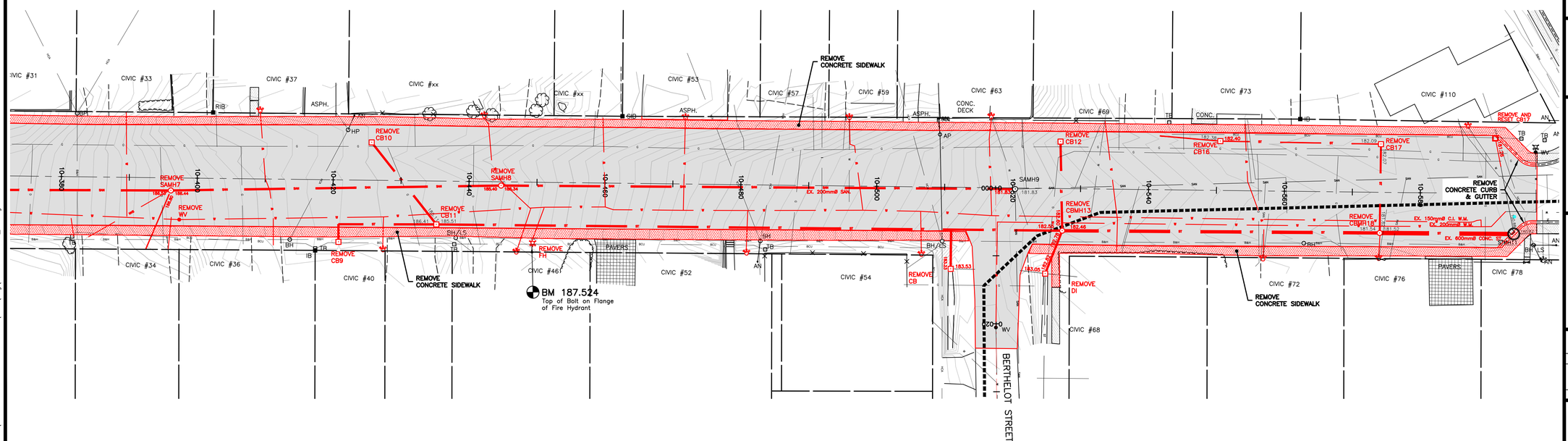
23-0821	0	C1
PROJECT No.	REVISION	DRAWING

P:\2023\23082I Blind River Water Intake\CIVIL\dwg\23082I-Phase1_LFT.dwg

CAUTION

UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION.

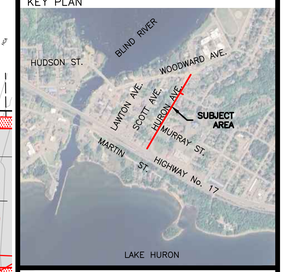




Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations

KEY PLAN



ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

DATE	REV.	REVISION	BY	APP'D
24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK

CLIENT: Blind River

CONSULTANT: TULLOCH

PROJECT TITLE:
NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:
REMOVALS PLAN

DRAWN	DESIGNED	CHECKED	APPROVED
DAS	DAS	CLK	CLK

SCALE		DATE
HOR-1:300	VER-1:30	JUN. 18, 2024

PROJECT No.	REVISION	DRAWING
23-0821	0	C2

P:\2023\23-0821 Blind River Water Intake\CIVIL\dwg\23-0821-Phase1_IFT.dwg

CAUTION
UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION.

Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations

KEY PLAN

ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

DATE	REV.	REVISION	BY	APP'D
24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK

CLIENT: Blind River

CONSULTANT: TULLOCH

PROJECT TITLE:
NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:
PLAN & PROFILE 10+180 to 10+350

DRAWN	DESIGNED	CHECKED	APPROVED
DAS	DAS	CLK	CLK

H-1:250 V-1:50 — SCALE
JUN. 18, 2024 — DATE

PROJECT No.	REVISION	DRAWING
23-0821	0	C3

P:\2023\230821 Blind River Water Intake\CIVIL\dwg\230821-Phase1_LPT.dwg

CAUTION

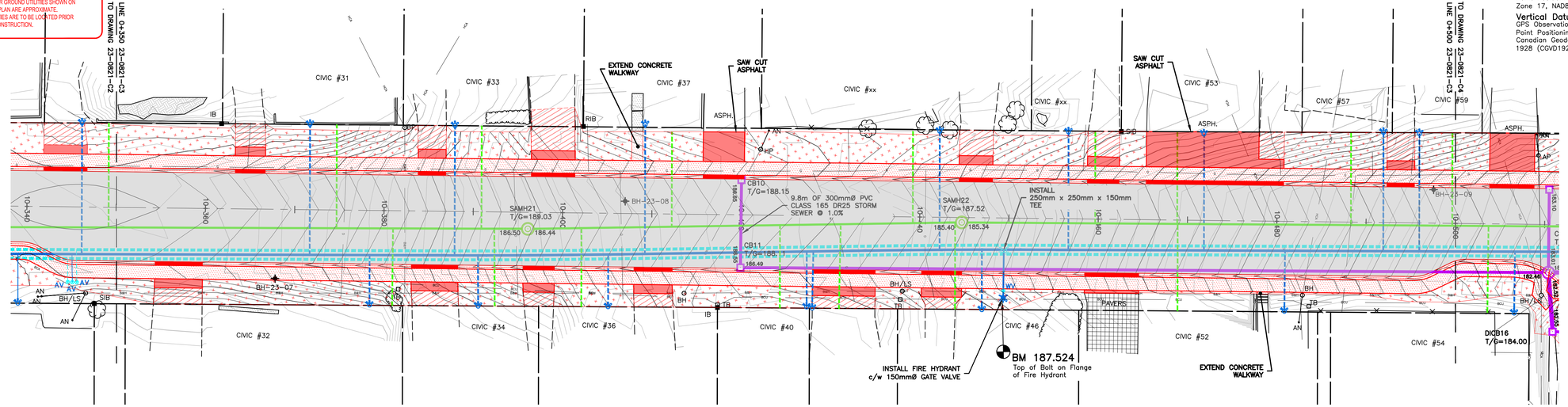
UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION.

