



CHUNG & VANDER DOELEN
ENGINEERING LTD.

**PRELIMINARY SCOPED HYDROGEOLOGICAL ASSESSMENT
ELMIRA INDUSTRIAL SUBDIVISION**

1665 Scotch Line Road
Elmira, Ontario

SUBMITTED TO:

1000525725 Ontario Inc.
30 Water Street North
Kitchener, ON
N2H 5A8

ATTENTION:

Mr. Bernie Nimer



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1000525725 Ontario Inc.
30 Water Street North
Kitchener, ON
N2H 5A8

Attention: Mr. Bernie Nimer

RE: Preliminary Scoped Hydrogeological Assessment
Elmira Industrial Subdivision
1665 Scotch Line Road, Elmira, Ontario

This report summarizes the preliminary findings of a scoped hydrogeological assessment completed in support of the construction of a proposed industrial subdivision which is to be located on the former agricultural lands of 1665 Scotch Line Road in Elmira, Ontario.

If you have any questions or concerns regarding the report, please contact the undersigned.

Yours truly,

CHUNG & VANDER DOELEN ENGINEERING LTD.

Peter Dao, M.Sc., P.Geo.
Manager, Environmental & Hydrogeology

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1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by the 'Client', 1000525725 Ontario Inc., to complete a scoped hydrogeological assessment for the property located at 1665 Scotch Line Road in Elmira, Ontario ("Site"), as shown in Figure 1.

The purpose of the investigation is to evaluate existing hydrogeological conditions at the Site in support of the proposed construction for a light industrial subdivision and its associated infrastructure. This development includes a combination of industrial use lots, roadways, a stormwater management facility, along with associated landscaping and services. The Site is to be fully municipally serviced with water and wastewater infrastructure, which will include the construction of a stormwater management (SWM) facility within the western portion of the Site. A roadway network, comprising Streets 'A' and 'B', will be constructed throughout the industrial subdivision, connecting it to South Field Drive in the north, and Scotch Line Road to the south.

This report presents the preliminary findings of the ongoing hydrogeological investigation, conducted between March and December 2024, and should be read in conjunction with the CVD Preliminary Geotechnical Soil Investigation Report (December 2024). At the time of the writing of this report, only a Draft Plan (MHBC, February 20, 2025) of the proposed development, as provided in Appendix A, was available for our review. As more information about the development is made available, and more field data is gathered, further updates to this report will be provided.

2.0 INVESTIGATION SCOPE

2.1 BACKGROUND DATA REVIEW

The following background information (Section 8.0 lists the specific information) has been considered and reviewed as part of this investigation:

- Blackport, R., et al., Developing science-based policy for protecting the Waterloo Moraine groundwater resource, Canadian Water Resources Journal, Volume 39 (June 19, 2014).
- Grand River Source Protection Report Region of Waterloo (February 9, 2022)
- Grand River Conservation Authority (November 2024)
- GM BluePlan Engineering; Elmira Drain #1, Overall Watershed, Township of Woolwich, Drawing No. 1 (November 2020)
- Karrow, P.F. Quaternary Geology, Conestogo Area; Ontario Geological Survey. Map 2558 (1993)
- Matrix Solutions. Inc., The Region of Waterloo, Tier Three Water Budget and Local Area Risk Assessment, prepared for the Region of Waterloo (September 2014)
- MECP Water Well Records (Appendix F)
- MHBC, Draft Plan of Industrial Subdivision, 1665 Scotch Line Road, Elmira, Ontario (February 20, 2025)



- MTE Consultants, Beisel Lands Proposed Residential Subdivision Hydrogeologic Investigation, Barnswallow Drive, Elmira, ON, prepared for Activa Holdings Inc., File No. 45530-104 (June 10, 2021)
- Toporama Topographical Map, Ministry of Natural Resources Canada (November 2024) (Figure 3)

2.2 BOREHOLE DRILLING & MONITORING WELL INSTALLATION

As part of both the initial hydrogeological and preliminary geotechnical soil investigations, completed by CVD between March 26 and April 1, 2024, twenty-three (23) boreholes were advanced to depths between 3.50 and 15.75 m below existing grade, corresponding to elevations ranging between 345.99 and 356.11 mASL. Monitoring wells were installed at fourteen (14) of the borehole locations (monitoring wells BH 1 to 12). A cluster of deep and shallow wells were installed at Boreholes 4 and 8 (labelled BH 4D/4S and BH 8D/8S). These combined boreholes/monitoring wells were drilled/installed to investigate the subsoil and groundwater table conditions at the property. Boreholes 13 to 21 were drilled to provide subsoil information for the reconstruction of the sections of Scotch Line Road and South Field Drive that surround the property. All CVD monitoring well/boreholes logs are included on Enclosures 1 to 23.

The investigation was completed using a track-mounted CME-55 drill rig, equipped both with standard 108 mm inner diameter hollow stem augers (HSA) and 152 mm outer diameter solid stem augers (SSA) operated by Davis Drilling Ltd. of Milton, Ontario. Davis Drilling Ltd. is an MECP licensed water well contractor. Soil samples collected during the borehole investigation program were examined in the field and subsequently brought to CVD's laboratory for tactile and textural examination. Moisture content determinations were performed on all retrieved subsoil samples collected from the drilling program.

The ground surface elevation of the boreholes, monitoring wells, and geomorphological features of the site were surveyed by CVD for the purpose of this report using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using the UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

2.3 DRIVE-POINT PIEZOMETER INSTALLATION

Shallow drive-point piezometers (DP) were installed at two (2) wetland/water course locations in the northwestern corner of the Site (DP 1 and DP 2) in December 2023, and an additional (1) shallow piezometer (DP 2S) was installed on March 25, 2024, beside DP 2, as shown in Figure 5. The piezometers were installed to investigate both groundwater and surface water levels (i.e., both inside and outside the piezometers) to characterize the groundwater-dependent features for the Grand River Conservation Authority (GRCA) regulated wetland, located within the northwestern section of the Site.

DP 1 was installed in the northern edge of the wetland, in a small intermittent stream travelling in a west to east direction. DP 2 was installed farther south at the edge of the stream that runs parallel to the railroad line (north to south). DP 2S was installed approximately 5 m east of DP 2, in an area overgrown with



marsh-related vegetation which only intermittently displays standing water. Figure 5a shows the locations of the drive-point piezometers within the wetlands and associated watercourses.

The procedure for installing each drive-point piezometer was as follows:

1. auger a 0.85 m deep hole through the upper soil layers to observe the stratigraphy and groundwater conditions of the location,
2. attach a 0.30-m long, 1.9-cm diameter stainless steel piezometer tip (or screen) to a length of 1.9-cm threaded steel riser pipe,
3. drive the assembled piezometer from ground surface to the depth desired using a post hammer, and
4. fill any annular space around the pipe with bentonite to prevent surface water from moving directly along the annulus to the piezometer screen.

2.4 WELL DEVELOPMENT, WATER LEVEL MONITORING, & RESPONSE TESTS

Each monitoring well was developed using Waterra™ polyethylene tubing, foot-valve and hand pumps. As of the writing of this report, a full round of groundwater level monitoring at all of the existing monitoring well and piezometer locations was performed on four (4) occasions: on April 16 and 30, July 26, and October 24, 2024. Additional readings on individual wells were recorded on March 19 and 24, and May 2, 2024. Table 1 (see Appendix C) provides a summary of the groundwater levels and calculated elevations for all the monitoring events, as well as the fluctuations in groundwater levels at each monitoring well location relative to April 16, 2024, during which, in general, the highest groundwater table elevations were recorded. Additionally, the groundwater level data has also been represented visually in the form of hydrographs. Both Table 1 and all the hydrographs for each monitoring well can be found in Appendix C.

To provide a more comprehensive summary of groundwater conditions at the Site, fourteen (14) Van Essen DI801 10 m TD-Diver automated data loggers and one (1) Baro-Diver were installed at select monitoring well locations. The data loggers provide continuous measurements (2-hour intervals) during the entire water table monitoring period. The purpose of the Baro-Diver was to compensate for atmospheric noise and pressure at the ground surface. Furthermore, three (3) DI601 10 m Micro-Divers were installed in all three piezometers. The automated monitoring at these wells/piezometers using the data loggers is currently ongoing.

Well response tests (slug/bail tests) were completed at six (6) of the monitoring well locations (Boreholes 1, 3, 4D/4S, 6, and 9) on May 2, 2024, to provide a more accurate estimate of the hydraulic conductivity (K) (or permeability) of the saturated aquifer subsoil strata, and to assist in providing more accurate infiltration rates. The hydraulic conductivities were calculated through the Aquifer Test software utilizing the Bouwer and Rice method. The results of the tests are graphically presented in Appendix D, and a summary of the data is also included in Table 1.



Furthermore, fourteen (14) grain size distribution analyses were carried out on representative subsoil samples to confirm the subsoil textures and to help identify and assist in providing estimates of hydraulic conductivities for the encountered groundwater-bearing subsoil deposits. The results of these tests are presented in Enclosures 24 and 37.

2.5 GEOTECHNICAL INVESTIGATIONS IN SURROUNDING AREAS

To further understand the geology and hydrogeological conditions of the area surrounding the subject lands, a study of relevant past geotechnical investigations in vicinity to the Site was performed.

A previous subsurface investigation was conducted by MTE consultants Inc. (June 10, 2021) for the Biesel Lands Proposed Residential Subdivision, which is located directly west of Elmira, approximately 2.5 km northwest of the subject site. As part of the study, seven (7) boreholes, all of which were converted into monitoring wells, were advanced to depths ranging between 4.6 to 7.5 mbgs. An additional thirty (30) boreholes were advanced during the second round of drilling, of which two (2) of the boreholes were converted into groundwater monitoring wells.

The MTE boreholes/monitoring wells identified a clayey silt likely corresponding to the regional hydrostratigraphic Unit 1 (see Section 3.2), which is composed of the Tavistock and/or Upper Maryhill Till (aquitard ATB1/ATB3). Shallow groundwater was measured at depths ranging between 0.22 and 4.01 mbgs, corresponding to elevations between 371.8± and 367.9± masl, with shallow groundwater flow directions mimicking local topography and travelling from a northeasterly to southeasterly direction. Additionally, single well hydraulic response tests conducted on the wells in the clayey silt unit showed hydraulic conductivity values ranging from 1×10^{-10} to 3×10^{-7} m/s with a geometric mean of 7×10^{-9} m/s.

A deeper monitoring well, owned by the Region of Waterloo, was installed near the Biesel development in regional hydrostratigraphic Unit 3 (generally located from 31± to 44± mbgs), corresponding to the Pre-Catfish Outwash confined aquifer. Water levels from the deep monitoring well were measured between the depths of 20.5 and 20.7 mbgs (elevations 348.58 and 348.38 m).

