

The following revisions are herewith incorporated into the Tender Documents and shall be included in the Tender Price. Where a revision is called for in one drawing or section of the Specification, it shall be considered revised for all related drawings and sections of the Specification. This Addendum shall be returned with other Tender Documents at the time of submission.

This addendum (52 pages) shall form a part of and be included in the Contract Documents for the above titled project and no consideration will be entertained for extras to the Contract due to failure of the contractor to become thoroughly familiar with this addendum.

Signify that Addendum has been received by listing the Addendum number and date in the appropriate spaces on the Tender Form.

GENERAL

1. See attached for Geotechnical Investigation Report from November 12, 2025 (51 pages).



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SMS Engineering

Baldur PCH-HC Geotechnical Investigation Report

Prepared for:

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Project Number: 0579-013-00

Date: November 12, 2025

November 12, 2025

Our File No. 0579-013-00

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**RE: Baldur PCH-HC
Geotechnical Investigation Report**

TREK Geotechnical Inc. is pleased to submit our final geotechnical investigation report for the above-noted project.

Please contact the undersigned should you have any questions.

Sincerely,

TREK Geotechnical Inc.
Per:

A handwritten signature in blue ink, appearing to read "Brent Hay", with a horizontal line extending to the right.

Brent Hay, M.Sc., P.Eng.
Senior Geotechnical Engineer

Encl.

Revision History

Revision No.	Author	Issue Date	Description
0	Craig Allard	November 12, 2025	Final Report

Authorization Signatures

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1.0 Introduction

This report provides geotechnical design recommendations prepared by TREK Geotechnical Inc. (TREK) for SMS Engineering. (the Client) for a new cistern, fire pump house, and generator house at the Baldur Personal Care Home and Health Centre in Baldur, Manitoba. The terms of reference for this work are included in our contract dated August 20, 2025. TREK's scope of work includes a sub-surface investigation, laboratory testing, provision of recommendations for foundations, concrete slabs, buried walls, temporary excavations, drainage and backfill materials.

2.0 Background

2.1 Project Description

The project is approximately 200 km southwest of Winnipeg. The new structures are proposed to be located northwest of the existing personal care home. The generator house will be a single-storey building with a structural floor slab and a footprint of 6 m × 12 m. The cistern will have a footprint of 6 m × 13 m and will extend approximately 5 m to 6 m below the existing grade. The fire pump house is expected to be a single-storey structure constructed above the cistern, with a structural floor slab and a footprint of 3 m × 4 m. Foundation loads are unknown at this time but are anticipated to be relatively light (i.e. < 200 kN).

3.0 Field Program

3.1 Sub-surface Investigation

A sub-surface investigation was completed on October 7, 2025, under the supervision of TREK personnel to better delineate the soil stratigraphy and groundwater conditions relative to the proposed building construction. Two test holes (TH25-01 and 02) were drilled and sampled to depths of 12.6 m below ground surface, at the locations shown on Figure 01.

The test holes were drilled by Paddock Drilling Ltd. using a Canterra CT250 truck mounted geotechnical drilling rig equipped with 125 mm solid stem augers. One standpipe piezometer (SP25-01) equipped with a Casagrande tip was installed within the clay with silt and sand (till) layer to 9.1 m below ground surface in TH25-01. TH25-01 was backfilled with filter sand around the standpipe tip, sealed with bentonite chips above sand, and backfilled with auger cuttings and bentonite chips to surface. TH25-02 was backfilled with auger cuttings and bentonite chips to surface.

Sub-surface soils encountered during drilling were visually classified based on the Unified Soil Classification System (USCS). Disturbed (auger grab and split spoon) samples were obtained at regular intervals. Standard Penetration Tests were performed at depths where split-spoon samples were obtained. The collection of Shelby tube samples was attempted within the clay with silt and sand (till) layer but resulted in minimal to no recovery.

All samples retrieved during drilling were transported to TREK's material testing laboratory. in Winnipeg, Manitoba. Laboratory testing consisted of moisture contents on all samples; grain size

determination (hydrometer method), and Atterberg Limit tests were performed on select samples. One sample was sent to ALS Environmental Laboratory to determine soluble sulphate content, conductivity, resistivity, and pH. Laboratory testing results are included in Appendix A.

The test hole locations were established using a handheld GPS. The test hole elevations were surveyed using a rod and level relative to a temporary benchmark (TBM), located on the top of a concrete base for an overhead light standard (UTM 14U, 482580.0 m E, 5470393.0 m N), and was assigned a local elevation of 100.0 m. The TBM and test hole locations are indicated in Figure 01.

Test hole logs describing the soil units encountered and other pertinent information, such as test hole location (UTMs coordinates), elevation (local), groundwater conditions, and a summary of the laboratory testing results are also attached to this report.

3.2 Soil Stratigraphy

A brief description of the stratigraphy and groundwater conditions encountered during drilling are provided below. All interpretations of soil stratigraphy for the purposes of design should refer to the detailed information provided on the attached test hole logs.

In general, the stratigraphy at the site consists of organic clay (topsoil), underlain by tills.

Organic clay (topsoil) was observed in both test holes (TH25-01 and TH25-02). The organic clay is approximately 0.2 thick, is silty, contains trace to some sand, and trace organics. It is black, moist and soft.

Beneath the organic clay (topsoil), a layer of clay with silt and sand (till) was encountered in both test holes. The stratum is generally moist, becoming wet and increasingly stiff with depth, transitioning from stiff to very stiff, and is of low plasticity. It is light brown in color, becoming grey with depth, and contains trace gravel. The layer was observed to extend from beneath the topsoil to a depth of 8.8 m in TH25-01 and to 9.1 m in TH25-02, transitioning into a sand (till) layer in both cases.

A silt with sand (till) was encountered in both test holes at depths ranging from 8.8 m to 9.1 m, extending to the maximum depth of exploration. The silt with sand (till) contains some gravel, trace clay, is grey, wet, very stiff and of high plasticity. The silt with sand till is predominantly sand, however behaves as a high plasticity silt and therefor was classified as such. Although not directly observed, cobbles and boulders are commonly associated with this type of glacial deposit.

3.3 Power Auger Refusal

Power auger refusal was not encountered in the test holes.

3.4 Groundwater Conditions

Groundwater seepage was observed in both test holes within the clay with silt and sand (till) during drilling. Sloughing was observed in TH25-02 within the clay with silt and sand (till) during drilling. Table 1 summarizes the observed groundwater seepage and sloughing conditions.

Table 1. Observed Groundwater Seepage and Sloughing Conditions

Test Hole ID	Test Hole Depth	Depth of Seepage Below Ground Surface	Depth of Sloughing Below Ground Surface	Depth of Open Test Hole Below Ground Surface ¹	Depth of Measured Water Below Ground Surface ¹
TH25-01	12.6 m	Below 5.6 m	Not observed	12.6 m	5.2 m
TH25-02	12.6 m	Below 4.6 m	Below 4.6 m	6.7 m	5.5 m

1. Measurements taken after drilling to the final test hole depth and augers removed.

A water level logger (Solinst Levellogger) was installed in SP25-01 at a depth of 9.1 m for continuous monitoring of the piezometer between October 7, 2025, and November 6, 2025. During this period the water level in SP25-01 gradually increased from 8.9 m depth after installation to 5.1 m depth approximately 1 month later (local elevation 90.9 to 94.7 m). Figure B-1 in Appendix B provides a plot of groundwater elevation versus date for the piezometers.

These observations are short-term and should not be considered reflective of static groundwater levels at the site, which would require monitoring over an extended period to determine. It is important to recognize that groundwater conditions may vary seasonally, annually, or as a result of construction activities.

4.0 Foundation Recommendations

Based on the sub-surface conditions encountered during the investigation and the anticipated loading conditions, the preferred foundation alternative for the cistern and pumphouse is a raft slab bearing on very stiff clay with silt and sand (till). For the generator house, a thickened-edge slab bearing on stiff clay with silt and sand (till) is preferred. Recommendations for these foundation types according to the Manitoba Building Code (MBC 2024) which is based on the National Building Code of Canada (NBCC, 2020) are provided in the following sections.

4.1 Limit States Design

The foundation recommendations provided in this report are based on limit state design. The National Building Code of Canada (NBCC, 2020), the Canadian Highway Bridge Design Code (CHBDC, 2019), and the American Association of State Highway and Transportation Officials (AASHTO, 2024) require the use of limit state design that utilize load and resistance factor design (LRFD) methodology. CHBDC (2019) also incorporates a consequence factor for geotechnical systems while NBCC (2020) does not.

Table 2 of this report summarizes the recommended ULS geotechnical resistance factors that can be used for the design of foundations based on the degree of understanding (low, typical and high) of the site subsurface conditions and models used to predict geotechnical resistance. Depending on the relevant Code, resistance factors may depend upon the degree of understanding and verification testing completed during construction.

The following definitions from the 5th Ed. of the Canadian Foundation Engineering Manual (CFEM, 2023) are provided with additional notes to assist the reader with the limit state design terminology used in the building foundation recommendations.

Limit states: conditions beyond which a geotechnical system or component ceases to meet the criteria for which it was designed. The main ones are:

Serviceability limit states (SLS) – states corresponding to behaviour of the ground that causes unacceptable serviceability performance conditions, such as deformations, that restrict the intended use of the supported structure and (or) geotechnical system. Recommendations in this report are provided for evaluating the SLS that are developed based on limiting settlement to 25 mm or less. If a more stringent settlement tolerance is required, detailed settlement analysis should be conducted to refine the estimated settlement and/or adjust our recommendations.

Ultimate limit states (ULS) – states corresponding to a loss of stability of the geotechnical system and (or) failure of the supported structure.

Load factor – factor used to modify (usually increase) the characteristic load acting on and from a structure, for the limit state being considered.

Geotechnical resistance factor (ϕ)– multiplicative value that accounts for uncertainty in the geotechnical resistance to produce an acceptable and reliable geotechnical system.