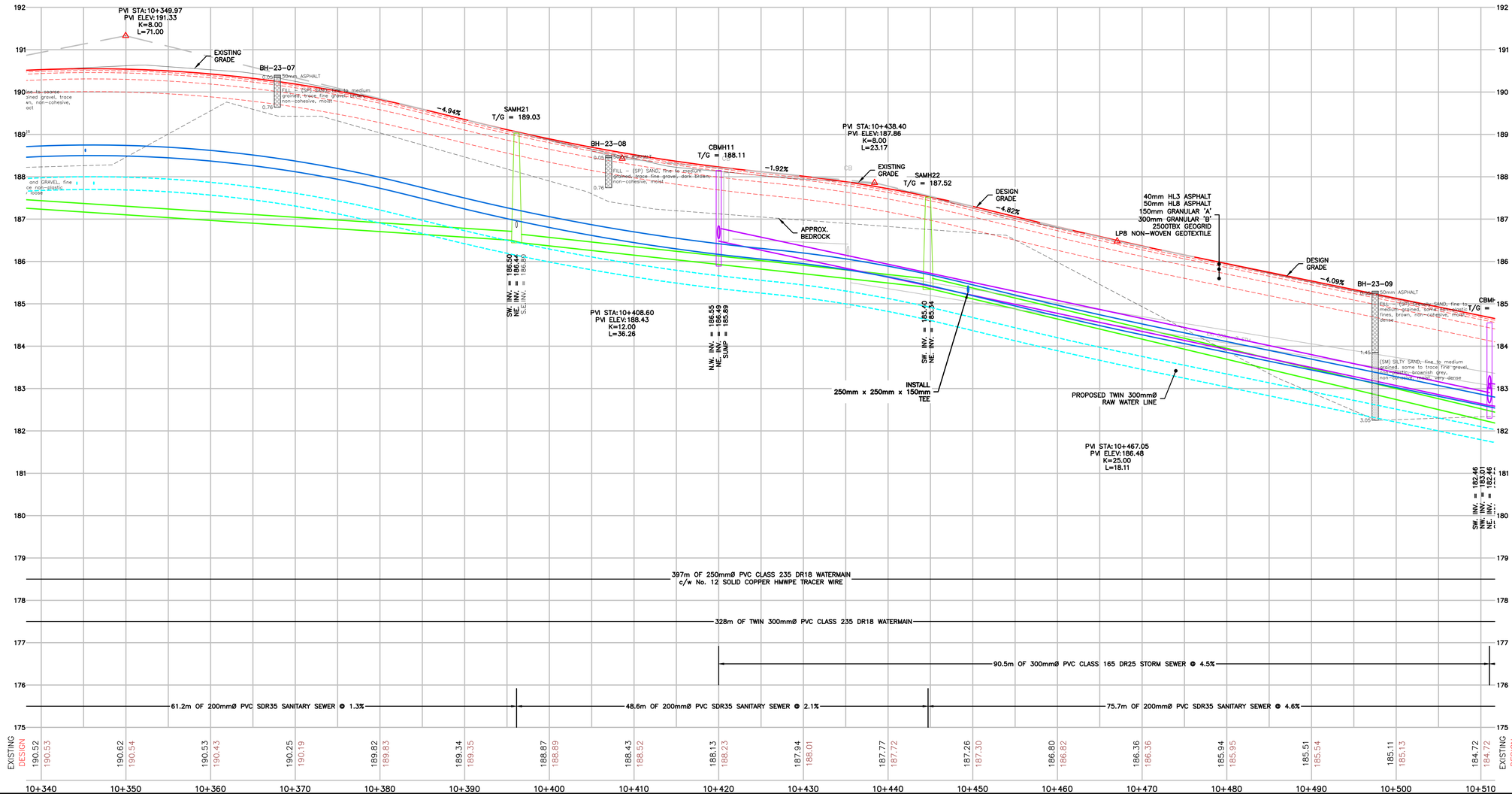
MATCH LINE 0+350 23-0821-C3
REFER TO DRAWING 23-0821-C2

MATCH LINE 0+500 23-0821-C3
REFER TO DRAWING 23-0821-C4

Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations





KEY PLAN

ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK
DATE	REV.	REVISION	BY	APP'D

CLIENT:

Blind River

CONSULTANT:

TULLOCH

PROJECT TITLE:

NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:

PLAN & PROFILE 10+350 to 10+500

DAS	DAS	CLK	CLK
DRAWN	DESIGNED	CHECKED	APPROVED
H-1:250	V-1:50	JUN. 18, 2024	
SCALE		DATE	

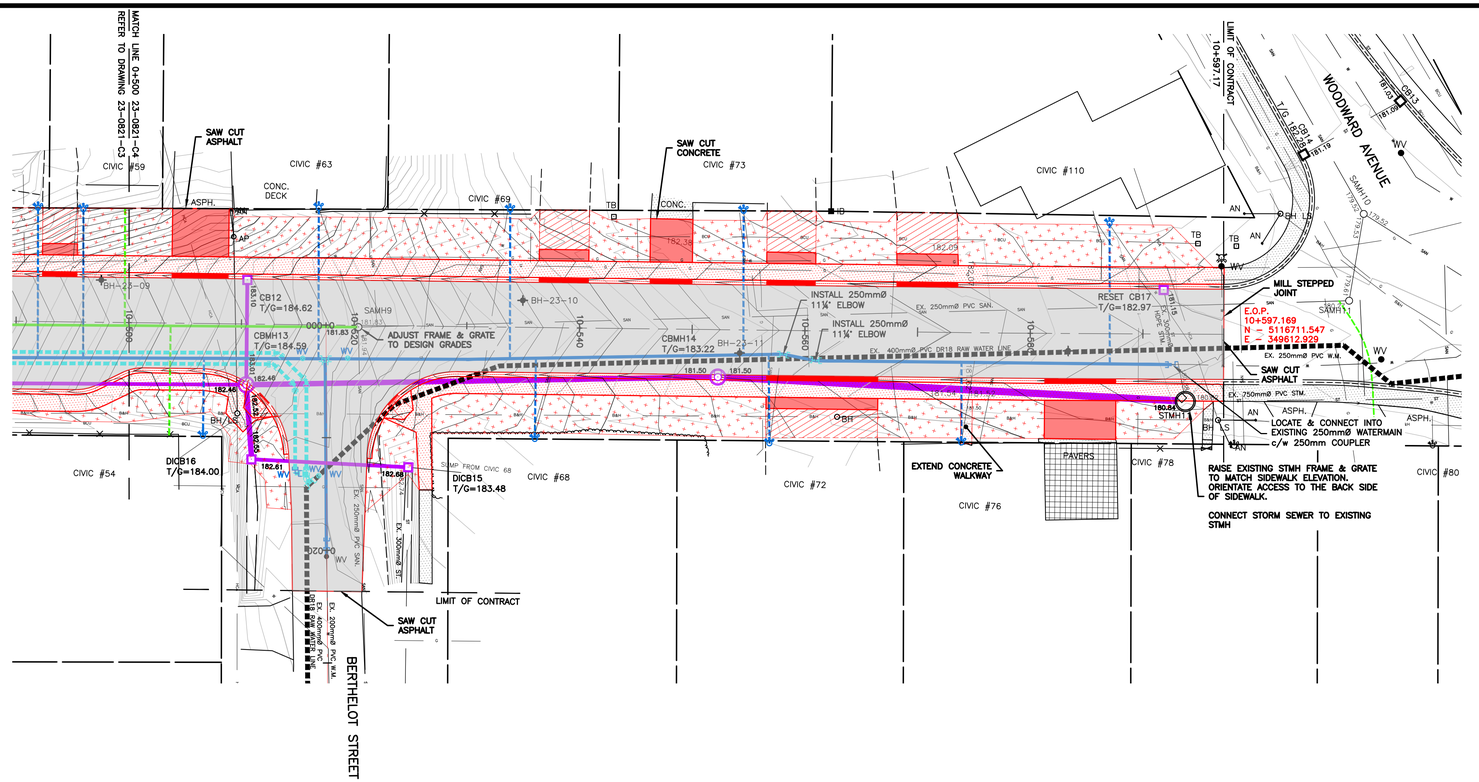
23-0821	0	C4
PROJECT No.	REVISION	DRAWING