3.0 SITE CHARACTERIZATION

3.1 TOPOGRAPHY, DRAINAGE & WETLAND FEATURES

The Subject Lands are located within the Canagagigue Creek Subwatershed in the Township of Woolwich. Canagagigue Creek, which is located approximately 700 m north of the Subject Lands, drains eastwards into the Grand River and is part of the larger Grand River Watershed. The Elmira drain No. 1 (GM BluePlan Engineering, 2020) which is situated about 25 to 50 m west of the site, adjacent to the Waterloo Central Rail Corridor, drains northwards into the Canagagigue Creek. Figure 1 shows the relative location of the Site to the aforementioned surface water features. A small Grand River Conservation Authority (GRCA) regulated wetland is located within the northwestern area of the property as shown in Figure 5a.



Physically, the Site is bounded to the north by Southfield Drive, to the south by Scotch Line Road, and to the west by the Waterloo Central Rail Corridor railway tracks. The subject Lands are bordered to the east by agricultural lands which are themselves bounded further east by New Jerusalem Road. A local unnamed road/driveway passes through the centre of the property in a north-south orientation.

Regionally, elevations significantly increase westwards towards Wallenstein, as well as northwards towards Floradale and North Woolwich. Elevations generally decrease east and southeast towards Conestogo and Winterbourne. Minor decreases in elevations occur northwards and westwards towards the drain that flows into Canagagigue Creek. Regional topography and ground surface elevations are shown on Figure 3.

Locally, the ground surface elevation considerably varies across the Site, with elevations ranging from 345± to 356± masl, and the property generally exhibits a glacial hummocky topography. Elevations are typically highest at the centre of the property, with other local highs occurring along the north and southern areas. There is a relatively large decrease in elevation from the centre of the Site westwards towards the wetland/creek (10± m), as well as a smaller decrease from the centre of the property towards the east (5± m). The ground surface elevations at the CVD borehole locations (Enclosures 1 to 23) ranged between 345.99 and 356.11 masl.

3.2 GEOLOGICAL CONDITIONS

The subject lands are located in the glacial Oxford Till Plain, which spans over an area of 156,000 ha, and is characterized by frequent glacial geomorphic features, such as drumlins and flutes (Chapman and Putnam, 1984). Surface geological mapping for the area (by Karrow P.F., 1993), presented in Figure 2, shows that the Site is predominantly underlain by the Tavistock Till of the Port Bruce Stadial occurring during the Late Winsconsinan Period of the Pleistocene. A small area of ice-contact sand and gravel and/or sand is shown to be present in the northeast corner of the Site, which is likely part of an esker, while outwash sands are purported to be situated in the very northwestern corner of the property.

Paleozoic geological mapping shows that the property is located within the Salina formation of the Upper Silurian Epoch (Armstrong and Carter, 2006). The bedrock in this area is comprised of interbedded grey and brown dolostone and/or red shale.

According to the Region of Waterloo's Tier 3 study under the Clean Water Act (AquaResource Inc., 2012), four (4) regional hydrostratigraphic units were identified and characterized in the vicinity of the Site as follow:

- **Unit 1 – Clay:** Brown to grey clay encountered at depths from 0± to 9± mbgs and corresponding to the Tavistock Till (geologic unit ATB1, as characterized by the Ontario Geological Survey) and/or the Lower Maryhill Till (ATB3).
- **Unit 2 – Gravelly Clay:** A clay encountered at depths from 9± to 31± mbgs, and likely corresponding to the Catfish Creek Till (ATC1/ATC2).
- **Unit 3 – Clayey Sand and Gravel:** A clayey sand and gravel deposit encountered at depths from 31± to 52± mbgs, which was interpreted as the Pre-Catfish Outwash confined aquifer unit



(AFD1).

- **Unit 4 – Bedrock:** A grey blue/red shale of the Salina Formation encountered at a depth of $>52\pm$ mbgs.

The geological subsurface data, shown on the CVD Borehole Logs (Enclosures 1 to 23) as obtained during the subsurface investigation, is generally consistent with the geological mapping listed above. Based on the drilled boreholes, the surficial and subsoils encountered generally consisted of topsoil, underlain by a 0.5 to 2.9 m thick layer of fill materials, followed by a Clayey Silt Till or Silty Sand to Sand and Silt Till, likely corresponding to the Tavistock Till (geologic unit ATB1). Most of the boreholes contained a combination of the two layers, in which typically the Clayey Silt Till which was underlain by the Sand and Silt Till.

Occasional seams and/or minor layers of granular deposits were also found interlayered within the till layers and included silt, sandy silt to silty sand, and fine sand layers. These granular seams/layers within the till act as the primary water bearing strata of the water table aquifer.

In Borehole 8, from 14.1 to 15.74 m depth, the termination depth of the borehole, a deeper water-bearing silty sand to sand and silt deposit was encountered. It is possible that this unit is related to the AFD1 aquifer (Blackport et al., 2014). Near surface sandy silt and sand and gravel layers were encountered in Borehole 13, which is located within the northeastern corner of the Site, likely correspond to the outwash sand deposit identified by Karrow (1993).

3.3 HYDROGEOLOGIC SETTING

3.3.1 Water Table Depth and Configuration

Due to the predominance of the clayey silt/sand and silt till throughout the majority of the Site (see Section 3.2), the shallow groundwater table aquifer exists predominantly within the fine granular lenses, seams, and occasional layers which can be found within the till subsoils.

As shown in Figure 5, in general, the shallow groundwater flow direction mimics the local topography of the Site, with groundwater travelling away from the raised plateaus of the centre, north, and south of the property, towards the west (into the wetland and creek) and towards the east (into the adjacent farmlands). As with the topography of the property, there is a large variation in shallow groundwater levels, with groundwater elevations within all of monitoring wells during all seasons varying from 343.31 to 353.77 masl. The highest recorded groundwater elevations at each well varied from 344.20 to 353.77 masl. Variations in groundwater levels between all wells varied by up to $10.46\pm$ m, while within individual wells, the seasonal variation ranged from $0.01\pm$ to $3.96\pm$ m. These large differences are due to the aquitard nature of the clayey silt/sand and silt till overburden soil. Since the recharge is very slow, large variations of water levels between wet and dry seasons are expected.

Regarding the confined aquifer (monitoring wells BH 4D and 8D), groundwater water levels were measured at elevations ranging from 341.71 to 343.32 masl. A significant downward vertical gradient exists between the shallow groundwater table and the confined aquifer, with a maximum difference in hydraulic head of 5.64 and 12.06 m in monitoring wells BH 4 and 8, respectively.



Further groundwater level monitoring is required to fully understand the shallow groundwater behaviour and flow patterns beneath the Site. Only one seasonal high watermark (Spring freshet) has thus far been recorded, and as such, more data is required to fully understand both the seasonal and yearly groundwater variations. Ongoing groundwater monitoring is being conducted to provide an evaluation of the seasonal variability of the groundwater table and its fluctuations.

The groundwater measurements for each monitoring well and piezometer collected thus far for the investigation (March to October 2024) are summarized in Table 1 and are visually represented as a hydrograph (both included in Appendix C).

3.3.2 Groundwater Infiltration and Recharge

Due to the general predominance of the shallow clayey silt till and sand and silt till deposits across the site, infiltration rates are expected to be generally very slow. Infiltration and recharge areas are also influenced by the topographical features of the land, along with existing vegetation coverage, which in this case promotes shallow groundwater flow to the west towards the wetland/creek, and towards the east into the adjacent farmlands.

Based on the single well response tests performed on the water table aquifer (wells BH 1, 3, 4S, 6, and 9), the hydraulic conductivities for the clayey silt/sand and silt till ranged from 7×10^{-8} to 1×10^{-7} m/s, while the hydraulic conductivity of well BH 9, which was installed in the shallow sand and silt to sandy silt layer contacted above the sand and silt till, was measured at 1×10^{-6} m/s. The hydraulic conductivity of well BH 4D, a confined aquifer composed of gravelly silty sand, was calculated as 1×10^{-5} m/s. These values are consistent with the hydraulic conductivity ranges typically associated with similar soils (Freeze & Cherry, 1979). Hydraulic conductivities calculated from soil grain sizes analysis (using the Hazen Formula) were similar in magnitude to those of the single well response tests.

Based on the single well response tests, review of soil grain size analyses, and physical examination of the subsoil deposits, the correlation estimated infiltration rates for the various near-surface soils at the property are as follows:

- Sand and Gravel: 100 to 150 mm/hr.
- Fine to Medium Sand: 75 to 100 mm/hr.
- Silty Sand: 15 to 30 mm/hr.
- Sandy Silt to Sand and Silt: 5 to 10 mm/hr.
- Silt: 3 to 5 mm/hr.
- Clayey Silt Till and Sand and Silt Till: <5 to 1 mm/hr.

During the period of higher groundwater elevations, anticipated during the Spring and Fall, infiltration is expected to be reduced across the site; however, considering the intermittent nature of the local farm drains and surface water features in the area, infiltration will likely marginally increase during the Summer and Fall seasons as the water table lowers.

Based on the above information, due to the predominance of the low permeable till across the Site and its low anticipated infiltration rate, enhanced on-site infiltration across much of the property will likely



be not feasible. The only potential areas of significant infiltration are located in the northeast and northwest corners of the Site, where fine granular soils and occasional sand and gravel deposits (the remnants of an esker feature) can be found; however, the lateral extent of these coarser soils is likely limited. The ultimate composition of the subsoils in these areas will need to be further explored if infiltration features are to be considered at these locations. Conventional Low Impact Development Infrastructure (LID) may be difficult to design within native soils having low anticipated infiltration rates.

3.3.3 Groundwater / Surface Water / Wetland Interaction

The interactions occurring within the wetland feature located in the northwestern portion of the Site were examined based on both field observations and surface water/groundwater level data gathered at the three (3) piezometer locations: DP1, DP2, and DP2S, as shown on Figure 5. These piezometers are in the general vicinity of the existing drainage course (Elmira Drain No.1) which traverses along the west side of the existing railroad tracks, which generally mark the western limits of the Site. The watercourse travels in a northerly direction, adjacent to the Waterloo Central Railway corridor, and ultimately discharges into Canagagigue Creek, situated north of Southfield Road. The wetland is directly connected to Drain No.1 through a culvert located under the railroad tracks along the northern edge of the wetland.

Based on the gathered data, the vertical gradient in the piezometers exhibits an intermittent nature, which largely depends upon the season. During Spring, it was observed that a weak positive vertical hydraulic gradient (VHG) exists at DP1 (located in a stream in the north of the wetland), which later became neutral in the Summer, and finally became a negative VHG in the Fall. At DP2 (located in the stream parallel to the railroad tracks), a consistent negative VHG was observed during each round of groundwater level measurements. The VHG at DP2S (located in the overgrown wetland area 5 m east of DP2) has generally been relatively neutral with only a very weak positive VHG during the Spring and Summer. During the latest round of groundwater level measurements taken on October 23, no surface water was observed in the wetland. As such, it is considered that this wetland is of an intermittent nature and is likely heavily influenced by the amount of water within the adjacent Drain No.1, and subsequently, by the amount of surface runoff which feeds the drain.

Further seasonal groundwater monitoring will need to be performed to provide an adequate evaluation of the wetland groundwater-surface water interactions and to confirm whether these trends are consistent.