Ultimate geotechnical resistance factor – resistance factor to be used at the ULS.

Characteristic (Nominal) geotechnical parameter – an appropriately conservative estimate of the mean value of a geotechnical parameter for individual strata within the zones of influence of applied loads.

Consequence factor (Ψ) - multiplicative factor applied to ultimate and serviceability geotechnical resistances, which accounts for consequences of exceeding the limit state under consideration.

Geotechnical resistance – load that the ground can support at a limit state. Different resistances can be defined, including:

Characteristic (nominal) ultimate geotechnical resistance – maximum load that the ground can support at the ULS, estimated using characteristic (nominal) geotechnical parameters.

Factored ultimate (ULS) geotechnical resistance – product of the consequence factor, the ultimate geotechnical resistance factor, and the characteristic (nominal) ultimate geotechnical resistance.

Table 2. Ultimate Geotechnical Resistance Factors for Shallow Foundations

Shallow Foundations	Resistance Factors (ϕ) ^(Note 1)	
Limit State: Test Method / Model	Degree of Understanding	
	Typical	High
Bearing: Analysis	0.5	n/a
Sliding (frictional): Analysis	0.8	n/a

¹ Based on a consequence factor of 1.0

4.2 Raft Foundation

For the cistern, a raft foundation bearing on very stiff clay with silt and sand (till), installed at a depth of 5 to 6 m below existing grade, can be designed using an SLS bearing resistance of 200 kPa and a ULS bearing resistance of 350 kPa. If, for any reason, the designer raises the elevation of the cistern above 5.0 m, TREK should be contacted to provide updated bearing capacity values. Groundwater dewatering may be required in order to permit excavation for the raft in dry conditions.

Additional Raft Foundation Design Recommendations

1. Rafts should be installed on very stiff clay with silt and sand (till) at a minimum depth of 2.4 m below final grade.
2. Resistance against buoyancy should be evaluated assuming a groundwater level coincident with ground surface and an empty reservoir, as described below in Section 6.0.
3. The foundation should be designed by a qualified structural engineer to resist all applied loads from the proposed structures.
4. Foundations for structures subjected to lateral and/or eccentric loads must be designed to resist overturning and uplift forces. Lateral and eccentric loading will result in the development of overturning and uplift forces and consequently a non-uniform applied pressure distribution under footings. In this regard, the maximum applied pressure should not exceed the ULS unit bearing resistance and the minimum applied pressure should not be less than 0 kPa. Sliding is not expected to be a concern for design.

Additional Raft Foundation Installation Recommendations

1. Organics, fills, silt, and any other deleterious materials should be stripped away such that the bearing surface consists of native, undisturbed, very stiff clay with silt and sand (till).
2. Excavations should be completed by an excavator equipped with a smooth-bladed bucket operating from the edge of the excavation. The contractor should work carefully to prevent disturbance to the bearing surface at all times.
3. The bearing surface should be protected from disturbance, freezing, drying, or inundation with water at all times. If any of these conditions occur, the disturbed soil should be entirely removed.
4. The final bearing surface should be inspected and documented by TREK prior to concrete placement to verify the adequacy of the bearing surface and proper installation of the footing.
5. If a levelling course is required, or the ground surface must be built up, a well-graded 20 mm down

sand and gravel material, consisting of GBC-I or GBC-II crushed granular base course can be used. The material should be in accordance with MTI Standard Construction Specification No.901(1), *Material Specification for Aggregate–Granular Course*, placed in lifts not exceeding 150 mm and compacted to a minimum of 100% of the Standard Proctor Maximum Dry Density (SPMDD). Even with this level of compaction settlements of approximately 0.5% of the fill thickness should be anticipated. Alternatively, a concrete mud-slab with a minimum compressive strength of 2 MPa may be used.

4.3 Thickened Edge Slabs

Thickened-edge slabs can be designed using a factored ULS bearing resistance of 125 kPa and SLS bearing resistance of 85 kPa if installed according to these recommendations. The SLS bearing resistances are based on a settlement of 25 mm or less and the factored ULS bearing resistances were calculated using a resistance factor of 0.5.

Additional Thickened Edge Slab Design Recommendations:

1. Minimum thickened edge widths should be verified with the applicable building code (e.g., Manitoba Building Code, NBCC).
2. Thickened-edge slabs should be designed by a qualified structural engineer to resist axial, lateral, and bending loads from the structure. To accommodate thickened edge movements, it may be desirable to provide control joints in the floor slabs to reduce random cracking and isolation joints to separate the footings from other structural elements.

Additional Thickened Edge Slab Construction Recommendations:

1. All organics, silt, debris, and any other deleterious material should be completely removed such that the bearing sub-grade surfaces consists of stiff clay with silt and sand (till).
2. Excavations for thickened-edges should be completed by an excavator equipped with a smooth-bladed bucket operating from the edge of the excavation. The contractor should work carefully to prevent disturbance to the bearing surface at all times.
3. GBC-I or GBC-II crushed granular base course, in accordance with MTI Standard Construction Specification No. 901(1), *Material Specification for Aggregate – Granular Course*, should be used as the final lift or as a levelling course. The granular base course should be placed in lifts no greater than 150 mm and compacted to 100% of the SPMDD.
4. Where thickened edges are installed above 2.4 m depth insulation should be used as per recommendations in Section 4.5.
5. The bearing surfaces should be protected from freezing, drying, inundation and disturbance at all times. If any of these conditions occur, the disturbed zone must be over-excavated such that the bearing surface consists of undisturbed clay with silt and sand (till).
6. Groundwater should be controlled and removed from the bearing surface such that concrete is placed under dry conditions.
7. Foundation units should be backfilled along the outside with non-frost susceptible soils (clean, granular fill) above the insulation and compacted to 98% of the SPMDD.

4.4 Resistance to Overturning, Uplift and Sliding

Foundations for structures subjected to lateral and/or eccentric loads must be designed to resist overturning and uplift forces. Lateral and eccentric loading will result in the development of overturning and uplift forces and consequently a non-uniform applied pressure distribution under thickened-edges. In this regard, the maximum applied pressure should not exceed the ULS unit bearing resistance and the minimum applied pressure should not be less than 0 kPa. Sliding is not expected to be a concern for design; however, Limit States Design values can be provided, if necessary, once lateral/eccentric loads are known.

4.5 Footing Insulation Recommendations

In areas where footings are installed above the depth of seasonal frost and flat lying polystyrene insulation is being considered, the following recommendations apply to footings along exterior walls of structures that will be heated year-round:

1. Rigid extruded polystyrene insulation (e.g. Styrofoam Highload™) should be placed at a minimum depth of 0.4 m and extended 1.2 m horizontally in all directions from the building foundation according to manufacturers specifications.
2. Insulation should be a minimum of 50 mm thick. Joints between insulation layers should be staggered.
3. For heated structures, insulation should be fastened to exterior walls up from the horizontal insulation to a level coincident with the insulation of the interior wall.

Insulation should be sloped away from the structure to promote runoff.

4.6 Foundation Inspection Requirements

In accordance with Section 4.2.2.3 *Field Review* of the NBCC (2020), the designer or other suitably qualified person shall carry out a field review on:

- a) as-required, unless otherwise directed by the *authority having jurisdiction*,
 - i. in the construction of all *shallow foundation units*, and
 - ii. in excavating, dewatering and other related works

In accordance with Engineers and Geoscientists of Manitoba, a Professional Engineer or delegated staff responsible to them must perform site reviews for the work presented in the documents they've sealed.

For conformance with the NBCC and EGM requirements, TREK should be retained to observe and document the installation of all foundations, shoring or engineered fills supporting the structure, and other components such as subgrade inspections and compaction testing. TREK is familiar with the geotechnical conditions present and the underlying design assumptions of our foundation recommendations. TREK is therefore solely qualified to evaluate any design modifications deemed to be necessary should altered subsurface conditions be encountered.

4.7 Foundation Concrete

All foundation concrete should be designed by a structural engineer for the anticipated axial (compression and uplift), lateral, and bending loads from the structure. Concrete should be designed in accordance with CSA A23.1-19 (Concrete Materials and Methods of Construction). Sulphate testing was completed on one combined sample (SS20 and G21). Testing results are presented in Table 3 and included in Appendix A.

Table 3. Water Soluble Sulphate Testing Results

Test Hole ID	Sample Depth (m)	Sample ID	Water Soluble Sulphate
TH25-02	1.5 to 2.0 and 2.1 to 2.4	SS20 and G21	NR

1. A result of "NR" indicates that the total sulfate analysis was $<0.2\%$ and based on CSA-A23.2-3B no analysis for soluble sulfate is required

Based on the results provided in Table 3, the soluble sulphate content in the soils at the site are negligible and the degree of exposure for concrete subjected to sulphate attack is considered negligible according to CSA A23.1-19. In this regard, high sulphate-resistant cement is not required at the site. Concrete that may be exposed to freezing and thawing should be adequately air entrained to improve freeze-thaw durability in accordance with Table 4, CSA A23.1-19.

5.0 Lateral Earth Pressures

The magnitude of lateral earth pressures from retained soil acting against retaining walls and/or buried walls will depend on the retained material type, method of placing and compacting the backfill, the magnitude of rotation of the walls, drainage, and surcharge loading.

Retained Material Type

The granular backfill material behind below grade walls should be a clean, unfrozen, well-draining, sand and gravel with a maximum particle size of 50 mm and less than 5 percent passing the 75 μ m sieve size.

A clay cap 0.6 to 1.0 m thick, should be provided around the perimeter of the structure to help reduce water infiltration into the granular backfill. The clay should be compacted to 90% of the Standard Proctor Maximum Dry Density (SPMDD). Granular backfill should extend from the walls to approximately 1 to 1.5 m away from buried walls to provide adequate drainage and protection from expanding soils.