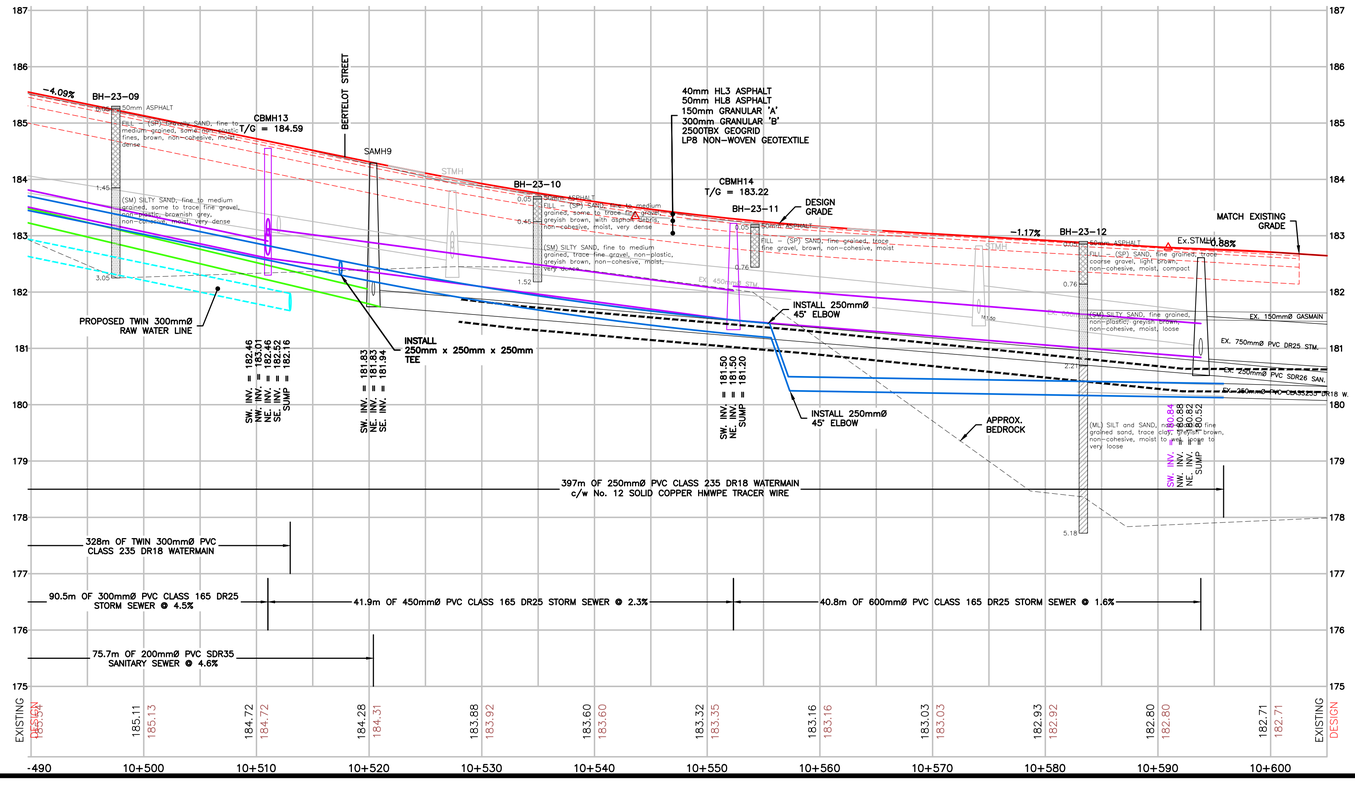
P:\2023\23821 Blind River Water Intake\CIVIL\dwg\23821-Phase1_PT.dwg

CAUTION
UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION.

Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations





KEY PLAN

ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

DATE	REV.	REVISION	BY	APP'D
24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK

CLIENT:
Blind River

CONSULTANT:
TULLOCH

PROJECT TITLE:
NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:
PLAN & PROFILE 10+500 to 10+600