3.4 SOURCE WATER PROTECTION AND GROUNDWATER USE

The Grand River Source Protection Plan (updated February 2022) has established four Wellhead Protection Areas (A, B, C & D) in the Region of Waterloo; WHPA-A for the immediate 100-m zone around each municipal well and WHPA-B to D based on modelled groundwater 'times of travel' to each well (or wellfield), varying between 2, 5, and 25-years, respectively. In addition, relative groundwater 'vulnerability' to contamination scores (on an increasing scale from 1 to 10) have been established for all lands within the WHPAs.



According to data provided on the GRCA-Web GIS application (see Figure 4), the southwestern half of the property is located within the WHPA-D zone of the municipal well No. 10 wellfield, situated approximately $1.2 \pm$ km southwest of the Site, which has a vulnerability score of 2 to 4. WHPA-D denotes an area in which the groundwater travel time to the wellfield is 25 years or less, but greater than 5 years. The low vulnerability is due to the presence of the Tavistock and/or Lower Maryhill Tills which are silt and clay rich at the surface, resulting in slow groundwater recharge.

The entire northeastern half of the property falls outside the WHPA. As such, the risk to the municipal well from any on-site construction activities is deemed to be very low, especially considering the vertical separation of on-site shallow groundwater (located in aquitard ATB1) from that of the municipal aquifer (AFD1).

The northeastern-most corner of the Site falls within the category of a Tier 2 significant groundwater recharge area. This can be attributed to the sand and gravel and to sand-rich near-surface soils that exist in that area, and which are likely remnants of an esker feature.

3.5 PRELIMINARY GROUNDWATER QUALITY ASSESSMENT

Preliminary groundwater quality testing was performed on select wells (BH 1, 3, 4S, 4D, 9) as well as the surface water beside DP 2, between March 30 and April 30, 2024, to provide an initial screening of the on-site groundwater quality. An additional attempt was made to collect surface water samples (from the piezometers located in the wetland area) on October 23, 2024; however, no surface water was present, nor was there sufficient quantity of groundwater present within the piezometers to sample.

Analysis results from all of the collected groundwater samples were compared to the Provincial Water Quality Objectives (PWQO). Overall, relatively high concentrations of iron in both the wells and surface water were detected. Additionally, minor exceedances of a variety of metals including aluminum, arsenic, cadmium, cobalt, copper, lead, nickel, vanadium, and zinc, were identified. Slightly higher concentrations of lead were found in the well at BH 3. As well, exceedances of phosphorus were detected in wells at BH 3, 4S, 9, and the surface water sample near DP 2. This is not surprising considering the agricultural activities on-site and in the surrounding fields.

Further groundwater and surface water testing should be completed to provide a reasonable analysis of the on-site groundwater/surface water chemistry. Appendix E provides the Certificates of Analysis and Chain of Custody forms for all groundwater quality sampling and analysis events completed thus far by CVD.

3.6 DOOR-TO-DOOR PRIVATE WELL INVENTORY STUDY

A door-to-door private well inventory study (see Appendix F) was completed by CVD between October 25 and 29, 2024, in which all of the residences with suspected private wells within a $500 \pm$ m radius of the Site were visited and surveyed. In total, eighteen (18) properties (including the Subject Lands) were identified which currently utilize a private water well supply. Prior to the door-to-door survey, a desktop analysis of potential MECP well records which might correlate to the wells of the identified residences



was completed, and information potentially relevant to the investigation was extrapolated. All potentially relevant MECP well records are included in Appendix F.

Table 2 provides a summary of the investigation, and Figure 6 shows the locations of each surveyed residence. Of the 18 residences, one (1) homeowner refused to speak with CVD staff, and three (3) residents were not at home. Survey packages which included a letter of explanation, a questionnaire, and a pre-paid envelope were left at the vacant residencies for the owner to complete and mail back to CVD.

Of the 18 residencies, with the permission of the well owners being provided, drinking water samples were collected from eight (8) separate properties, as indicated in Figure 6. These water samples were sent to ALS Laboratories of Waterloo for chemical analysis, with the results then compared to Ontario Drinking Water Quality Standards (ODWQS). Most samples showed minor exceedances in iron, manganese (especially the residence at 95 South Field Drive), nitrate, hardness, and total dissolved solids (TDS). All Certificates of Analysis and Chain of Custody forms for the private well water quality sampling are included in Appendix F.

4.0 SITE SERVICING REQUIREMENTS & IMPACT ASSESSMENT

4.1 WASTEWATER SYSTEMS & POTENTIAL IMPACT OF EFFLUENT

It has been proposed that the industrial subdivision will be connected to municipal sanitary sewers. No private wastewater treatment system requirements are anticipated for the proposed subdivision.

4.2 WATER SUPPLY & POTENTIAL IMPACT OF WATER TAKING

The proposed industrial subdivision will be serviced by municipal water services. No private water supply service requirements are anticipated.

4.3 STORMWATER MANAGEMENT, POTENTIAL IMPACT TO GROUNDWATER RECHARGE

The proposed industrial subdivision will be serviced by municipal stormwater management works; however, at the time of the writing of this report, aside from a review of the overall concept plan, no specific design drawings/plans were available. As the realization of the project proceeds, addendums addressing stormwater management and any theoretical impacts to groundwater recharge including proposed LID infrastructure at the Site may be provided during the detailed design stage.

Based on review of the current development plans, the proposed storm water management facility will be situated within the western portion of the subject site. The final dimensions and depths for the facility were not available at the time of the writing of this report.

Further recommendations may be provided for stormwater management infrastructure once more detailed development plans become available.



5.0 CONCLUSIONS & RECOMMENDATIONS

Based on the results of the hydrogeological investigation described in this report, the following conclusions and recommendations are provided.

- 1) The local subsoil strata in which the water table is found is predominantly comprised of clayey silt/sand and silt till (Tavistock Till – ATB1 aquitard), with more notable quantities of groundwater being found in fine granular seams interlayered within the deposit. Groundwater elevations significantly vary across the Site (343.31 to 353.77 masl), with groundwater flow direction generally mimicking that of the topography. Groundwater generally flows away from the centre of the Site towards the wetland in the western section of the property, and towards the east into the surrounding farmlands.
- 2) The wetland, located in the northwestern section of the property is likely of an intermittent nature, with notable surface water (streams and standing water in the marsh) existing during the Spring and disappearing during the late Summer and Fall. The wetland is likely heavily influenced by the presence of water within the Elmira Drain No. 1 which is directly connected to the wetland through a culvert and travels parallel to the western property line of the Site. Additional seasonal data is required to provide conclusive evidence for this observation.
- 3) Due to the very low permeability of the predominant clayey silt/sand and silt till deposits across the Site, infiltration rates for the developed site are expected to be slow. Conventional Low Impact Development Infrastructure (LID) may be difficult to design within native soils having low anticipated infiltration rates.
- 4) The southwestern half of the Site falls within the WHPA-D zone of the municipal well No. 10 (E10), situated approximately 1.2± km southwest of the Site, and has a vulnerability score of 2 to 4, which is very low. The entire northeastern half of the property falls outside the WHPA. Additionally, on-site shallow groundwater (located within aquitard ATB1) is hydrogeologically and vertically separate from that of the municipal aquifer (AFD1). As such, risks to the municipal well are considered minimal.
- 5) Site servicing (wastewater, water supply, stormwater management) for the development is to be fully municipally supplied. At the time of the writing of this report, no specific design drawings/plans were available for site servicing. As design plans are updated and additional information becomes available, addendums may be provided to address specific site servicing issues. Further groundwater monitoring should be completed to aid in the design and location of the proposed SWM facility and any proposed LID infiltration infrastructure.
- 6) Seasonal groundwater monitoring is incomplete and is currently ongoing at the Site to better characterize the hydrogeological setting, seasonal groundwater level patterns, and groundwater/surface water interactions.
- 7) It is recommended that once a site grading plan is available, that CVD be retained to review the final design and provide updates to the recommendations and conclusions provided in this report. Based on the final design, additional boreholes/monitoring wells might be required to delineate the extent of the water table and provide additional information.



6.0 CLOSING

This hydrogeological investigation report has been prepared for the exclusive use of the Client and their assigns for specific application to this project property.

The assessment was conducted in accordance with the verbal and written requests from the Client, and generally accepted assessment practices. Performance of this assessment is intended to reduce, but not eliminate, uncertainty regarding the hydrogeological conditions encountered at the project site, given reasonable limits of time and cost. No other warranty, expressed or implied, is made.

We trust this report is sufficient for your immediate requirements. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
CHUNG & VANDER DOELEN ENGINEERING LTD.



Yaroslav Chudin, EIT
Geotechnical Engineering Intern



Gavin R. O'Brien M.Sc., P.Geo.
Senior Hydrogeologist



Peter Dao, M.Sc., P.Geo.
Manager, Environmental & Hydrogeology



7.0 REFERENCES

The following documents, maps, and other publications have been used in the preparation of this report:

- Blackport, R. J., Meyer, P. A., & Martin, P. J. Developing science-based policy for protecting the Waterloo Moraine groundwater resource, Canadian Water Resources Journal, Volume 39 (June 19, 2014).
- Freeze, R.A., and Cherry, J.A., Groundwater: Englewood Cliffs, NJ, Prentice-Hall, 604 p. (1979)
- Grand River Source Protection Report Region of Waterloo (February 9, 2022)
- Grand River Conservation Authority, GRCA Web-GIS (Retrieved November 2024)
- Grand River Conservation Authority; ESRI; ArcGIS, “Map Your Property Tool” (Retrieved November 2024)
- GM BluePlan Engineering; Elmira Drain #1, Overall Watershed, Township of Woolwich, Drawing No. 1 (November 2020)
- Hewitt D.F., Paleozoic Geology of Southern Ontario. Geological Report 105. Map 2554 (1972)
- Karrow, P.F., Quaternary Geology, Conestogo Area; Ontario Geological Survey. Map 2558 (1993)
- Matrix Solutions. Inc., The Region of Waterloo, Tier Three Water Budget and Local Area Risk Assessment, prepared for the Region of Waterloo (September 2014)
- MHBC, Draft Plan of Industrial Subdivision, 1665 Scotch Line Road, Elmira, Ontario (February 20, 2025)
- MTE Consultants, Beisel Lands Proposed Residential Subdivision Hydrogeologic Investigation, Barnswallow Drive, Elmira, ON, prepared for Activa Holdings Inc., File No. 45530-104 (June 10, 2021)
- Ontario Ministry of the Environment, Conservation and Parks (MECP) Water Well Records; <https://www.ontario.ca/page/map-well-records> (Retrieved October 2024)
- Toporama Topographical Map, Ministry of Natural Resources (Retrieved November 2024)



APPENDIX A

Draft Plan (MHBC, February 20, 2025) & CVD Geotechnical Borehole Location Plan (May 2024)



DRAFT PLAN OF SUBDIVISION

Legal Description
PART LOT 83 & 86, G.C.T. WOOLWICH;
AS IN 1267295 (firstly) LYING E OF OF 1288904
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF WATERLOO

Owner's Certificate
I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____
BERNIE NIMER
1000525725 ONTARIO INC.

Surveyor's Certificate
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____
GAVIN P.T. SEAMAN, OLS
SBM GEOMATICS LTD.