Method of Placement and Compaction

The backfill should not be placed and compacted until the walls can support lateral earth pressures. Over-compaction of the retained fill may result in earth pressures that are considerably higher than those predicted in design. Granular fill should be placed and compacted in lifts no greater than 150 mm. Compaction of granular fill within about 1.5 m of the walls should be conducted with a light hand-

operated vibrating plate compactor and the number of compaction passes should be limited. A compacted density between 90 and 92% (i.e. no more than 92%) of the SPMDD should be specified for backfill placed directly adjacent to the walls.

Lateral Earth Pressure Coefficients and Magnitude of Rotation of the Walls

Table 4 below provides values for calculation of lateral earth pressures acting on below grade walls that are not free to rotate. An active earth pressure coefficient (K_a) should be used to calculate lateral loads against walls which are free to translate horizontally away from the retained soil by more than 0.1% of the wall height. A passive earth pressure coefficient (K_p) should be used if the wall is free to translate horizontally towards the retained soil by more than 2% of the wall height. An at-rest earth pressure coefficient (K_o) should be used if the walls undergo less than 2% movement of the wall height towards the retained soil and less than 0.1% of the wall height away from the retained soil.

Table 4. Lateral Earth Pressure Parameters for Buried Wall Design

Design Parameter	Backfill
At-Rest Earth Pressure Coefficient (K_o)	0.5
Passive Earth Pressure Coefficient (K_p)	3.0
Active Earth Pressure Coefficient (K_a)	0.3
Estimated Bulk Unit Weight, γ (kN/m ³)	20
Estimated Effective Unit Weight, γ' (kN/m ³)	10

Drainage

Backfill drainage such as a filter protected sub-drainage system at the base of the wall should be constructed to prevent the build-up of hydrostatic pressures (e.g. HDPE weeping tile, min. 100 mm diameter with filter sock directed to a sump pit). Backfill around subdrains (e.g. weeping tile with filter sock) should be a pea gravel. The drainage stone should be wrapped in non-woven geotextile filter material (TE-8 or equivalent). The total lateral earth pressure force is the area of the triangular pressure distribution acting on a below grade wall which can be derived based on the following equation:

$$P = K_o \gamma D$$

Where,

P = lateral earth pressure at depth D (kPa)

K_o = earth pressure coefficient (unitless)

γ = bulk unit weight of retained soil (kN/m³)

D = depth below finished grade to where earth pressure is being calculated (m)

Since long-term groundwater levels are unknown at the site, it would be prudent to assume that the groundwater level is at existing or final grade (whichever is higher) for the undrained case.

Surcharge Loading

The effect of any surcharge loads (e.g. construction equipment) must be added to the pressure acting on the walls in addition to the calculated earth pressures. The pressure diagram for surcharge loads is uniform (rectangular) with the wall pressure equivalent to the surcharge pressure multiplied by the earth pressure coefficient as defined in Table 4.

6.0 Reservoir Buoyancy

Resistance against buoyancy should be checked during design for the reservoir. If drainage is not provided at the base of the reservoir, the buoyant soil unit weight should be used and the water (hydrostatic) pressure added assuming a water level coincident with the ground surface. If a granular drainage system is used around the perimeter of the structure(s), a groundwater level at the bottom of the drainage layer can be assumed for design. For calculation of uplift resistance, a bulk unit weight of 17.0 kN/m^3 (buoyant unit weight of 7.2 kN/m^3) should be used for soil overlying the tank or above buried foundation elements.

Additional Design Recommendations

1. During the service life of the cistern, the potential for flotation due to high groundwater must be evaluated. The most critical condition occurs when the tank is completely empty, and the groundwater table is at or near ground surface. Under this circumstance, the tank has very little self-weight resisting buoyant uplift. Under this short-term condition a minimum factor of safety (FS) of 1.3 is recommended.
2. When the tank is in normal operation with water inside, the contents of the reservoir provide additional downward weight and improve resistance to uplift. In this long-term condition a minimum FS of 1.5 is recommended.
3. If it cannot be guaranteed that the tank will always retain some water (for example, if the Owner cannot commit to always maintaining a minimum operating water level), then the empty-tank condition must govern. In this case, the design should be based solely on the requirement of $FS \geq 1.3$, since this represents the worst-case scenario.
4. Where the calculated FS does not meet the minimum thresholds described above, the design should incorporate structural measures to resist buoyancy. These could include thickening the base slab to provide additional dead weight, extending the base into the underlying clay as a shear key, adding fill to surface, or installing tie-down anchors to resist uplift forces directly. TREK can provide additional design recommendations for these options if required.

If the operational strategy relies on maintaining a minimum operating water level to achieve the required factor of safety, then the facility must include monitoring systems and alarms. These should alert operators if water levels drop below the safe threshold so that corrective actions can be taken before uplift pressures threaten the integrity of the tank.

7.0 Buried Pipe Installation

To reduce the risks of freezing, underground utilities should be buried below 2.4 m depth. Alternatively, measures such as flat lying rigid polystyrene insulation may be considered to reduce the frost penetration depth. Also, insulated and/or heat trace piping may be considered for buried utilities within the depth of frost penetration. Manufacturers should be consulted to ensure the proper selection of heat trace and pipe insulation. Pipe connections to rigid structures should be fitted with flexible connections to accommodate seasonal movement between pipes and the structures.

The pipe subgrade should be evenly graded and compacted to a minimum of 95% SPMDD to provide uniform support. In-situ fine-grained (e.g., clay) soils should not be used as pipe bedding but is acceptable as trench backfill above the pipe backfill provided the recommendations outlined below are adhered to and surface settlement is permissible. Pipe bedding material should consist of granular material with less than 5% fines, free from organics or other deleterious material, with a maximum particle size of 25 mm. Pipe backfill should consist of granular material with trace to some fines with a maximum particle size of 25 mm.

Pipe backfill should be placed equally on each side of the pipe in uniform lifts not exceeding 300 mm or 1/3 of the pipe diameter (whichever is less) and compacted to a minimum of 95% SPMDD. Haunching material must be carefully placed and compacted so as not to disturb the pipe from its line and grade while ensuring that it is in firm and intimate contact with the entire bottom surface of the pipe. A minimum 300 mm of pipe backfill should be placed above the pipe before the placement of trench backfill to ensure the pipe is not damaged during compaction.

Excavated fine-grained soils are suitable for use as trench backfill provided long-term surface movements are acceptable (i.e. the fine-grained soils compacted to 95% SPMDD will result in settlement of approximately 2 to 4% of the fill thickness). If these settlements are not acceptable, backfilling should be completed with a well graded granular fill compacted to 95% SPMDD within 1 m of the bedding material and compacted to a minimum of 98% SPMDD above, in lifts not exceeding 150 mm. Some settlement along the trench alignment should be expected regardless of backfill materials, methods and degree of compaction.

7.1 Corrosion

Resistivity/conductivity and pH testing was conducted on a sample at the proposed location for the cistern structure; the results of which are presented in Table 5.

Table 5. Resistivity Testing Results

Test Hole ID	Sample Depth (m)	Sample ID	pH	Resistivity (ohm-cm)	Conductivity (mS/cm)
TH25-02	1.5 to 2.0 and 2.1 to 2.4	SS20 and G21	7.87	610	1.64

According to Table 2-27 of the *Handbook of Corrosion Engineering*, soils with resistivity below 1,000 ohm-cm are classified as extremely corrosive. The measured value of 610 ohm-cm therefore indicates a high corrosion potential for buried or embedded steel at this location. The near-neutral to slightly

alkaline pH (7.87) does not increase the risk significantly, but the low resistivity itself is sufficient to warrant concern.

To address this potential, the design should incorporate corrosion protection measures such as:

- Application of protective coatings on steel elements.
- Allowance for increased steel thickness/corrosion margin.
- Drainage improvements to reduce moisture accumulation.
- Electrical isolation of dissimilar metals to prevent galvanic effects.
- Consideration of cathodic protection for critical or long-service-life components.

A detailed prediction of corrosion rates and development of project-specific mitigation measures is beyond the scope of this report. Engagement of a corrosion specialist is recommended for further refinement.

8.0 Temporary Excavations

All temporary excavations must be carried out in compliance with the appropriate regulation(s) under the Manitoba Workplace Safety and Health Act. Excavations near existing structures should also be designed such that the existing structure foundations or floor slabs are not impacted. Any open-cut excavations greater than 3 m deep must be designed and sealed by a professional engineer and should be reviewed by the geotechnical engineer of record (TREK). As the excavation is located near the existing personal care home, shoring may be required to protect the existing structure from damage. Foundations for the existing structure should not be undermined during construction of the cistern. Dewatering may be required prior to excavation for foundations and water lines. A dewatering contractor should be retained to design the dewatering system. A FS against piping/boiling of ≥ 1.5 (i.e. the critical hydraulic gradient over the maximum hydraulic gradient, i_{cr}/i_{max}) shall be demonstrated at the final subgrade elevation. If the factor of safety cannot be achieved with the planned system, design modifications will be required such as adjusting the reservoir depth accordingly.

Excavation stability is the responsibility of the Contractor for the duration of construction. Excavations should be monitored regularly and flattened as necessary to maintain stability recognizing that excavation stability is time and weather dependent. Excavated slopes should be covered with polyethylene sheets to prevent wetting and drying.

Stockpiles of excavated material and heavy equipment should be kept away from the edge of any excavation by a distance equal to or greater than the depth of excavation. Dewatering measures should be completed as necessary to maintain a dry excavation and permit proper completion of the work. If seepage is encountered, it should be collected and pumped out of the excavation. If saturated silts or sands are encountered, shoring or slope flattening may be required. To prevent wet silts and sands from entering the excavation, gravel buttressing could be used in conjunction with sump pits for dewatering. Surface water should be diverted away from the excavation, and the excavation should be backfilled as soon as possible following construction.