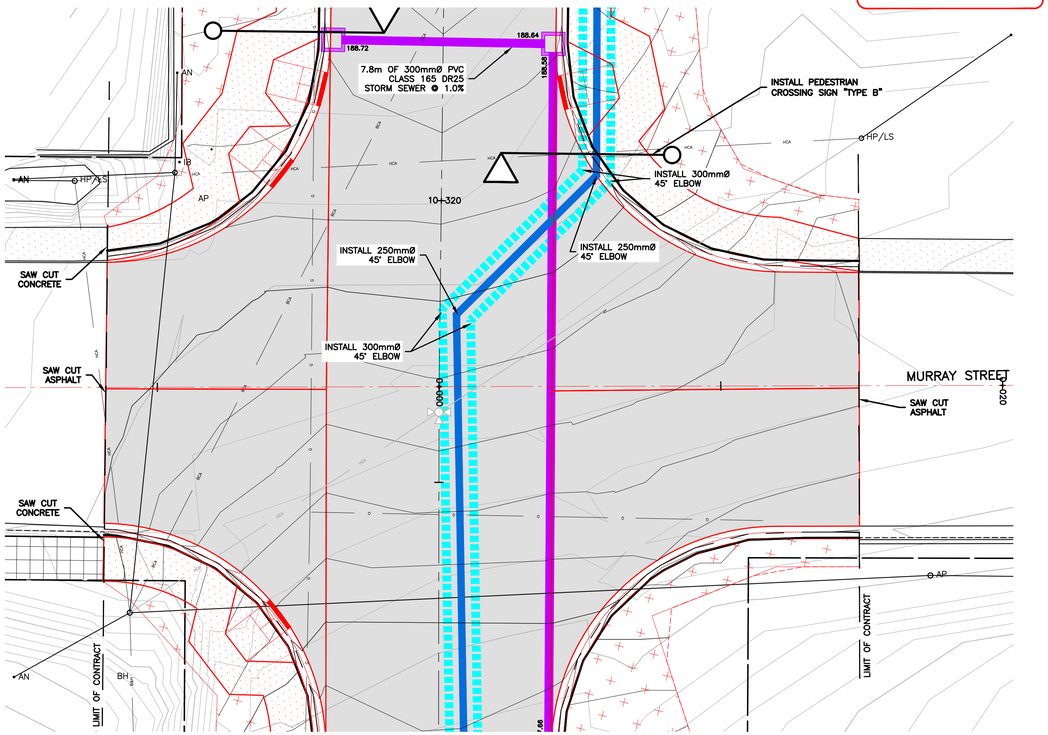
DRAWN	DESIGNED	CHECKED	APPROVED
DAS	DAS	CLK	CLK

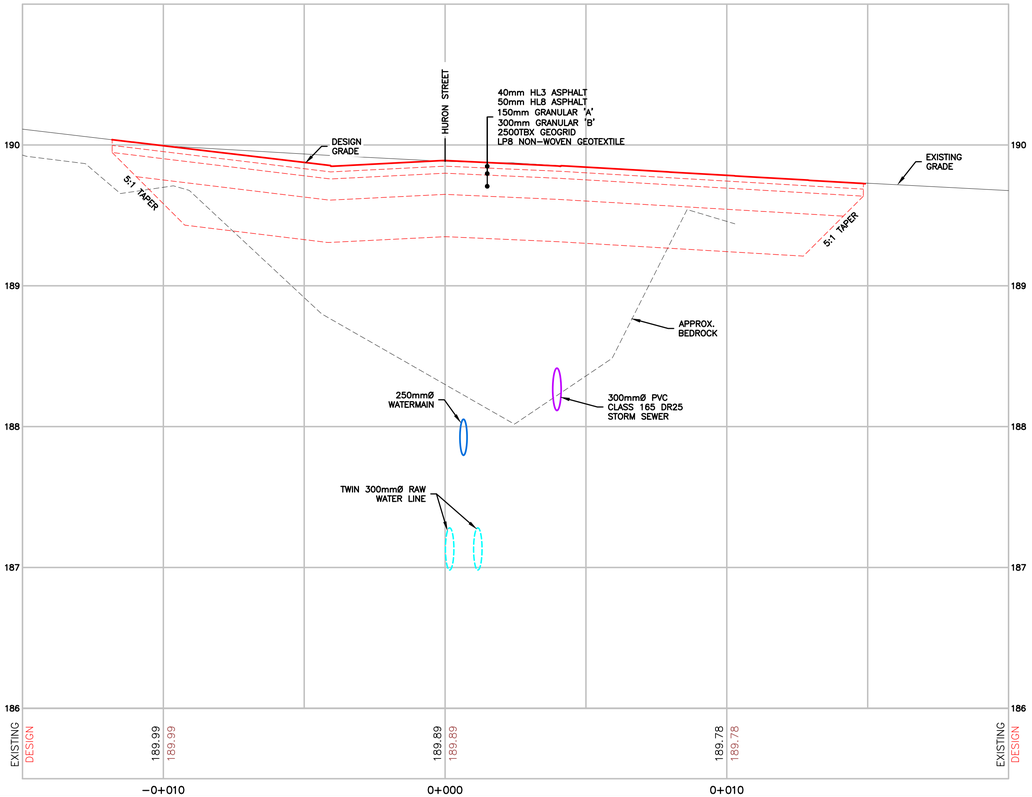
SCALE	DATE
H-1:250 V-1:50	JUN. 18, 2024

PROJECT No.	REVISION	DRAWING
23-0821	0	C5

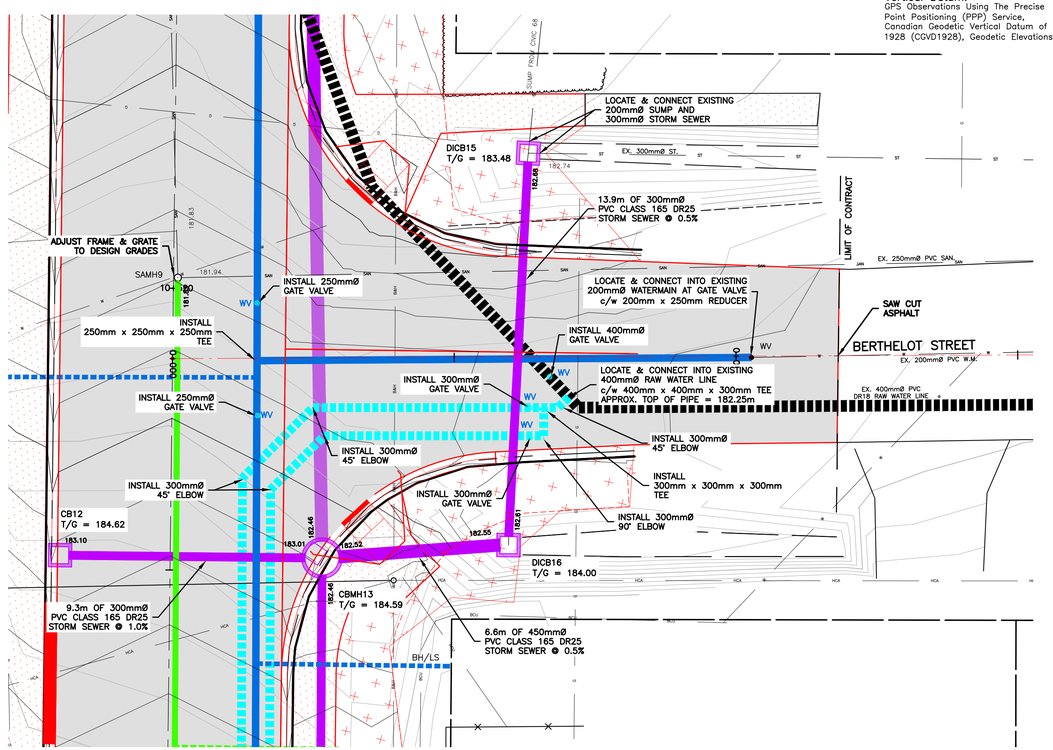
P:\2023\23082l Blind River Water Intake\CIVIL\dwg\23082l-PhaseI_LFT.dwg