Additional Information Required Under Section 51(17) of the Planning Act
R.S.O. 1990, c.P.13 as Amended
A. AS SHOWN B. AS SHOWN C. AS SHOWN
D. INDUSTRIAL F. AS SHOWN
G. AS SHOWN H. MUNICIPAL WATER SUPPLY I. LOAM
J. AS SHOWN K. ALL SERVICES AS REQUIRED L. AS SHOWN

Area Schedule 30T-_____

DESCRIPTION	BLOCKS	AREA (ha)
Industrial	1-11	36.499
Stormwater Mgmt	12	1.554
Pumping Station	13	0.039
Open Space	14	6.173
Future Development	15-17	3.892
Road Widening	18-28	2.148
0.3m Reserve	29-37	0.030
Roads		4.594
TOTAL	37	54.928

Notes
- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN
- SITE BOUNDARY, TOPOGRAPHIC BASE PLAN AND WETLAND INFORMATION PREPARED BY SBM GEOMATICS LTD. (MAY 5, 2024)
- CONTOURS, REGION OF WATERLOO (2014)
- REGULATION LIMIT AND FLOODPLAIN (GRCA, 2024)

Revision No. Date Issued / Revision By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

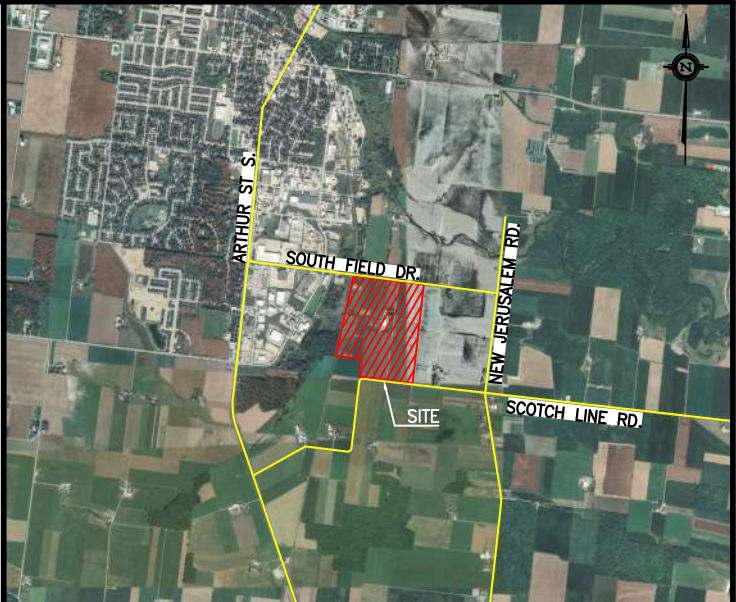
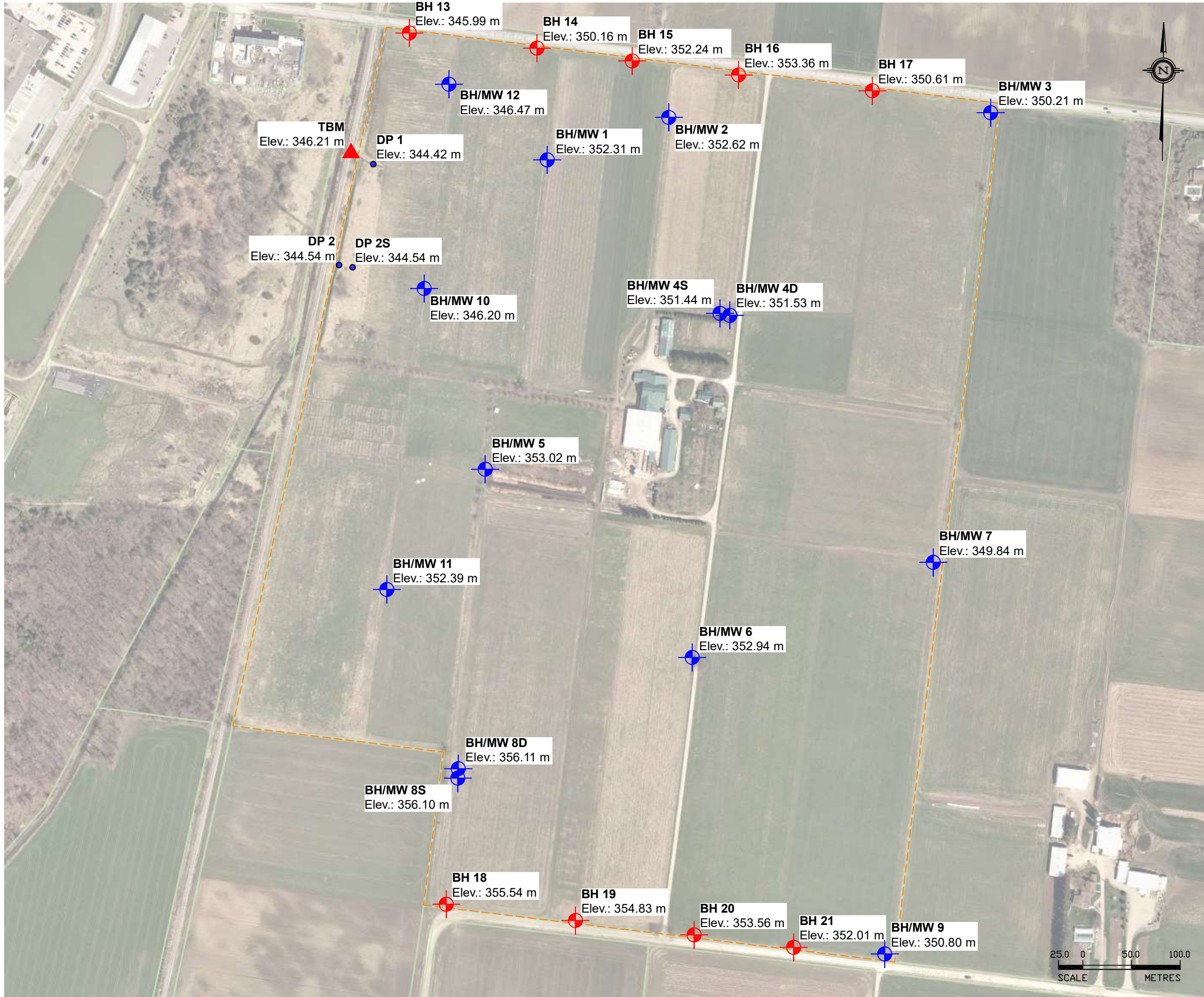
Approval Stamp	Date Feb. 20, 2025
File No. 2388A	
Plan Scale 1:1,500	
Drawn By CAC	
Checked By PC	

Applicant
1000525725 Ontario Inc.
1665 Scotch Line Rd
Elmira, Ontario

File Name DRAFT PLAN Dwg No. 1 of 1

Scale Bar
0 10 25 50 75 100 125 150m

K:\2388A-1965 Scotch Line Rd-Elmira\DP\DraftPlan_20Feb2025.dwg



KEY PLAN SOURCE: Google Earth

- LEGEND**
- TBM: Top of culvert on east side of existing railroad tracks. Elev.: 346.21 m (Geodetic)
 - Borehole Location
 - Borehole and Monitoring Well Location
 - Drive-Point Piezometer Location
 - Site Boundary

Image Ref.: Region of Waterloo GIS; ESRI; Retrieved May 9, 2024.
Elev. Ref.: The borehole locations and associated ground surface elevations were surveyed using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

BOREHOLE LOCATION PLAN
Proposed Industrial Subdivision
1665 Scotch Line Road
Elmira, Ontario



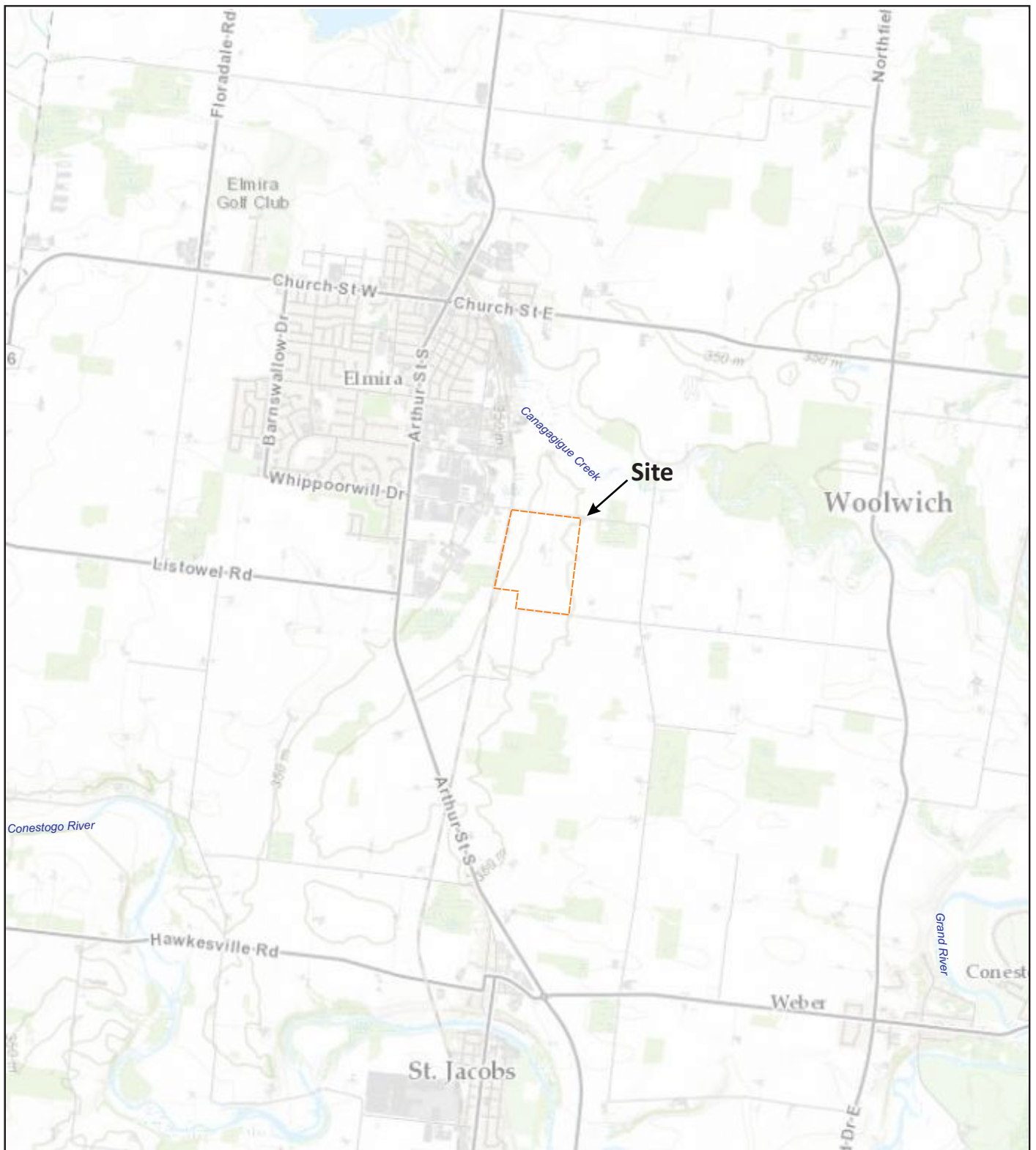
CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1 / 519-742-8979