8.1 Protection of Adjacent Structures and Utilities

- The dewatering system shall be designed and operated to limit drawdown outside the excavation to levels that will not induce ground settlement at the adjacent building. Unless otherwise approved by the Geotechnical Engineer, drawdown measured in external monitoring standpipes shall not exceed 0.3 to 0.5 m at the building line during any stage of construction.
- Prior to pumping, the Contractor's Professional Engineer shall submit a groundwater flow and settlement assessment demonstrating that the proposed dewatering system layout maintains factors of safety against piping ≥ 1.5 at subgrade elevation and keeps predicted building settlements within the criteria below.
- Construction activities (pile installation, compaction, hoe-ramming) shall be executed in a manner that limits peak particle velocity (PPV) at the building. The threshold PPV required to cause structural damage depends on several factors; however, for preliminary design, a value of less than 12 mm/s may be assumed. For more sensitive structures, limits as low as 5 mm/s may apply. The contractor shall select construction methods and equipment to control vibrations accordingly (e.g., press-in sheet piles, low-energy vibratory settings, staged compaction). Vibration monitoring during construction is recommended to confirm that vibrations remain within acceptable limits.

9.0 Site Drainage

Drainage adjacent to structures and exterior slabs should promote run-off away from the structures and slabs. A minimum gradient of about 2% should be used for both landscaped and paved areas and maintained throughout the life of the structures. All paved areas should be provided with minimum slopes of 2% to improve long-term drainage. The water discharge from roof leaders and run-off from exposed slabs should be directed away from the structures.

10.0 Seismic Site Classification

The site classification for seismic site response was determined based on Table 4.1.8.4.-B in Section 4.1.8 *Earthquake Load and Effects* of the NBCC (2020). Site Class D applies to this site based on the average standard penetration resistance of the soil at this site. The seismic site classification could possibly be improved by undertaking a geophysical site survey to measure shear wave velocities in the upper 30 m of the soil profile.

11.0 Closure

The geotechnical information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation and laboratory testing). Soil conditions are natural deposits that can be highly variable across a site. If sub-surface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary.

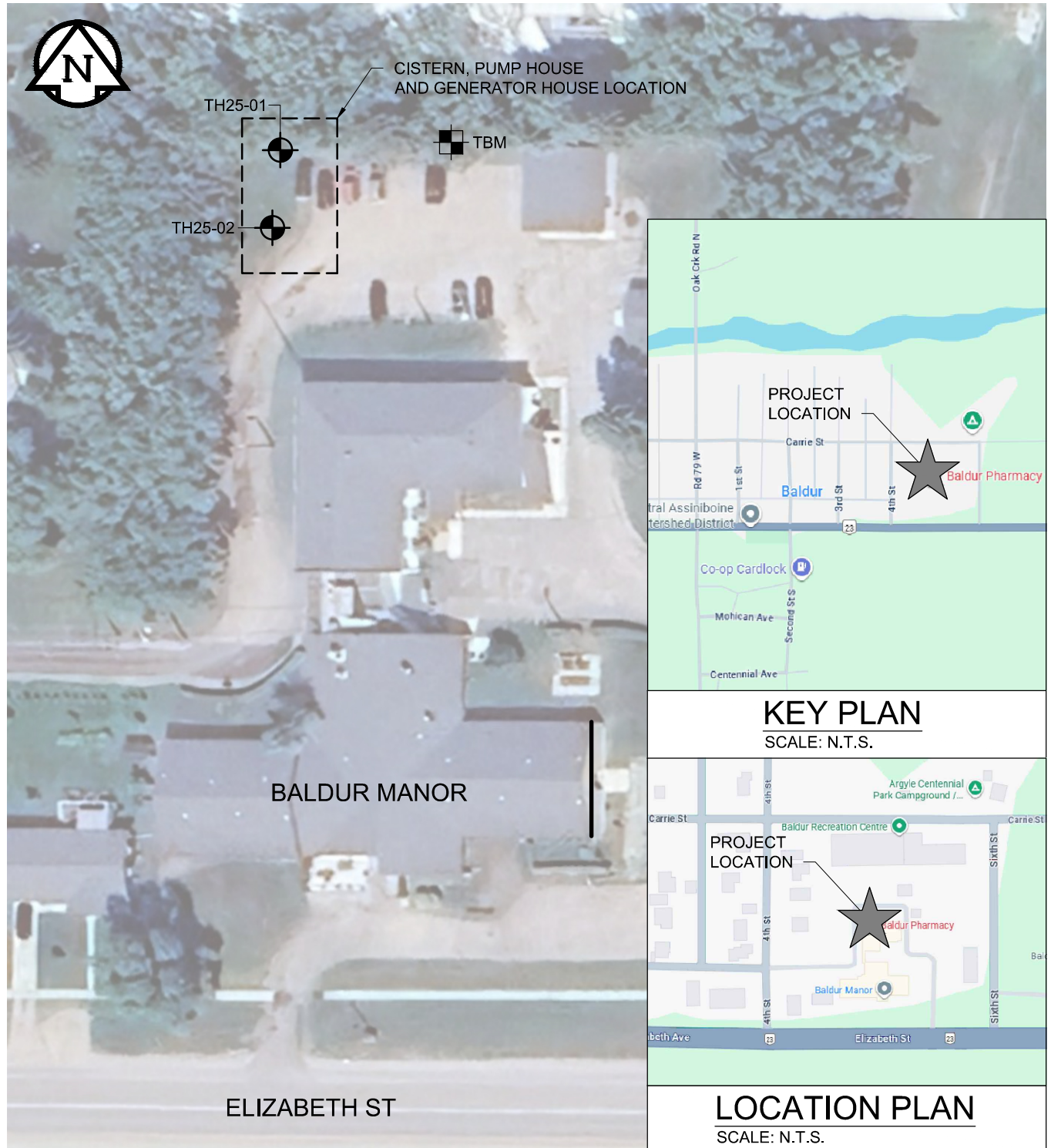
All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work or standard engineering services agreement.

If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy.

This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of SMS Engineering (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

Figure

Z:\Projects\0579 SMS Engineering\0579 013 00 Baldur PCH-HC\3 Survey and Dwg\3.4 CAD\3.4.3 Working Folder\Fig 2025-11-03 Baldur PCH 0_C 0579-013-00.dwg, 2025-11-03 2:08:28 PM



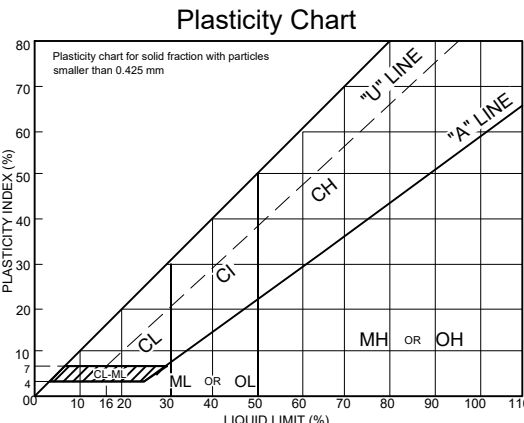
0 10 20 30 m
SCALE = 1 : 750 (216 mm x 279 mm)

Figure 01
Test Hole Location Plan

Test Hole Logs

GENERAL NOTES

- Classifications are based on the Unified Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
- When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Major Divisions	USCS Classification	Symbols	Typical Names	Laboratory Classification Criteria		Particle Size		Material
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows: Less than 5 percent..... GW, GP, SW, SP More than 12 percent..... GM, GC, SM, SC 6 to 12 percent..... Borderline cases requiring dual symbols*	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	ASTM Sieve sizes	#10 to #4 #40 to #10 #200 to #40 < #200	Sand
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW			
		GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4			
		GC	Clayey gravels, gravel-sand-silt mixtures		Atterberg limits above "A" line or P.I. greater than 7			
	Sands (More than half of coarse fraction is smaller than 4.75 mm)	SW	Well-graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	mm	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425 < 0.075	Coarse Medium Fine
		SP	Poorly-graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW			
		SM	Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4			
		SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line or P.I. greater than 7			
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silt and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	Plasticity Chart 	Von Post Classification Limit	Strong colour or odour, and often fibrous texture	ASTM Sieve Sizes	Material
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					
		OL	Organic silts and organic silty clays of low plasticity					
	Silt and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts					
		CH	Inorganic clays of high plasticity, fat clays					
		OH	Organic clays of medium to high plasticity, organic silts					
	Highly Organic Soils	Pt	Peat and other highly organic soils					

* Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols.
For example; GW-GC, well-graded gravel-sand mixture with clay binder.

Other Symbol Types

	Asphalt		Bedrock (undifferentiated)		Cobbles
	Concrete		Limestone Bedrock		Boulders and Cobbles
	Fill		Cemented Shale		Silt Till
			Non-Cemented Shale		Clay Till

LEGEND OF ABBREVIATIONS AND SYMBOLS

LL - Liquid Limit (%)	VW - Vibrating Wire Piezometer
PL - Plastic Limit (%)	SI - Slope Inclinator
PI - Plasticity Index (%)	▽ Water Level at Time of Drilling
MC - Moisture Content (%)	▼ Water Level at End of Drilling
SPT - Standard Penetration Test	▽ Water Level After Drilling as Indicated on Test Hole Logs
RQD - Rock Quality Designation	
Qu - Unconfined Compression	
Su - Undrained Shear Strength	

FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent
with *	with silt, with sand	> 35 percent

* Used when the material is classified based on behaviour as a cohesive material

TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

The undrained shear strength (Su) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>Undrained Shear Strength (kPa)</u>
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200