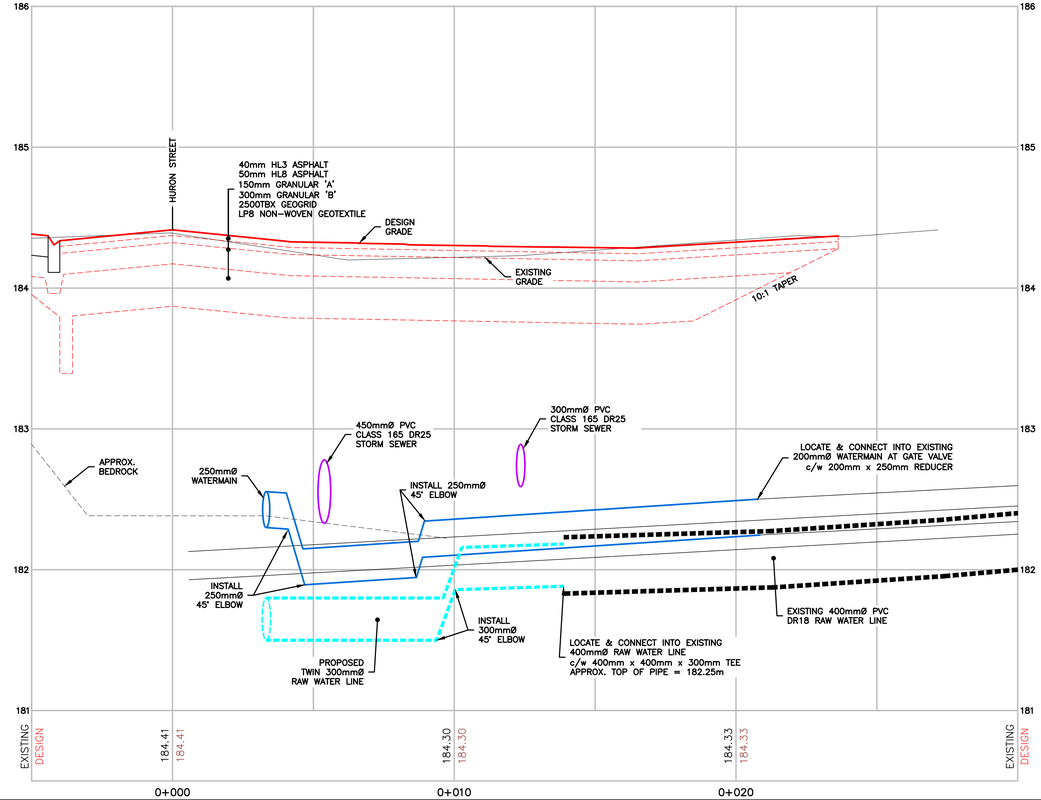
MURRAY STREET





BERTHELOT STREET

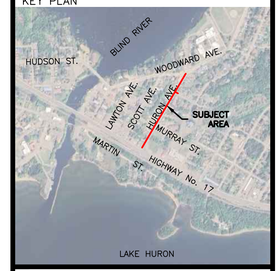




Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations

KEY PLAN



ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

DATE	REV.	REVISION	BY	APP'D
24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK

CLIENT: Blind River

CONSULTANT: TULLOCH

PROJECT TITLE:
NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:
MURRAY STREET & BERTHELOT STREET

PLAN & PROFILE

DRAWN	DESIGNED	CHECKED	APPROVED
DAS	DAS	CLK	CLK

SCALE		DATE
H-1:100	V-1:20	JUN. 18, 2024

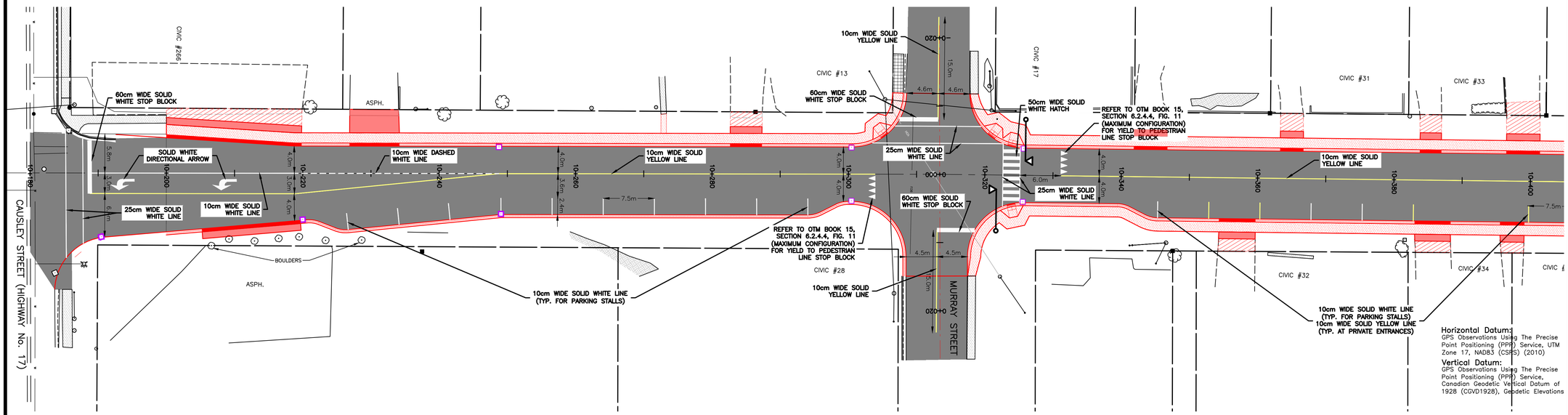
PROJECT No.	REVISION	DRAWING
23-0821	0	C6