Drawn By: JR/YC	Date: May 2024	File No.: 1650
Checked By: PD	Scale: 1:4000	Drawing No.: 1

APPENDIX B

Figures 1 to 5





LEGEND



Subject Development Property



0 m 1000 2000
Scale 1:50,000

Map Ref.: Region of Waterloo; ESRI; GIS Locator Retrieved November 25, 2024

Figure 1 - Site Location

Scoped Hydrogeological Assessment
Elmira Industrial Subdivision

1665 Scotch Line Road
Elmira, ON

Drawn By: YC

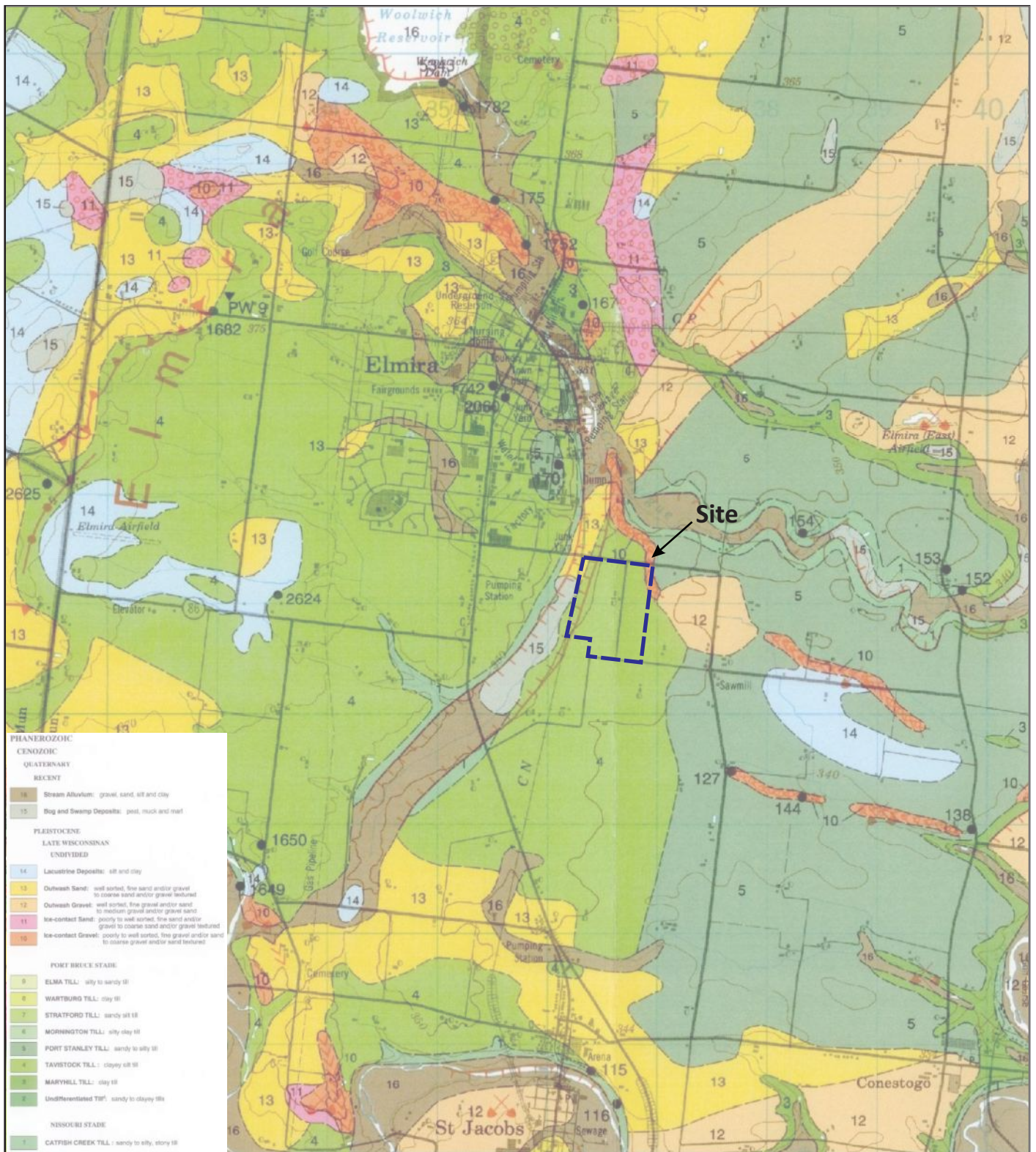
Date: November 25/24

File No. 1650



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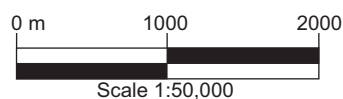
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979



LEGEND



Subject Development Property



Map Ref.: Karrow, P.F. Quaternary Geology, Conestogo Area;
 Ontario Geological Survey. Map 2558 (1993)

Figure 2 - Quaternary Geology

Scoped Hydrogeological Assessment
 Elmira Industrial Subdivision

1665 Scotch Line Road
 Elmira, ON

Drawn By: YC

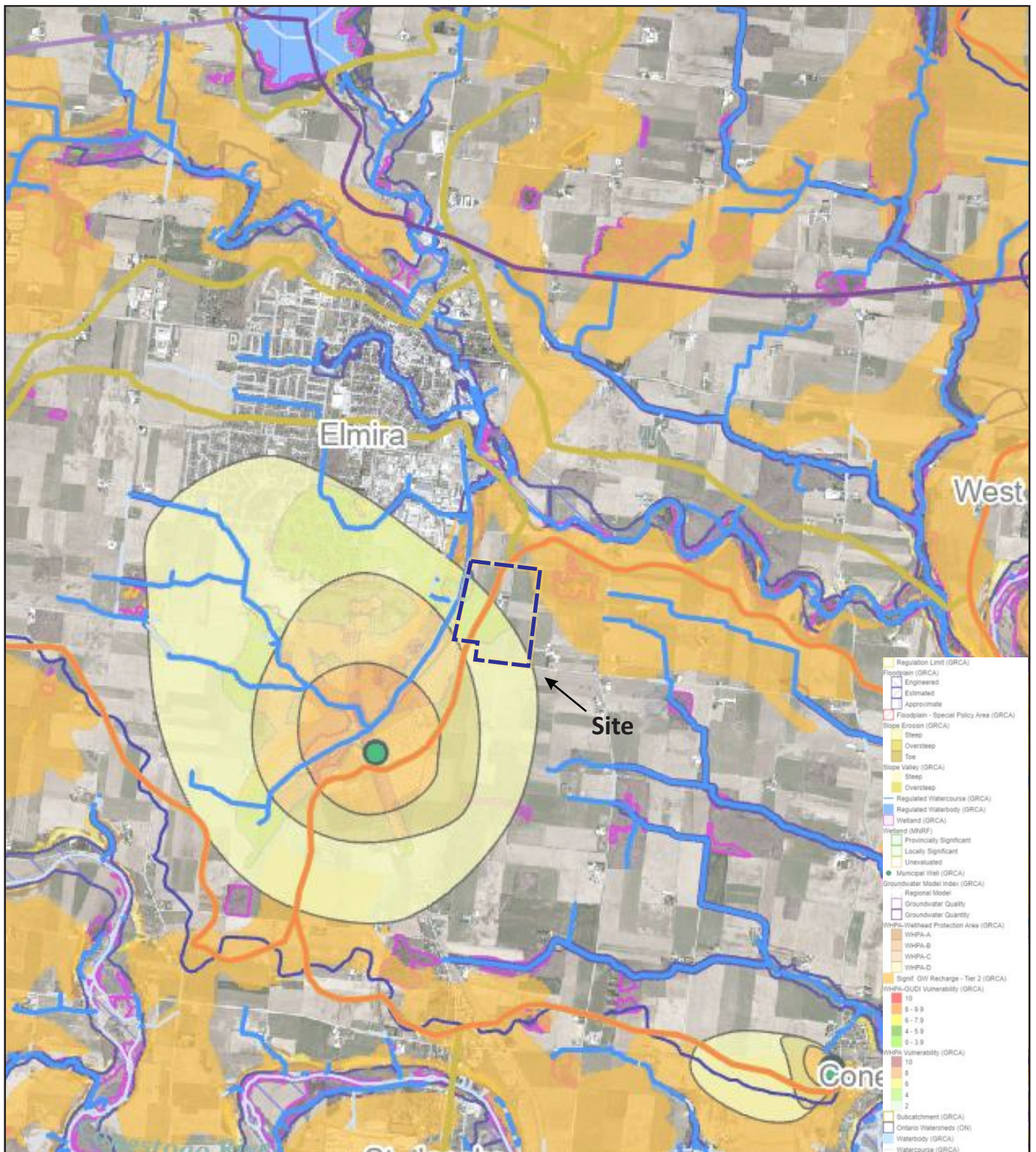
Date: November 27/24

File No. 1650



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LEGEND



Subject Development Property



0 m 1000 2000
Scale 1:50,000

Map Ref.: Grand River Conservation Authority; GRCA Web-GIS; Retrieved November 27, 2024