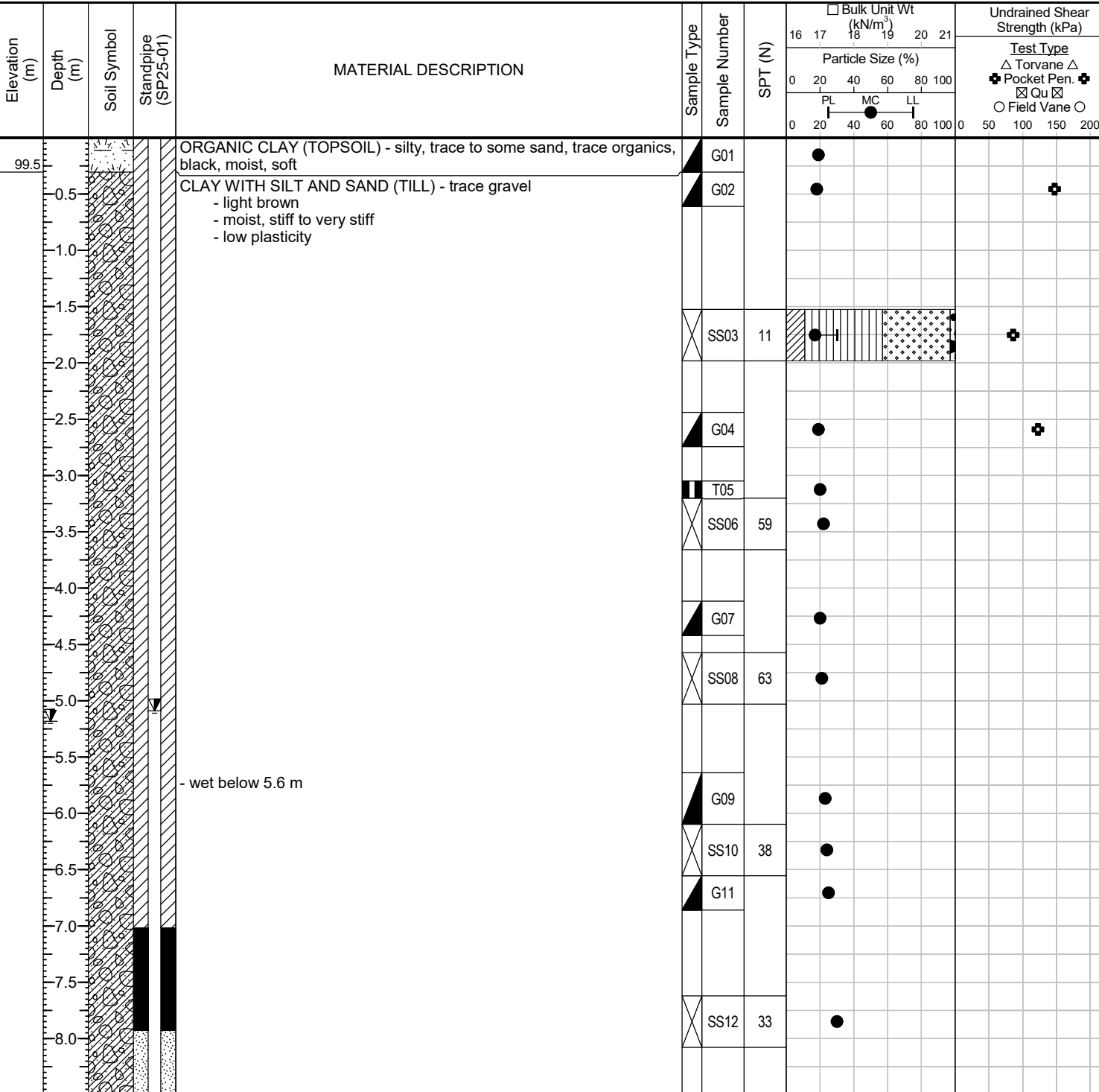


Sub-Surface Log

Test Hole TH25-01
1 of 2

Client:	SMS Engineering	Project Number:	0579-013-00
Project Name:	Baldur PCH & HC	Location:	UTM Zone 14U 482558 m E, 5470392 m N
Contractor:	Paddock Drilling Ltd.	Ground Elevation:	99.80 m (local datum)
Method:	Canterra CT 250, 125 mm diam. SSA	Date Drilled:	7 October 2025

Sample Type:	☒ Grab (G)	☒ Shelby Tube (T)	☐ Split Spoon (SS) / SPT	☒ Split Barrel (SB) / LPT	☐ Core (C)		
Particle Size Legend:	☒ Fines	☒ Clay	☐ Silt	☐ Sand	☐ Gravel	☐ Cobbles	☐ Boulders
Backfill Legend:	☒ Bentonite	☐ Cement	☐ Drill Cuttings	☐ Filter Pack Sand	☐ Grout	☐ Slough	



Logged By:	Craig Allard	Reviewed By:	Brent Hay	Project Engineer:	Reza Jamshidi Chenari
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Sub-Surface Log

Test Hole TH25-01

2 of 2

Elevation (m)	Depth (m)	Soil Symbol	Standpipe (SP25-01)	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	Bulk Unit Wt (kN/m ³)		Particle Size (%)		Undrained Shear Strength (kPa)	
								16	17	18	19	20	21
								PL MC LL				Test Type	
								0 20 40 60 80 100				△ Torvane △ + Pocket Pen. + ⊠ Qu ⊠ ○ Field Vane ○	
91.0	9.0			SILT WITH SAND (TILL) - some gravel (< 25 mm dia.), trace clay - grey - wet, very stiff - high plasticity	G13								
9.5					SS14	62							
10.0					G15								
10.5					SS16	29							
11.0					G17								
11.5					SS18	100							

END OF TEST HOLE AT 12.6 m IN SILT WITH SAND (TILL)

1. Power auger refusal was not observed.
2. Seepage was observed below 5.6 m.
3. Sloughing was not observed.
4. Test hole open to 12.2 m depth immediately after drilling.
5. Water level measured at 5.2 m depth immediately after drilling.
6. 25 mm diameter PVC standpipe with Cassagrande tip installed at 9.1 m depth with a 0.9 m stick-up. Levellogger installed in standpipe.
7. Test hole backfilled with filter sand around Cassagrande tip, sealed with bentonite above sand, and backfilled with auger cuttings and bentonite to ground surface.
8. Test hole elevation surveyed relative to a temporary benchmark (TBM) assigned a local elevation of 100.0 m, located on top of concrete base of overhead light standard. (14U 482580.0 m E, 5470393.0 m N)



Sub-Surface Log

Test Hole TH25-02

2 of 2

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	Bulk Unit Wt (kN/m ³)					Undrained Shear Strength (kPa)				
							Particle Size (%)					Test Type				
							0 20 40 60 80 100					△ Torvane △ ✦ Pocket Pen. ✦ ☒ Qu ☒ ○ Field Vane ○				
							0 20 40 60 80 100					0 50 100 150 200 250				
90.9	9.0		SILT WITH SAND (TILL) - some gravel (< 25 mm dia.), trace clay - grey - wet, very stiff - high plasticity													
	9.5			X	SS29	53										
	10.0			▲	G30											
	10.5															
	11.0			X	SS31	38										
	11.5			▲	G32											
	12.0															
87.4	12.5			X	SS33	95										

END OF TEST HOLE AT 12.6 m SILT WITH SAND (TILL)
1. Power auger refusal was not observed.
2. Seepage was observed below 4.6 m during drilling.
3. Sloughing was observed below 4.6 m during drilling.
4. Test hole open to 6.7 m depth immediately after drilling.
5. Water level measured at 5.5 m depth immediately after drilling.
6. Test hole backfilled with auger cuttings and bentonite chips to ground surface.
7. Test hole elevation surveyed relative to a temporary benchmark (TBM) assigned a local elevation of 100.0 m, located on top of concrete base of overhead light standard. (14U 482580.0 m E, 5470393.0 m N)

Appendix A

Laboratory Testing

MEMORANDUM

Date	October 28, 2025
To	Craig Allard, TREK Geotechnical
From	Angela Fidler-Kliwer, TREK Geotechnical
Project No.	0579-013-00
Project	Baldur PCH and CH
Subject	Laboratory Testing Results – Lab Req. R25-454

Distribution	Reza Jamshidi
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Attached are the laboratory testing results for the above noted project. The testing included moisture content determinations, Atterberg Limits and particle size distribution (Hydrometer method).

One sample (TH24-01 G4) was sent to ALS Environmental for sulphate, pH, conductivity and resistivity tests. The results will be issued in a separate report upon completion by ALS.

Regards,

Angela Fidler-Kliwer, C.Tech.

Attach.

Review Control:

<i>Prepared By:</i> AfK	<i>Reviewed By:</i> AFK	<i>Checked By:</i> NJF
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www.trekgeotechnical.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433 Fax: 204.975.9435

Moisture Content Report ASTM D2216-98

Project No. 0579-013-00
Client SMS Engineering
Project Baldur PCH and HC

Sample Date 07-Oct-25
Test Date 25-Oct-25
Technician J.Fidler-Kliwer

Test Hole	TH25-01	TH25-01	TH25-01	TH25-01	TH25-01	TH25-01
Depth (m)	0.0 - 0.3	0.3 - 0.6	1.5 - 2.0	2.4 - 2.7	3.0 - 3.2	3.2 - 3.7
Sample #	G01	G02	SS03	G04	T05	SS06
Tare ID	Z134	Z51	E76	D18	E83	D47
Mass of tare	8.8	8.5	7.0	8.7	7.0	9.3
Mass wet + tare	171.4	193.4	424.4	169.0	243.6	178.6
Mass dry + tare	145.0	165.6	362.9	143.8	204.0	148.4
Mass water	26.4	27.8	61.5	25.2	39.6	30.2
Mass dry soil	136.2	157.1	355.9	135.1	197.0	139.1
Moisture %	19.4%	17.7%	17.3%	18.7%	20.1%	21.7%

Test Hole	TH25-01	TH25-01	TH25-01	TH25-01	TH25-01	TH25-01
Depth (m)	4.1 - 4.4	4.6 - 5.0	5.6 - 6.1	6.1 - 6.6	6.6 - 6.9	7.6 - 8.1
Sample #	G07	SS08	G09	SS10	G11	SS12
Tare ID	D19	W41	W28	C8	K33	W45
Mass of tare	9.1	8.6	8.6	8.4	9.1	8.6
Mass wet + tare	160.1	161.9	174.1	155.4	163.4	173.0
Mass dry + tare	135.2	135.1	143.4	126.7	132.2	135.3
Mass water	24.9	26.8	30.7	28.7	31.2	37.7
Mass dry soil	126.1	126.5	134.8	118.3	123.1	126.7
Moisture %	19.7%	21.2%	22.8%	24.3%	25.3%	29.8%