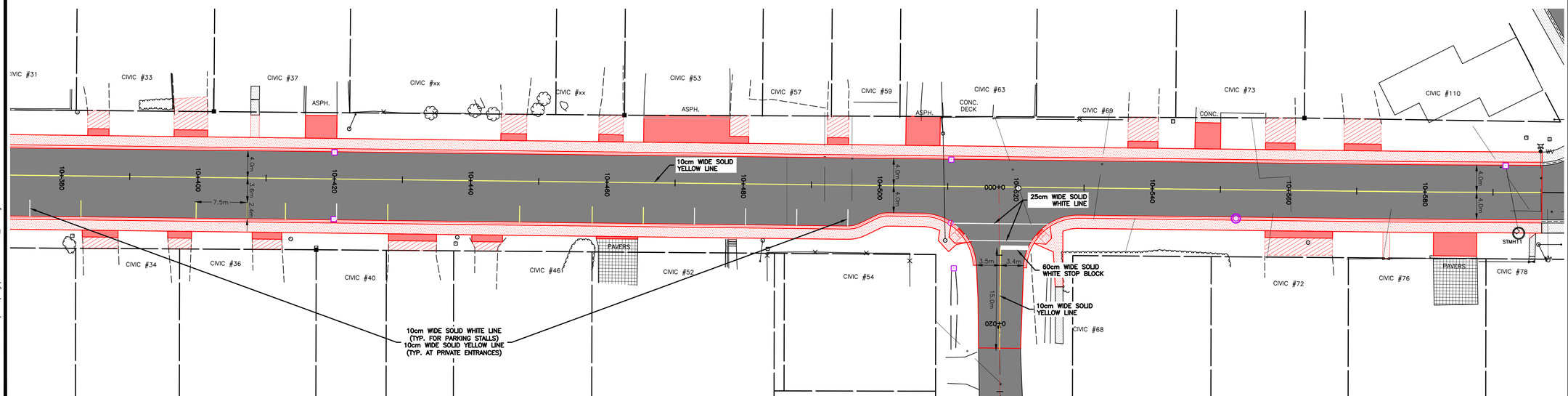
CAUTION
UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION.

P:\2023\230821 Blind River Water Intake\CIVIL\dwg\230821-PhaseI_LPT.dwg

CAUTION

UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION.





Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations

KEY PLAN

ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

DATE	REV.	REVISION	BY	APP'D
24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK

CLIENT: Blind River

CONSULTANT: TULLOCH

PROJECT TITLE:
NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

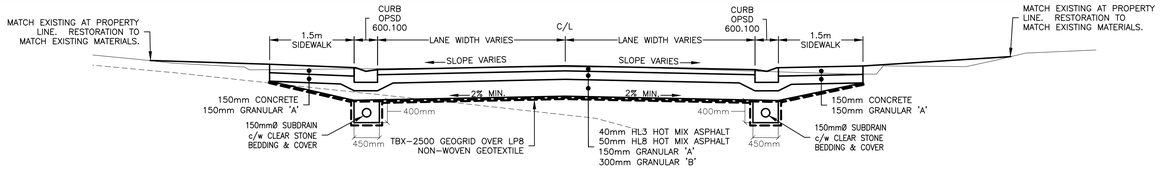
DRAWING TITLE:
PAVEMENT MARKINGS PLAN

DRAWN	DESIGNED	CHECKED	APPROVED
DAS	DAS	CLK	CLK

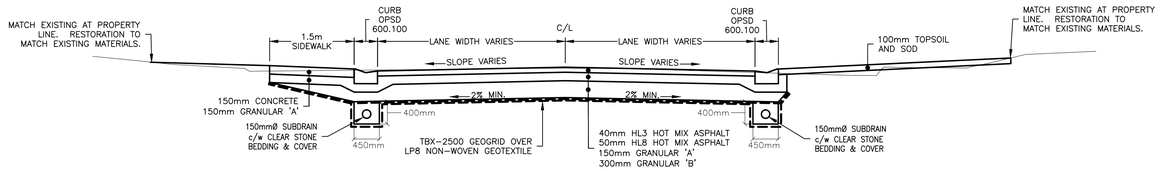
SCALE		DATE
HOR-1:300	VER-1:30	JUN. 18, 2024

PROJECT No.	REVISION	DRAWING
23-0821	0	C7

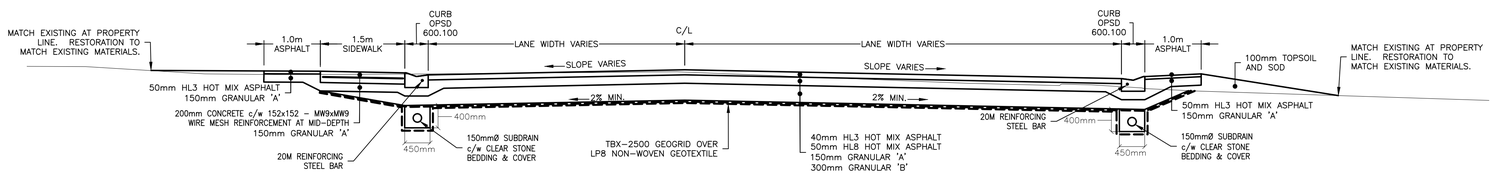
P:\2023\23-0821 Blind River Water Intake\CIVIL\dwg\23-0821-Phase1_IFT.dwg



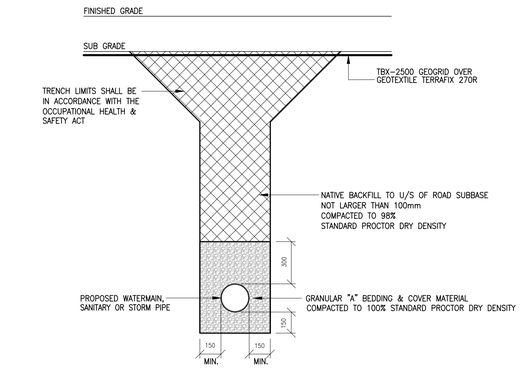
TYPICAL CROSS SECTION – DOUBLE SIDEWALK
1:50



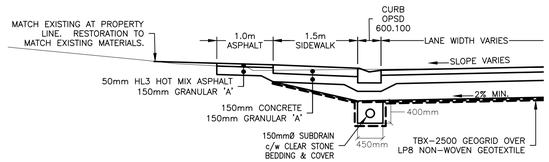
TYPICAL CROSS SECTION – SINGLE SIDEWALK
1:50



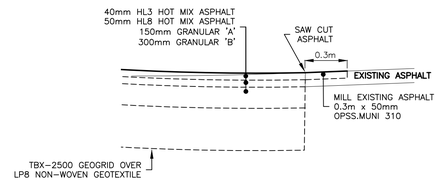
TYPICAL COMMERCIAL ENTRANCE SECTION
N.T.S.