Figure 4 - Watershed Mapping

Scoped Hydrogeological Assessment
Elmira Industrial Subdivision

1665 Scotch Line Road
Elmira, ON

Drawn By: YC

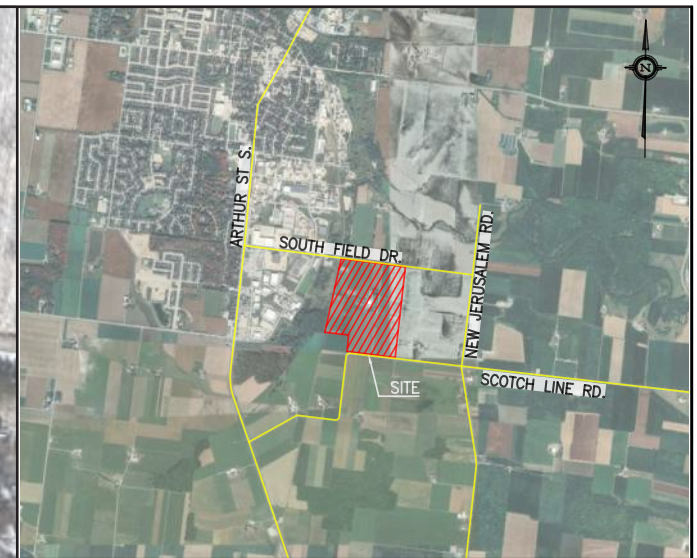
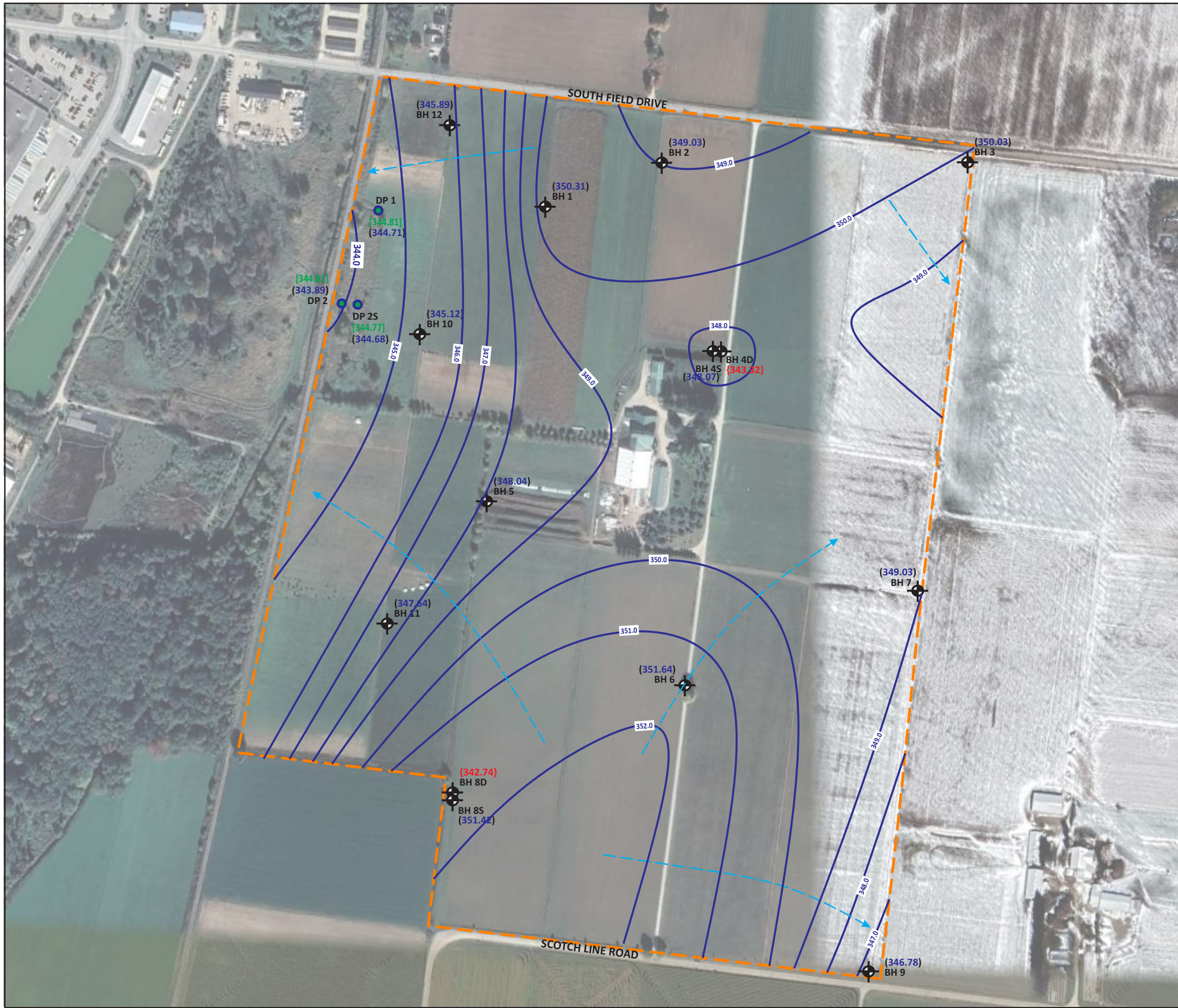
Date: November 27/24

File No. 1650



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LEGEND

- Property Boundary
- CVD Monitoring Well Location
- CVD Drive-Point Piezometer Location
- (350.31) Water Table Elevation (mASL)
- [344.81] Surface Water Level Elevation (mASL)
- {343.32} Potentiometric Water Level Elevation (Deep Aquifer)
- 350.5 Interpreted Groundwater Contour (mASL)
- Interpreted Shallow Groundwater Flow Direction

Image Reference: Google Earth; Retrieved: November 11, 2024

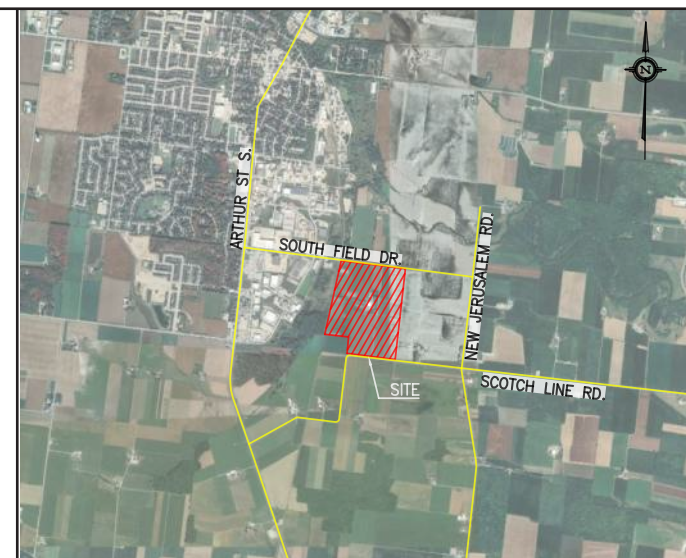
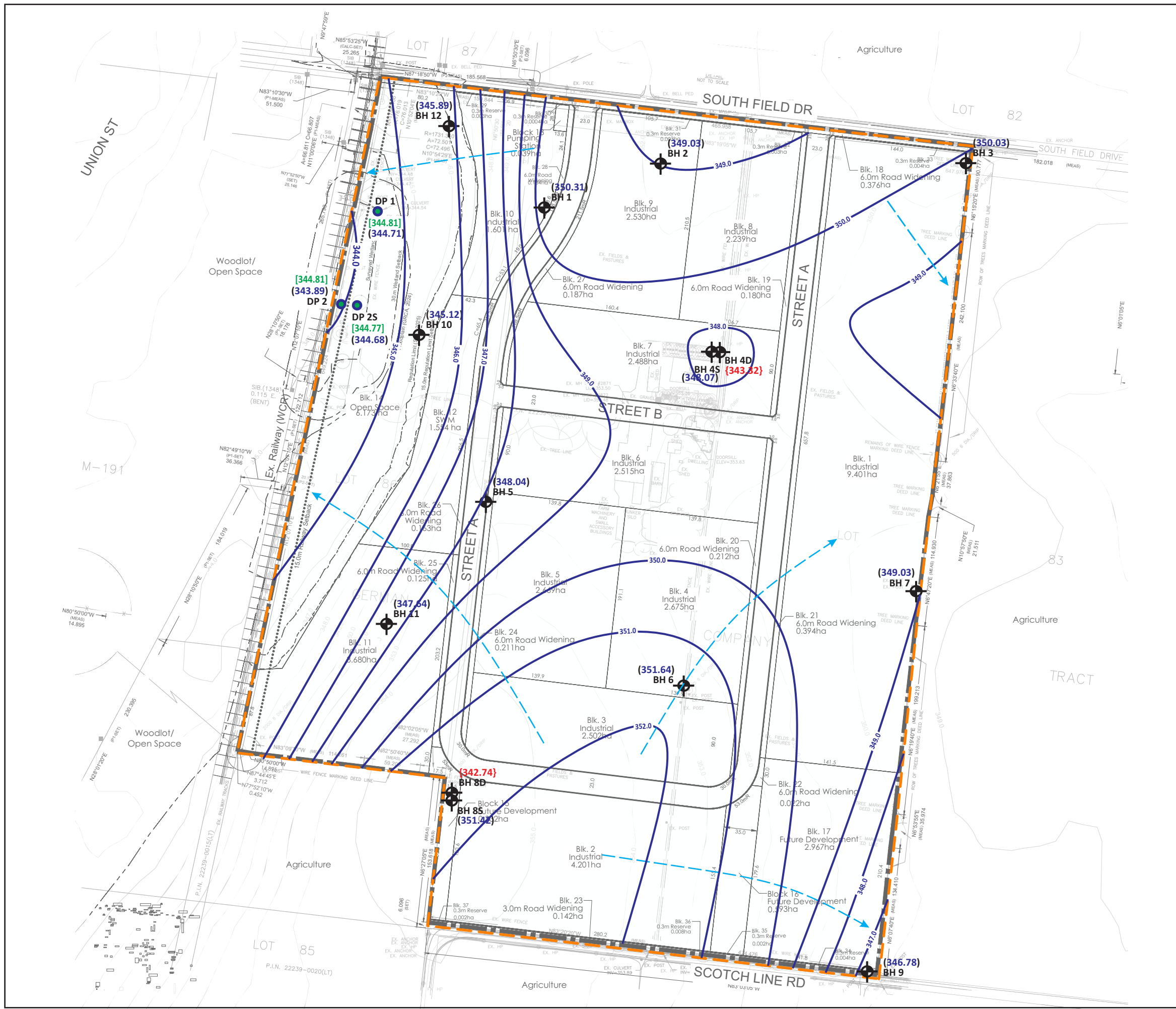
Figure 5a:
Shallow Groundwater Table Interpretation
Pre-Development
(April 30, 2024)

Hydrogeological Assessment
Elmira Industrial Subdivision

1665 Scotch Line Road
Elmira, ON

 **CHUNG & VANDER DOELEN**
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

Drawn By: YC / PD	Date: Nov. 2024	File No.: 1650
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LEGEND

- Property Boundary
- CVD Monitoring Well Location
- CVD Drive-Point Piezometer Location
- (350.31) Water Table Elevation (mASL)
- [344.81] Surface Water Level Elevation (mASL)
- {343.32} Potentiometric Water Level Elevation (Deep Aquifer)
- 350.5 Interpreted Groundwater Contour (mASL)
- Interpreted Shallow Groundwater Flow Direction

Scale 1:4000

DWG. Ref.: MHBC; "Draft Plan of Subdivision", File No. 2388A; February 20, 2025

Figure 5b:
Shallow Groundwater Table Interpretation
Post-Development
(April 30, 2024)