Test Hole	TH25-01	TH25-01	TH25-01	TH25-01	TH25-01	TH25-01
Depth (m)	8.8 - 9.1	9.1 - 9.6	10.1 - 10.4	10.7 - 11.1	11.3 - 11.6	12.2 - 12.6
Sample #	G13	SS14	G15	SS16	G17	SS18
Tare ID	E11	AB95	N24	J26	B23	M03
Mass of tare	8.3	8.6	9.0	7.5	7.8	7.5
Mass wet + tare	163.8	374.7	164.0	191.0	168.6	165.8
Mass dry + tare	121.8	279.5	120.1	141.8	122.7	124.8
Mass water	42.0	95.2	43.9	49.2	45.9	41.0
Mass dry soil	113.5	270.9	111.1	134.3	114.9	117.3
Moisture %	37.0%	35.1%	39.5%	36.6%	39.9%	35.0%



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Moisture Content Report ASTM D2216-98

Project No. 0579-013-00
Client SMS Engineering
Project Baldur PCH and HC

Sample Date 07-Oct-25
Test Date 25-Oct-25
Technician J.Fidler-Kliewer

Test Hole	TH25-02	TH25-02	TH25-02	TH25-02	TH25-02	TH25-02
Depth (m)	0.2 - 0.5	2.1 - 2.4	3.0 - 3.5	3.7 - 4.0	4.6 - 5.0	5.2 - 5.5
Sample #	G19	G21	SS22	G23	SS24	G25
Tare ID	Z123	QT18	J67	L4	J8	Z12
Mass of tare	8.6	18.3	7.0	7.2	8.5	8.6
Mass wet + tare	172.5	168.5	191.6	180.4	171.2	169.7
Mass dry + tare	149.7	146.2	158.6	152.9	140.4	141.3
Mass water	22.8	22.3	33.0	27.5	30.8	28.4
Mass dry soil	141.1	127.9	151.6	145.7	131.9	132.7
Moisture %	16.2%	17.4%	21.8%	18.9%	23.4%	21.4%

Test Hole	TH25-02	TH25-02	TH25-02	TH25-02	TH25-02	TH25-02
Depth (m)	6.1 - 6.6	6.6 - 6.9	7.6 - 8.1	9.1 - 9.6	9.8 - 10.1	10.7 - 11.1
Sample #	SS26	G27	SS28	SS29	G30	SS31
Tare ID	B22	M18	B12	J05	D225	QT21
Mass of tare	6.8	7.0	6.8	6.7	6.8	8.2
Mass wet + tare	165.5	168.4	151.4	150.0	166.7	165.7
Mass dry + tare	135.5	139.3	121.8	118.0	128.3	125.8
Mass water	30.0	29.1	29.6	32.0	38.4	39.9
Mass dry soil	128.7	132.3	115.0	111.3	121.5	117.6
Moisture %	23.3%	22.0%	25.7%	28.8%	31.6%	33.9%

Test Hole	TH25-02	TH25-02				
Depth (m)	11.4 - 11.7	12.2 - 12.6				
Sample #	G32	SS33				
Tare ID	C10	H57				
Mass of tare	6.8	8.8				
Mass wet + tare	158.8	161.4				
Mass dry + tare	115.4	123.3				
Mass water	43.4	38.1				
Mass dry soil	108.6	114.5				
Moisture %	40.0%	33.3%				

Project No. 0579-013-00
Client SMS Engineering
Project Baldur PCH and HC

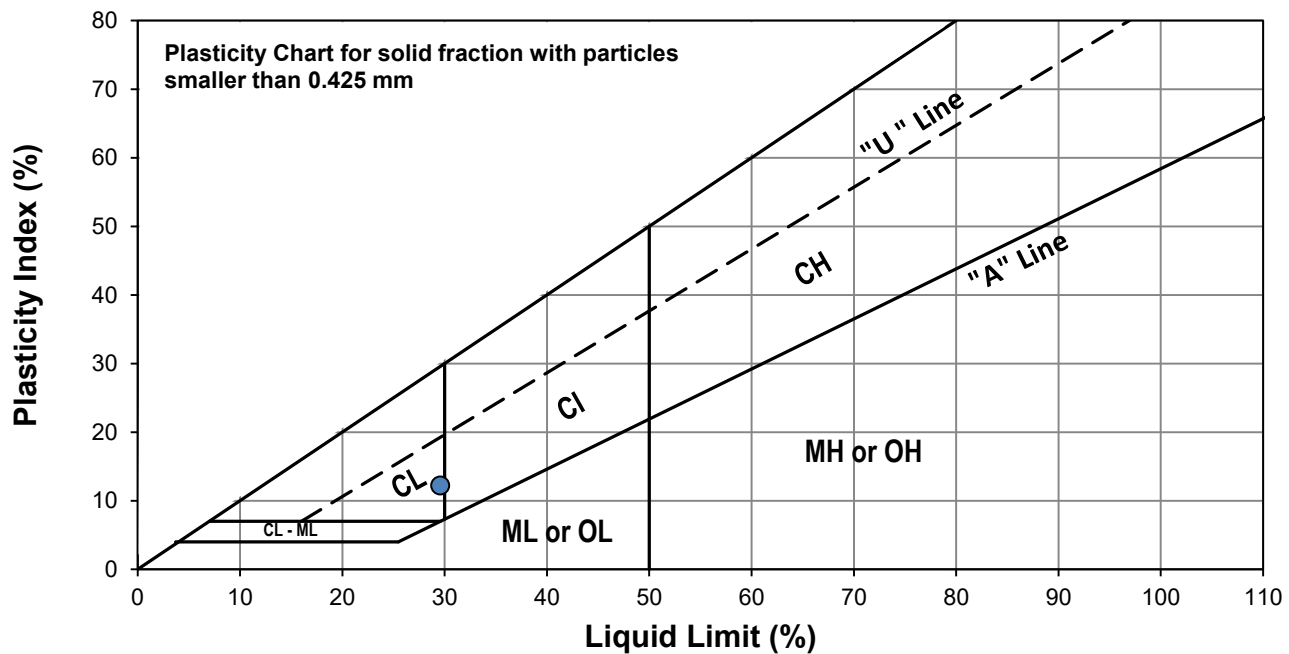


Test Hole TH25-01
Sample # SS03
Depth (m) 1.5 - 2.0
Sample Date 07-Oct-25
Test Date 21-Oct-25
Technician D.Sellick

Liquid Limit	30
Plastic Limit	17
Plasticity Index	12

Liquid Limit

Trial #	1	2	3		
Number of Blows (N)	15	23	32		
Mass Tare (g)	13.937	13.933	13.838		
Mass Wet Soil + Tare (g)	26.468	25.840	25.492		
Mass Dry Soil + Tare (g)	23.485	23.113	22.881		
Mass Water (g)	2.983	2.727	2.611		
Mass Dry Soil (g)	9.548	9.180	9.043		
Moisture Content (%)	31.242	29.706	28.873		



Plastic Limit

Trial #	1	2	3	4	5
Mass Tare (g)	13.958	13.973			
Mass Wet Soil + Tare (g)	21.071	21.416			
Mass Dry Soil + Tare (g)	20.027	20.303			
Mass Water (g)	1.044	1.113			
Mass Dry Soil (g)	6.069	6.330			
Moisture Content (%)	17.202	17.583			

Note: Additional information recorded/measured for this test is available upon request.

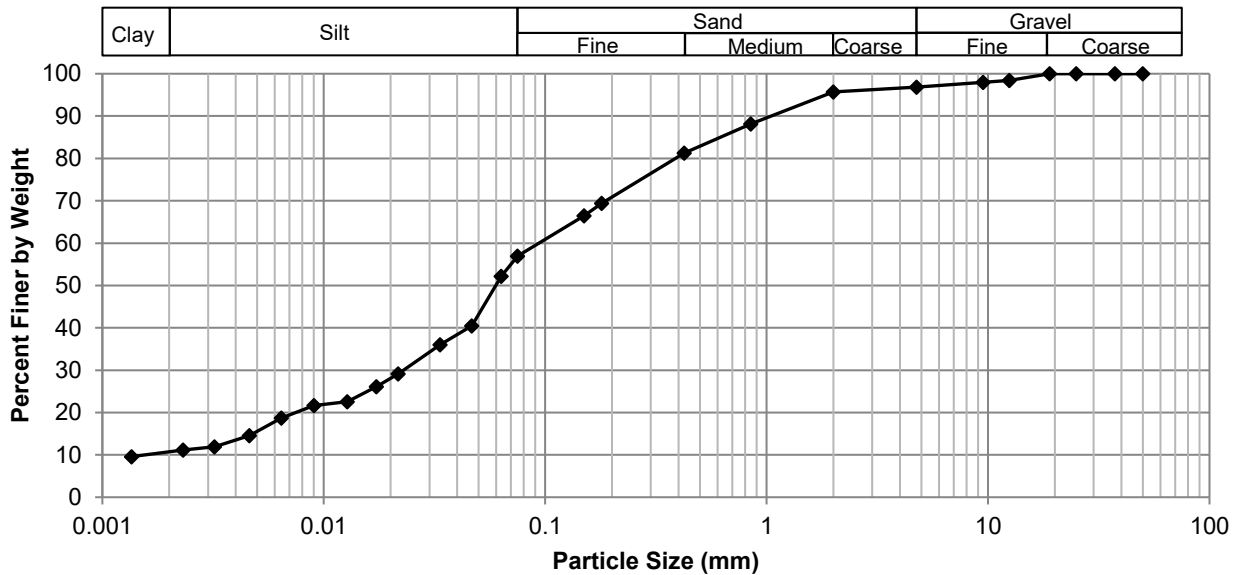
Project No. 0579-013-00
Client SMS Engineering
Project Baldur PCH and HC