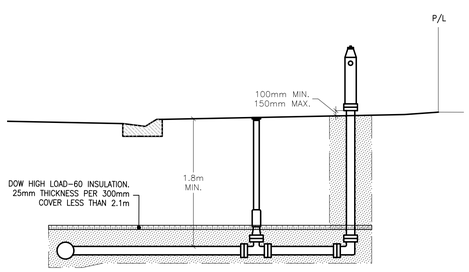
TYPICAL PIPE TRENCH – WATERMAIN, SANITARY OR STORM SEWER PIPE
1:50



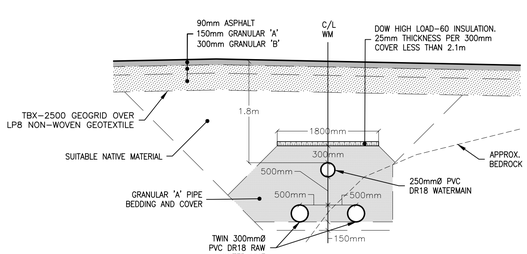
TYPICAL RESIDENTIAL ENTRANCE SECTION
N.T.S.



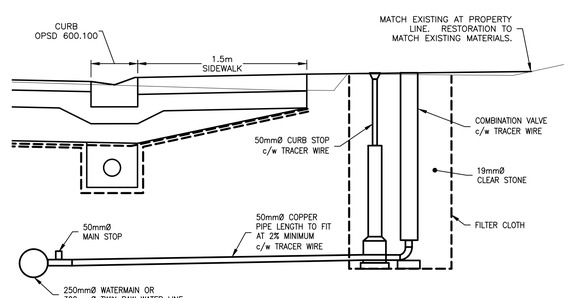
ASPHALT STEP JOINT DETAIL
N.T.S.



TYPICAL FIRE HYDRANT DETAIL
1:50



TYPICAL WATERMAIN AND RAW WATER LINE INSTALLATION DETAIL
N.T.S.



AIR RELEASE VALVE DETAIL
N.T.S.

KEY PLAN

ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
JUN. 18/24
C.L. KIRBY
100111792
PROVINCE OF ONTARIO

DATE	REV.	REVISION	BY	APP'D
24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK

CLIENT:

Blind River

CONSULTANT:

TULLOCH

PROJECT TITLE:

NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:

TYPICAL SECTIONS AND DETAILS

DAS	DAS	CLK	CLK
DRAWN	DESIGNED	CHECKED	APPROVED

HOR-1:300 VER-1:30 — SCALE

JUN. 18, 2024 — DATE

23-0821	0	C8
PROJECT No.	REVISION	DRAWING

P:\2023\230821 Blind River Water Intake\CIVIL\dwg\230821-Phase1_IFT.dwg

MH NO.	DIAMETER (mm)	OPSD	STATION	OFFSET	PIPE SIZE (mm)								INVERT ELEVATION (m)								GRATE ELEVATION (m)	DEPTHS (mm)		SAFETY PLATFORM	FROST STRAP	FRAME & GRATE
					NORTH	NORTHEAST	EAST	SOUTHEAST	SOUTH	SOUTHWEST	WEST	NORTHWEST	NORTH	NORTHEAST	EAST	SOUTHEAST	SOUTH	SOUTHWEST	WEST	NORTHWEST		SUMP	SAMH			
SAMH20	1200	701.010	10+334.97	2.4RT	-	200	-	150	-	-	-	-	-	187.30	-	187.45	-	-	-	-	190.41	0	3110	NO	YES	401.010 Type 'A'
SAMH21	1200	701.010	10+396.13	1.9RT	-	200	-	-	-	200	-	-	-	186.44	-	-	-	186.50	-	-	189.03	0	2590	NO	YES	401.010 Type 'A'
SAMH22	1200	701.010	10+444.72	0.6RT	-	200	-	-	-	200	-	-	-	185.34	-	-	-	185.40	-	-	187.52	0	2180	NO	YES	401.010 Type 'A'

MH NO.	DIAMETER (mm)	OPSD	STATION	OFFSET	PIPE SIZE (mm)								INVERT ELEVATION (m)								GRATE ELEVATION (m)	DEPTHS (mm)		SAFETY PLATFORM	FROST STRAP	FRAME & GRATE
					NORTH	NORTHEAST	EAST	SOUTHEAST	SOUTH	SOUTHWEST	WEST	NORTHWEST	NORTH	NORTHEAST	EAST	SOUTHEAST	SOUTH	SOUTHWEST	WEST	NORTHWEST		SUMP	CBMH			
CBMH13	1200	701.010	10+510.49	5.4RT	-	450	-	450	-	300	-	300	-	182.46	-	182.52	-	182.46	-	183.01	184.59	300	2430	NO	YES	400.020
CBMH14	1200	701.010	10+552.32	4.21RT	-	600	-	-	-	450	-	-	-	181.50	-	-	-	181.50	-	-	183.22	300	2020	NO	YES	400.020