Hydrogeological Assessment
Elmira Industrial Subdivision

1665 Scotch Line Road
Elmira, ON

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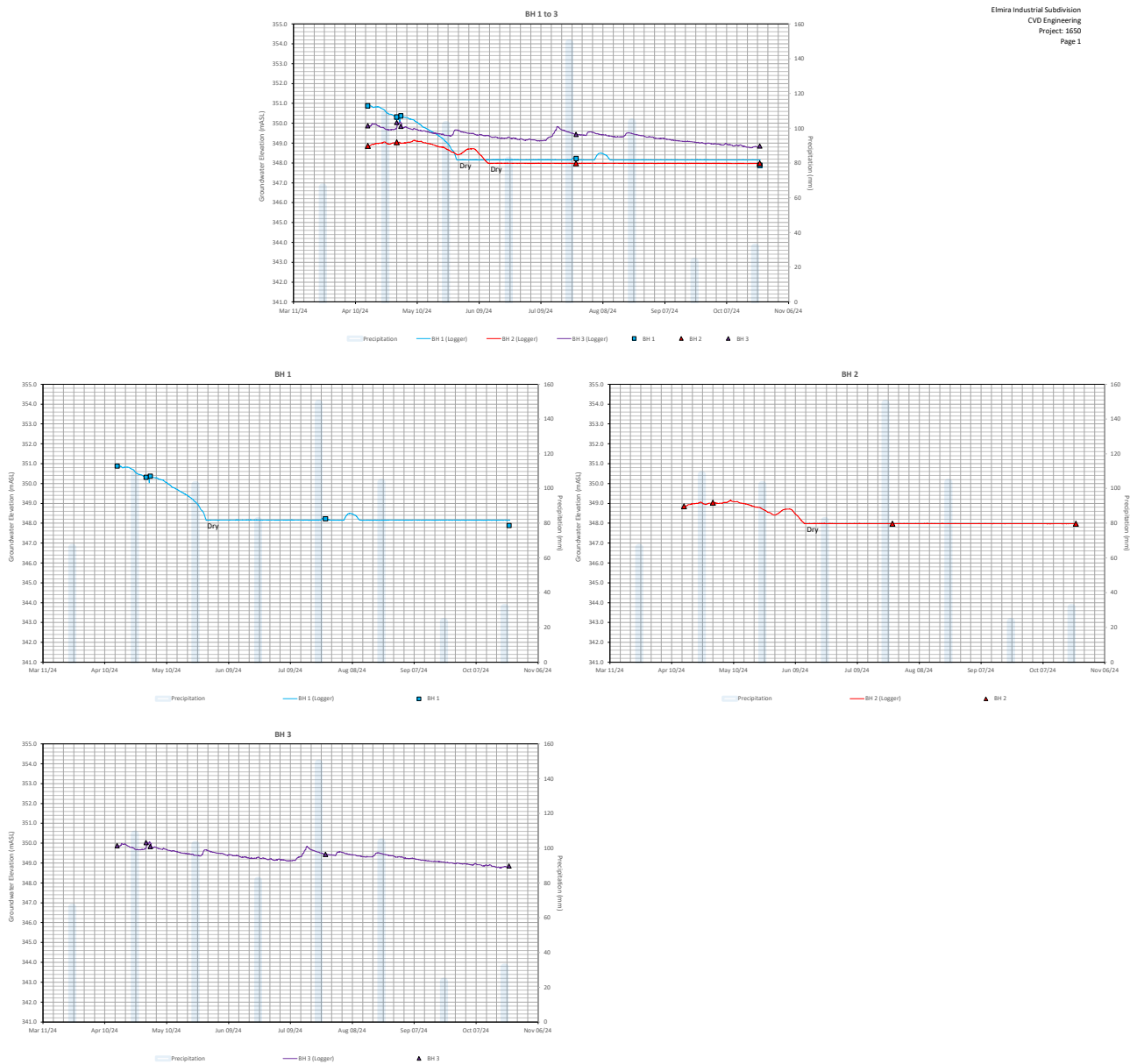
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

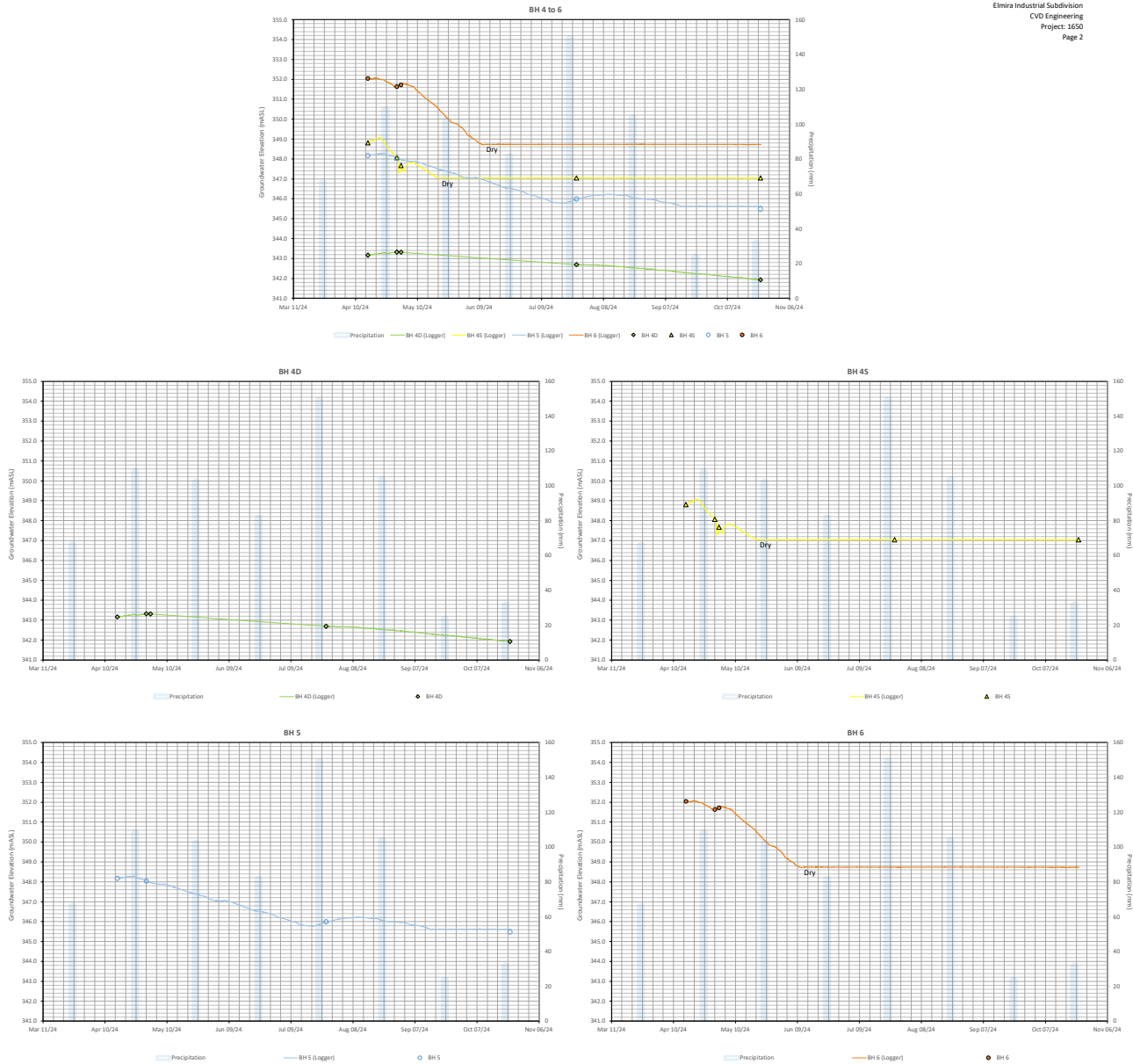
Drawn By: YC / PD	Date: April 2025	File No.: 1650
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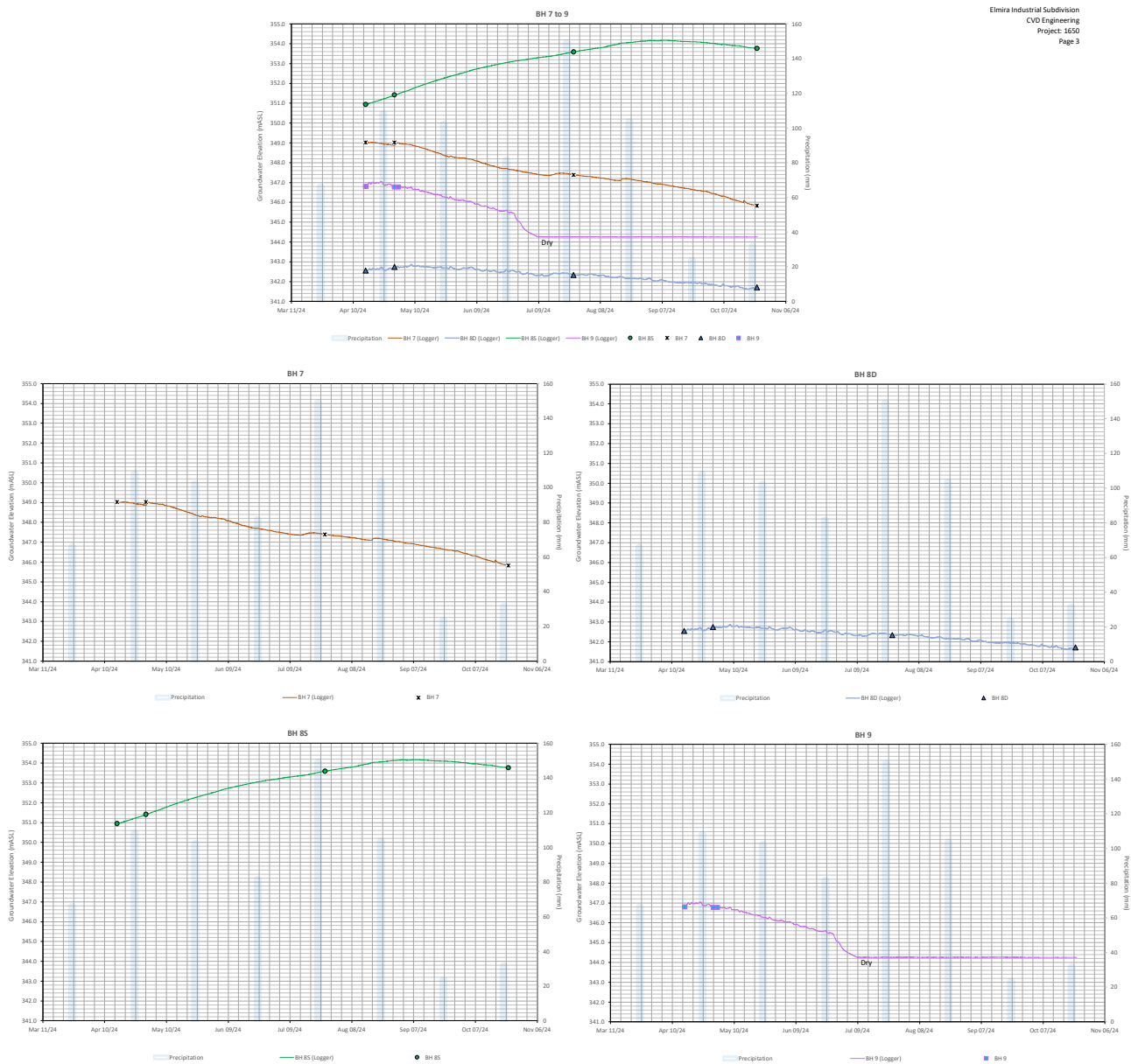
APPENDIX C