Test Hole TH25-01
Sample # SS03
Depth (m) 1.5 - 2.0
Sample Date 07-Oct-25
Test Date 21-Oct-25
Technician D. Sellick

Gravel	3.2%
Sand	39.9%
Silt	46.3%
Clay	10.6%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	96.84	0.0750	56.94
37.5	100.00	2.00	95.68	0.0632	52.15
25.0	100.00	0.850	88.17	0.0466	40.48
19.0	100.00	0.425	81.26	0.0335	35.99
12.5	98.41	0.180	69.40	0.0217	29.11
9.50	97.97	0.150	66.43	0.0173	26.12
4.75	96.84	0.075	56.94	0.0128	22.53
				0.0090	21.67
				0.0064	18.71
				0.0046	14.56
				0.0032	11.94
				0.0023	11.14
				0.0014	9.60

Project No. 0579-013-00
Client SMS Engineering
Project Baldur PCH and HC

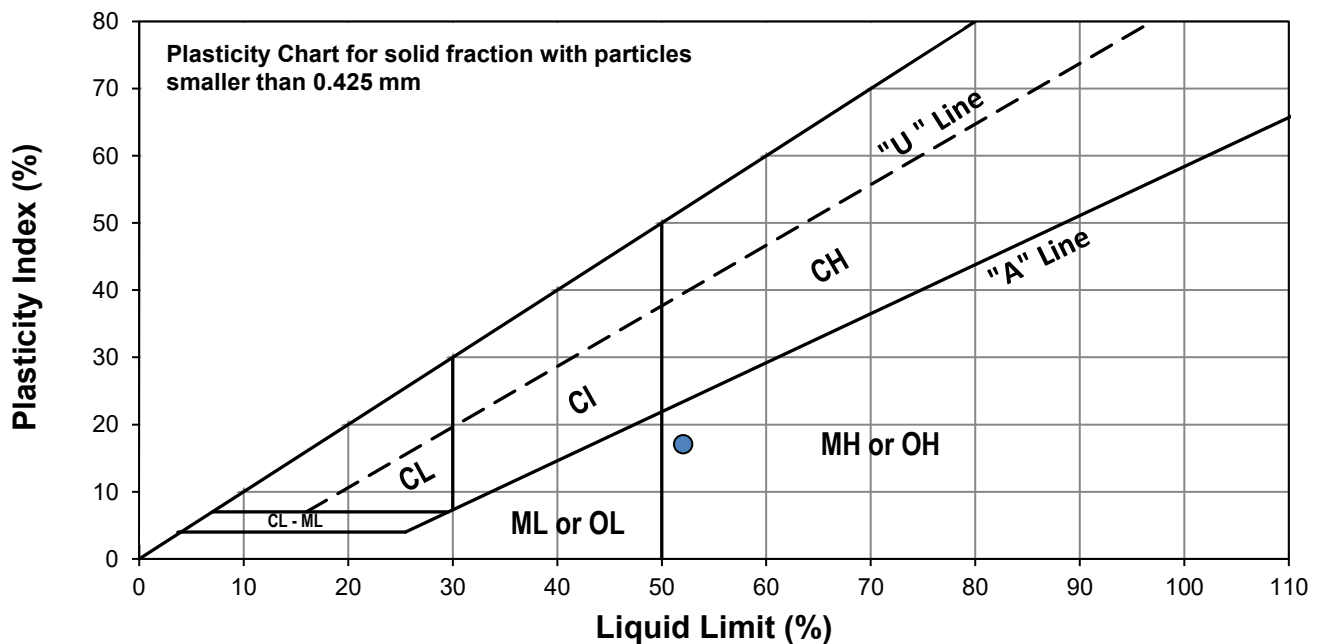


Test Hole TH25-01
Sample # SS14
Depth (m) 9.1 - 9.6
Sample Date 07-Oct-25
Test Date 25-Oct-25
Technician J. McEwing

Liquid Limit	52
Plastic Limit	35
Plasticity Index	17

Liquid Limit

Trial #	1	2	3		
Number of Blows (N)	35	22	20		
Mass Tare (g)	13.831	13.914	13.929		
Mass Wet Soil + Tare (g)	24.209	24.603	23.591		
Mass Dry Soil + Tare (g)	20.689	20.930	20.266		
Mass Water (g)	3.520	3.673	3.325		
Mass Dry Soil (g)	6.858	7.016	6.337		
Moisture Content (%)	51.327	52.352	52.470		



Plastic Limit

Trial #	1	2	3	4	5
Mass Tare (g)	13.842	13.945			
Mass Wet Soil + Tare (g)	20.744	20.723			
Mass Dry Soil + Tare (g)	18.956	18.966			
Mass Water (g)	1.788	1.757			
Mass Dry Soil (g)	5.114	5.021			
Moisture Content (%)	34.963	34.993			

Note: Additional information recorded/measured for this test is available upon request.

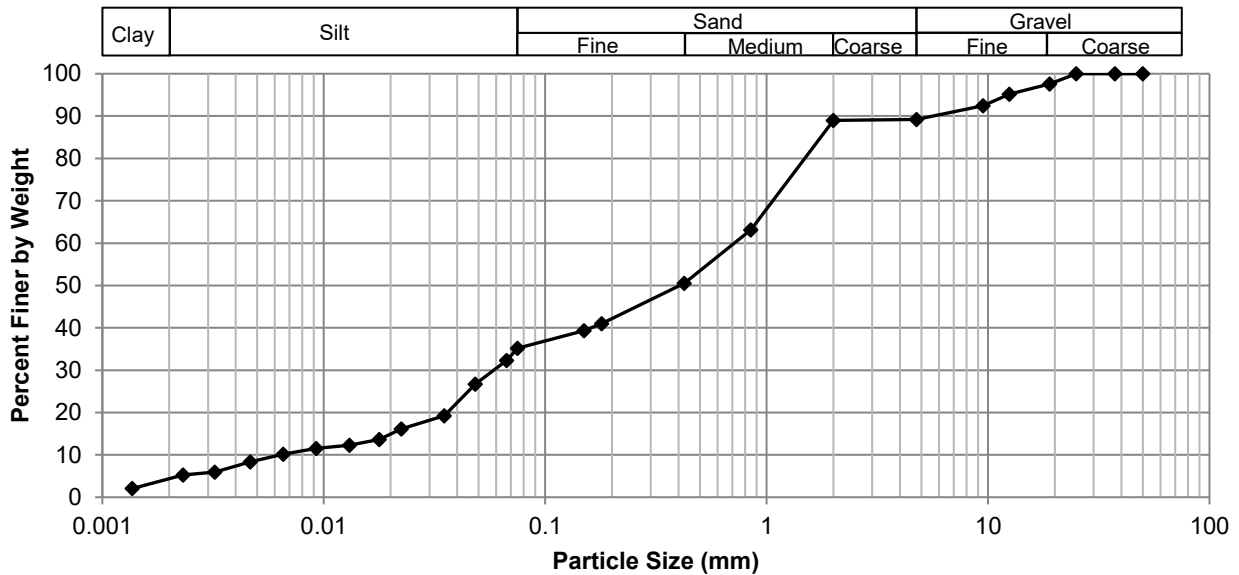
Project No. 0579-013-00
Client SMS Engineering
Project Baldur PCH and HC



Test Hole TH25-01
Sample # SS14
Depth (m) 9.1 - 9.6
Sample Date 07-Oct-25
Test Date 25-Oct-25
Technician D. Sellick

Gravel	10.8%
Sand	54.0%
Silt	31.0%
Clay	4.2%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	89.20	0.0750	35.20
37.5	100.00	2.00	88.96	0.0670	32.29
25.0	100.00	0.850	63.16	0.0483	26.73
19.0	97.57	0.425	50.49	0.0351	19.22
12.5	95.20	0.180	41.00	0.0224	16.16
9.50	92.42	0.150	39.35	0.0178	13.65
4.75	89.20	0.075	35.20	0.0131	12.26
				0.0093	11.53
				0.0066	10.19
				0.0047	8.35
				0.0032	5.92
				0.0023	5.29
				0.0014	2.05

CERTIFICATE OF ANALYSIS

Work Order	: WP2518501	Laboratory	: ALS Environmental - Winnipeg
Client	: TREK Geotechnical Inc.	Account Manager	: Riya Gill
Contact	: C Allard	Address	: 1329 Niakwa Road East, Unit 12
Address	: 1712 St. James Street		: Winnipeg MB Canada R2J 3T4
	: Winnipeg Manitoba Canada R3H 0L3	E-mail	: riya.gill@alsglobal.com
Telephone	: ----	Telephone	: +1 204 255 9720
Project	: 0579-013-00	Date Samples Received	: 22-Oct-2025 13:08
PO	: ----	Date Analysis Commenced	: 28-Oct-2025
C-O-C number	: ----	Issue Date	: 05-Nov-2025 16:10
Sampler	: ----		
Site	: TREK Geotechnical - Analytical		
Quote number	: 2025 Analytical Testing		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Greg Pokocky	Manager - Inorganics	Inorganics, Waterloo, Ontario
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	Description
%	percent
mS/cm	millisiemens per centimetre
ohm cm	ohm centimetres (resistivity)
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Analytical Results

Sub-Matrix: Soil/Solid
(Matrix: Soil/Solid)