CB NO.	SIZE (mm)	OPSD	STATION	OFFSET	PIPE SIZE (mm)								INVERT ELEVATION (m)								GRATE ELEVATION (m)	DEPTHS (mm)		FRAME & GRATE
					NORTH	NORTHEAST	EAST	SOUTHEAST	SOUTH	SOUTHWEST	WEST	NORTHWEST	NORTH	NORTHEAST	EAST	SOUTHEAST	SOUTH	SOUTHWEST	WEST	NORTHWEST		SUMP	CB	OPSD
CB1	600x600	705.010	10+188.16	5.8 LT	-	-	-	-	-	300	-	-	-	-	-	-	-	180.46	-	-	181.91	600	2050	400.020
CB2	600x600	705.010	10+190.46	9.4 RT	-	300	-	-	300	-	-	-	-	180.63	-	-	180.60	-	-	-	181.87	600	1870	400.020
CB3	600x600	705.010	10+220.00	6.8RT	-	300	-	-	-	300	-	-	-	181.60	-	-	-	181.60	-	-	183.33	600	2330	400.020
CB4	600x600	705.010	10+248.77	3.9LT	-	-	-	300	-	-	-	-	-	-	-	184.52	-	-	-	-	186.02	600	2100	400.020
CB5	600x600	705.010	10+249.07	5.9RT	-	300	-	-	-	300	-	300	-	184.36	-	-	-	184.36	-	184.42	186.01	600	2250	400.020
CB6	600x600	705.010	10+300.46	3.9LT	-	-	-	300	-	-	-	-	-	-	-	187.80	-	-	-	-	189.30	600	2100	400.020
CB7	600x600	705.010	10+300.46	3.9RT	-	300	-	-	-	300	-	300	-	187.66	-	-	-	187.66	-	187.72	189.32	600	2260	400.020
CB8	600x600	705.010	10+325.67	3.9LT	-	-	-	300	-	-	-	-	-	-	-	188.72	-	-	-	-	190.22	600	2100	400.020
CB9	600x600	705.010	10+325.67	3.9RT	-	-	-	-	-	300	-	300	-	-	-	-	-	188.58	-	188.64	190.21	600	2230	400.020
CB10	600x600	705.010	10+420.00	3.9LT	-	-	-	300	-	-	-	-	-	-	-	186.65	-	-	-	-	188.15	600	2100	400.020
CB11	600x600	705.010	10+420.00	5.9RT	-	300	-	-	-	-	-	300	-	186.49	-	-	-	-	-	186.55	188.11	600	2220	400.020
CB12	600x600	705.010	10+510.48	3.9LT	-	-	-	300	-	-	-	-	-	-	-	183.10	-	-	-	-	184.62	600	2120	400.020
DICB15	600x600	705.030 (3:1)			-	-	-	300	-	300	-	-	-	-	-	182.74	-	182.68	-	-	183.48	600	1400	403.010 TYPE 'A'
DICB16	600x600	705.030 (3:1			-	300	-	-	-	-	-	450	-	182.61	-	-	-	-	-	182.55	184.00	600	2050	403.010 TYPE 'A'

WATERMAIN JOINT RESTRAINT REQUIREMENTS

TEE OR HYDRANT LEAD

MAIN LINE DIAMETER (mm)	BRANCH DIAMETER (mm)	DEPTH OF BURY (m)	RESTRAINED LENGTH (m)
400	300	2.1	11.9
300	300	2.6	11
250	250	1.8	12.2
250	150	1.8	5.2
200	250	1.8	12.8

PLUG END OR VALVE

MAIN LINE DIAMETER (mm)	DEPTH OF BURY (m)	RESTRAINED LENGTH (m)
400	1.8	20
300	2.6	13.4
250	1.6	14.9

REDUCER

MAIN LINE DIAMETER (mm)	REDUCED DIAMETER (mm)	DEPTH OF BURY (m)	RESTRAINED LENGTH (m)
250	200	1.6	4.6

HORIZONTAL BENDS

MAIN LINE DIAMETER (mm)	BEND ANGLE (DEGREES)	DEPTH OF BURY (m)	RESTRAINED LENGTH (m)
300	45	2.6	1.8
300	22.5	2.6	0.9
300	11.25	2.6	0.6
250	45	1.8	2.1
250	22.5	1.8	1.2
250	11.25	1.8	0.6

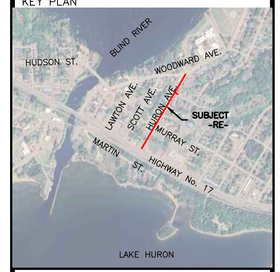
VERTICAL BENDS

MAIN LINE DIAMETER (mm)	HIGH SIDE			LOW SIDE		
	BEND ANGLE (DEGREES)	DEPTH OF BURY (m)	RESTRAINED LENGTH (m)	BEND ANGLE (DEGREES)	DEPTH OF BURY (m)	RESTRAINED LENGTH (m)
300	45	2.1	6.4	45	2.4	1.8
250	45	1.8	6.4	45	2.4	1.5

SUMMARY OF BOREHOLE INFORMATION

Borehole No.	Borehole Type	Easting (m)	Northing (m)	Ground Surface Elevation (m)	Depth of Borehole (mbgs)[1]
BH-23-01	Geotechnical	349 247	5 116 261	178.6	7.12
BH-23-02	Geotechnical	349 299	5 116 307	180.9	5.12
BH-23-03	Geotechnical	349 344	5 116 361	182.7	8.99
BH-23-04	Geotechnical	349 409	5 116 373	182.3	5.90
BH-23-05	Geotechnical	349 454	5 116 455	189.2	0.46
BH-23-06	Geotechnical	349 475	5 116 484	190.3	2.90
BH-23-07	Environmental	349 498	5 116 513	190.4	0.76
BH-23-08	Environmental	349 511	5 116 551	188.5	0.76
BH-23-09	Geotechnical	349 557	5 116 629	185.3	3.05
BH-23-10	Geotechnical	349 578	5 116 660	183.7	1.52
BH-23-11	Environmental	349 592	5 116 674	183.2	0.76
BH-23-12	Geotechnical	349 607	5 116 699	182.9	5.18

Note(s): [1]meters below ground surface.



24-06-18	0	Issued For Tender	DAS	CLK
24/06/14	B	Issued For Review	DAS	CLK
24/02/22	A	Issued For Review	DAS	CLK
D-TE	REV.	REVISION	BY	-PP'D

CLIENT: Blind River

CONSULTANT: TULLOCH

PROJECT TITLE:
NEW WATER INTAKE & HURON STREET RECONSTRUCTION

PHASE I

DRAWING TITLE:
STRUCTURE SCHEDULES

DAS	DAS	CLK	CLK
DRAWN	DESIGNED	CHECKED	APPROVED
HOR-1:300	VER-1:30	JUN. 18, 2024	
SCALE		DATE	

23-0821	0	C9
PROJECT No.	REVISION	DRAWING