					Client sample ID	TH02, SS20 & G21 (5'-6.5' & 7'8')	----	----	----	----
					Client sampling date / time	07-Oct-2025 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WP2518501-001	----	----	----	----	----
Result						----	----	----	----	----
Physical Tests										
Conductivity (1:2 leachate)	----	E100-L/WT	0.00500	mS/cm	1.64	----	----	----	----	----
pH (1:2 soil:CaCl2-aq)	----	E108A/WT	0.10	pH units	7.87	----	----	----	----	----
Resistivity	----	EC100R/WT	100	ohm cm	610	----	----	----	----	----
Inorganics										
Chloride, soluble ion content	16887-00-6	E246.CL/CG	0.0025	%	0.0103	----	----	----	----	----
Sulfate, total, ion content	14808-79-8	E246.SO4/CG	0.050	%	0.094	----	----	----	----	----
Sulfate, soluble ion content	14808-79-8	E246A.SO4/CG	0.05	%	NR	----	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WP2518501	Page	: 1 of 6
Client	: TREK Geotechnical Inc.	Laboratory	: ALS Environmental - Winnipeg
Contact	: C Allard	Account Manager	: Riya Gill
Address	: 1712 St. James Street Winnipeg MB Canada R3H 0L3	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: ----	Telephone	: +1 204 255 9720
Project	: 0579-013-00	Date Samples Received	: 22-Oct-2025 13:08
PO	: ----	Issue Date	: 13-Nov-2025 14:52
C-O-C number	: ----		
Sampler	: ----		
Site	: TREK Geotechnical - Analytical		
Quote number	: 2025 Analytical Testing		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Inorganics : Chloride in soil by boiling water extraction, DA										
LDPE bag TH02, SS20 & G21 (5'-6.5' & 7'8')	E246.CL	07-Oct-2025	03-Nov-2025	180 days	28 days	✓	04-Nov-2025	28 days	1 days	✓
Inorganics : Soluble Sulfate ion in soil by boiling water extraction, IC.										
LDPE bag TH02, SS20 & G21 (5'-6.5' & 7'8')	E246A.SO4	07-Oct-2025	05-Nov-2025	180 days	30 days	✓	05-Nov-2025	28 days	0 days	✓
Inorganics : Total Sulfate ion in soil by acidic boiling water extraction, IC										
LDPE bag TH02, SS20 & G21 (5'-6.5' & 7'8')	E246.SO4	07-Oct-2025	03-Nov-2025	180 days	28 days	✓	03-Nov-2025	28 days	0 days	✓
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap TH02, SS20 & G21 (5'-6.5' & 7'8')	E100-L	07-Oct-2025	29-Oct-2025	30 days	23 days	✓	29-Oct-2025	30 days	23 days	✓
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap TH02, SS20 & G21 (5'-6.5' & 7'8')	E108A	07-Oct-2025	28-Oct-2025	30 days	22 days	✓	29-Oct-2025	30 days	22 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	2304273	1	17	5.8	5.0	✔
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	2304758	1	9	11.1	5.0	✔
Chloride in soil by boiling water extraction, DA	E246.CL	2314920	1	10	10.0	5.0	✔
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4	2314704	1	12	8.3	5.0	✔
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4	2320407	0	11	0.0	5.0	✖
Laboratory Control Samples (LCS)							
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	2304273	2	17	11.7	10.0	✔
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	2304758	1	9	11.1	5.0	✔
Chloride in soil by boiling water extraction, DA	E246.CL	2314920	2	10	20.0	10.0	✔
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4	2314704	2	12	16.6	10.0	✔
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4	2320407	2	11	18.1	10.0	✔
Method Blanks (MB)							
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	2304273	1	17	5.8	5.0	✔
Chloride in soil by boiling water extraction, DA	E246.CL	2314920	1	10	10.0	5.0	✔
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4	2314704	1	12	8.3	5.0	✔
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4	2320407	1	11	9.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L ALS Environmental - Waterloo	Soil/Solid	CSSS Ch. 15 (mod)/APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Conductance is measured in the fluid that is observed in the upper layer.
pH by Meter (1:2 Soil:0.01M CaCl ₂ Extraction) - As Received	E108A ALS Environmental - Waterloo	Soil/Solid	MECP E3530	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C) and is carried out in accordance with procedures described in the Analytical Protocol (prescriptive method). A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil by centrifuging, settling, or decanting and then analyzed using a pH meter and electrode. This method is equivalent to ASTM D4972 and is acceptable for topsoil analysis.
Chloride in soil by boiling water extraction, DA	E246.CL ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-4B (mod)	Hot water soluble chloride is determined in soil by combining a fixed ratio of soil and water, boiling the mixture for a period of time, cooling, filtration, and analysis by Discrete Analyzer
Total Sulfate ion in soil by acidic boiling water extraction, IC	E246.SO4 ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-3B (Mod)	The dried solid is mixed with water and acid then heated. After filtration the liquid is ready for analysis by IC with conductivity detector.
Soluble Sulfate ion in soil by boiling water extraction, IC.	E246A.SO4 ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-3B (Mod)	The dried solid is mixed with water at a specified ratio then heated. After filtration the liquid is ready for analysis by IC with conductivity detector. A result of "NR" indicates that the total sulfate analysis was <0.2% and based on CSA-A23.2-3B no analysis for soluble sulfate is required.
Resistivity Calculation for Soil Using E100-L	EC100R ALS Environmental - Waterloo	Soil/Solid	APHA 2510 B	Soil Resistivity (calculated) is determined as the inverse of the conductivity of a 2:1 water:soil leachate (dry weight). This method is intended as a rapid approximation for Soil Resistivity. Where high accuracy results are required, direct measurement of Soil Resistivity by the Wenner Four-Electrode Method (ASTM G57) is recommended.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Waterloo	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Leach 1:2 Soil : 0.01CaCl ₂ - As Received for pH	EP108A ALS Environmental - Waterloo	Soil/Solid	MOEE E3137A	A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil by centrifuging, settling or decanting and then analyzed using a pH meter and electrode.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Chloride in soil by boiling water extraction	EP246.CL ALS Environmental - Calgary	Soil/Solid	CSA-A23.2-3B mod	Hot water soluble chloride is determined in soil by combining a fixed ratio of soil and water, boiling the mixture for a period of time, cooling, then filtration prior to analysis
Soluble ion Sulfate in soil or concrete preparation.	EP246.S ALS Environmental - Calgary	Soil/Solid	CSA-A23.2B	The dried solid is mixed with water then heated. After filtration the liquid is ready for analysis.
Total ion Sulfate in soil or concrete preparation	EP246.T ALS Environmental - Calgary	Soil/Solid	CSA-A23.2B	The dried solid is mixed with water and acid then heated. After filtration the liquid is ready for analysis.
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Calgary	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

QUALITY CONTROL REPORT

Work Order	: WP2518501	Page	: 1 of 4
Client	: TREK Geotechnical Inc.	Laboratory	: ALS Environmental - Winnipeg
Contact	: C Allard	Account Manager	: Riya Gill
Address	: 1712 St. James Street Winnipeg MB Canada R3H 0L3	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: ----	Telephone	: +1 204 255 9720
Project	: 0579-013-00	Date Samples Received	: 22-Oct-2025 13:08
PO	: ----	Date Analysis Commenced	: 28-Oct-2025
C-O-C number	: ----	Issue Date	: 05-Nov-2025 16:09
Sampler	: ----		
Site	: TREK Geotechnical - Analytical		
Quote number	: 2025 Analytical Testing		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Greg Pokocky	Manager - Inorganics	Waterloo Inorganics, Waterloo, Ontario
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

- Key :
- Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
 - CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
 - DQO = Data Quality Objective.
 - LOR = Limit of Reporting (detection limit).
 - RPD = Relative Percent Difference
 - # = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 2304273)											
WT2530044-004	Anonymous	Conductivity (1:2 leachate)	----	E100-L	5.00	µS/cm	0.269 mS/cm	272	1.11%	20%	----
Physical Tests (QC Lot: 2304758)											
TY2512310-002	Anonymous	pH (1:2 soil:CaCl2-aq)	----	E108A	0.10	pH units	6.09	6.05	0.659%	5%	----
Inorganics (QC Lot: 2314704)											
CG2515991-001	Anonymous	Sulfate, total, ion content	14808-79-8	E246.SO4	500	mg/kg	0.058 %	550	40	Diff <2x LOR	----
Inorganics (QC Lot: 2314920)											
WP2518501-001	TH02, SS20 & G21 (5'-6.5' & 7'8')	Chloride, soluble ion content	16887-00-6	E246.CL	25	mg/kg	0.0103 %	104	1.0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 2304273)						
Conductivity (1:2 leachate)	----	E100-L	5	µS/cm	<5.00	----
Inorganics (QCLot: 2314704)						
Sulfate, total, ion content	14808-79-8	E246.SO4	500	mg/kg	<500	----
Inorganics (QCLot: 2314920)						
Chloride, soluble ion content	16887-00-6	E246.CL	25	mg/kg	<25	----
Inorganics (QCLot: 2320407)						
Sulfate, soluble ion content	14808-79-8	E246A.SO4	500	mg/kg	NR	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 2304273)									
Conductivity (1:2 leachate)	----	E100-L	5	µS/cm	1410 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 2304758)									
pH (1:2 soil:CaCl2-aq)	----	E108A	----	pH units	7 pH units	100	98.0	102	----
Inorganics (QCLot: 2314704)									
Sulfate, total, ion content	14808-79-8	E246.SO4	500	mg/kg	10000 mg/kg	100	90.0	110	----
Inorganics (QCLot: 2314920)									
Chloride, soluble ion content	16887-00-6	E246.CL	25	mg/kg	100 mg/kg	102	70.0	130	----



Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	Qualifier
Physical Tests (QCLot: 2304273)									
QC-2304273-003	RM	Conductivity (1:2 leachate)	----	E100-L	888 µS/cm	103	70.0	130	----
Inorganics (QCLot: 2314704)									
QC-2314704-003	RM	Sulfate, total, ion content	14808-79-8	E246.SO4	33400 mg/kg	89.2	80.0	120	----
Inorganics (QCLot: 2314920)									
QC-2314920-003	RM	Chloride, soluble ion content	16887-00-6	E246.CL	1410 mg/kg	109	70.0	130	----

Appendix B

Groundwater monitoring summary

Baldur PCH

TH25-01 - Groundwater Monitoring Summary

GT