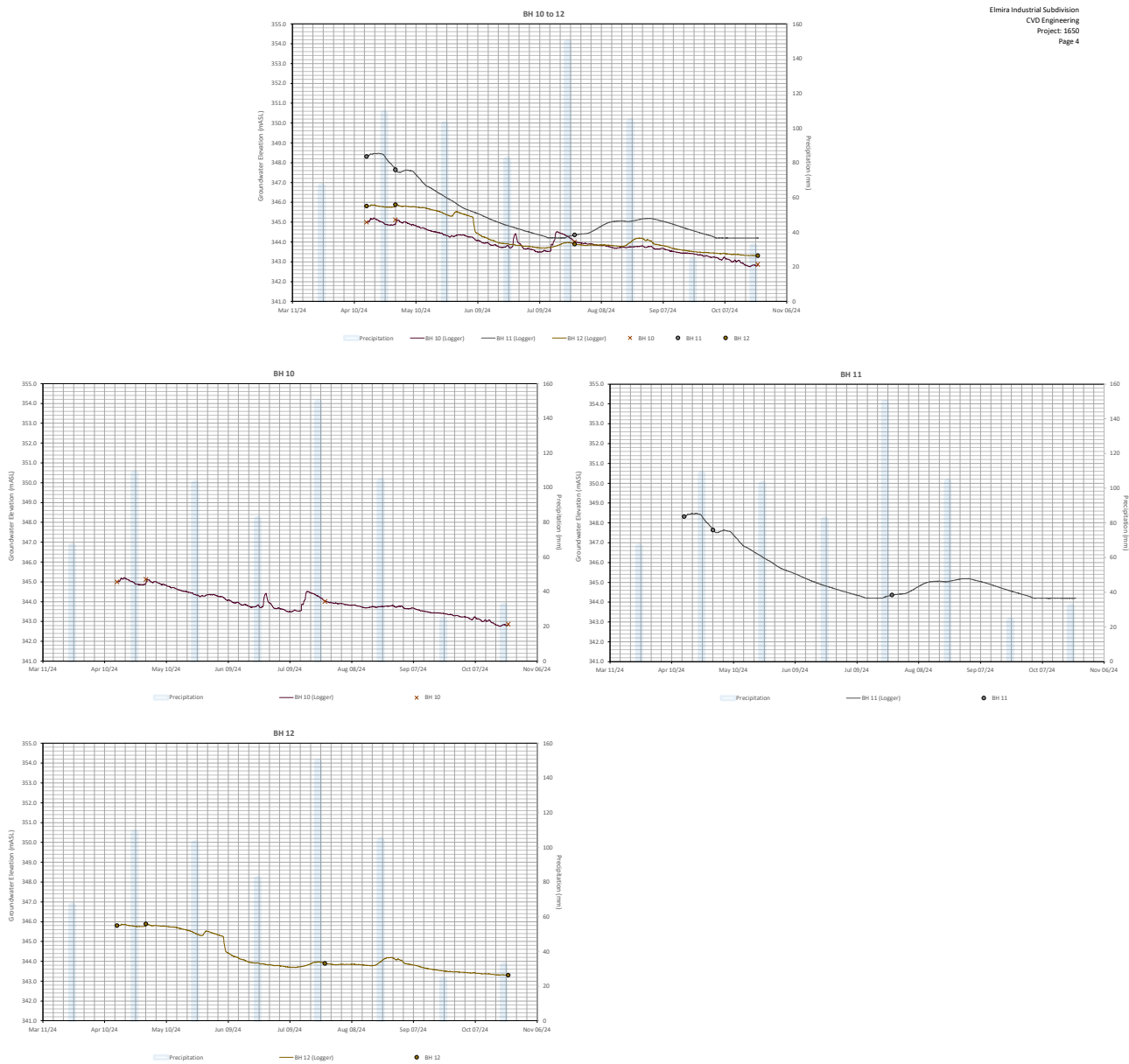
Table 1 – Summary of Groundwater Levels and Elevations & Hydrographs

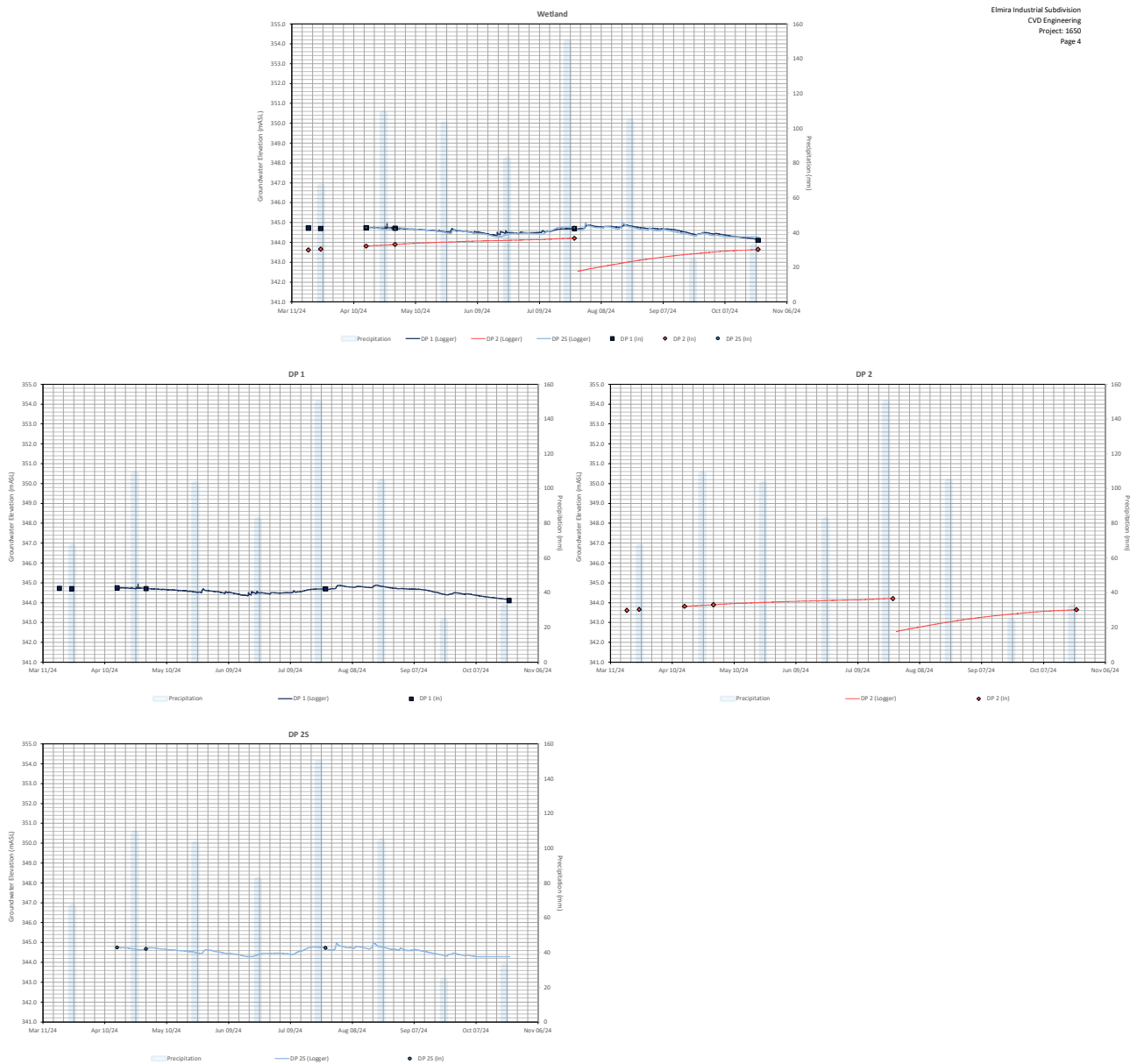












APPENDIX D

Single Well Response Test Analysis Charts





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Response Test - Water Level Data and Analysis

Page 1 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 1

Test Conducted by: R.S.

Test Date: 2024-05-02

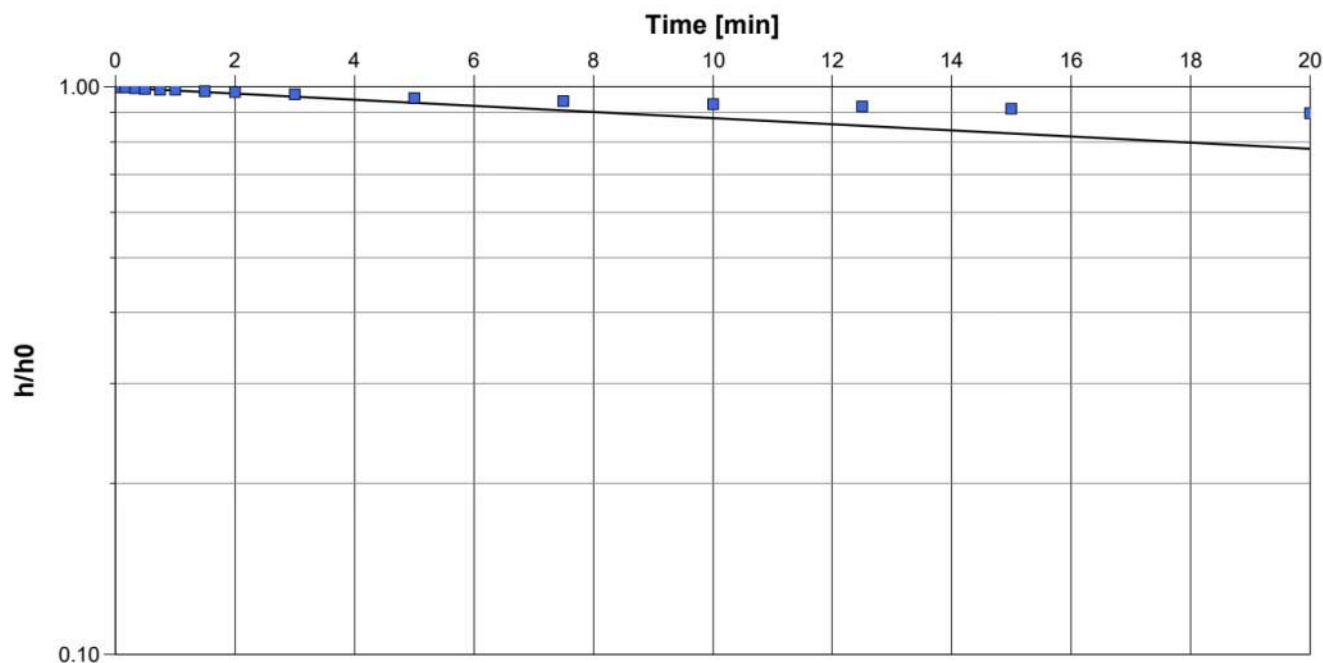
Aquifer Thickness: 4.6 m

Water level at t=0 [m]: 3.16

Static Water Level [m]: 1.95

Water level change at t=0 [m]: 1.22

	Time [min]	Water Level [m]	WL Change [m]
1	0	3.161	1.216
2	0.0833	3.159	1.214
3	0.1667	3.156	1.211
4	0.3333	3.154	1.209
5	0.5	3.151	1.206
6	0.75	3.148	1.203
7	1	3.145	1.20
8	1.5	3.139	1.194
9	2	3.134	1.189
10	3	3.124	1.179
11	5	3.108	1.163
12	7.5	3.093	1.148
13	10	3.078	1.133
14	12.5	3.068	1.123
15	15	3.056	1.111
16	20	3.038	1.093



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 1	7.12×10^{-8}



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Response Test - Water Level Data and Analysis

Page 2 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 3

Test Conducted by: R.S.

Test Date: 2024-05-02

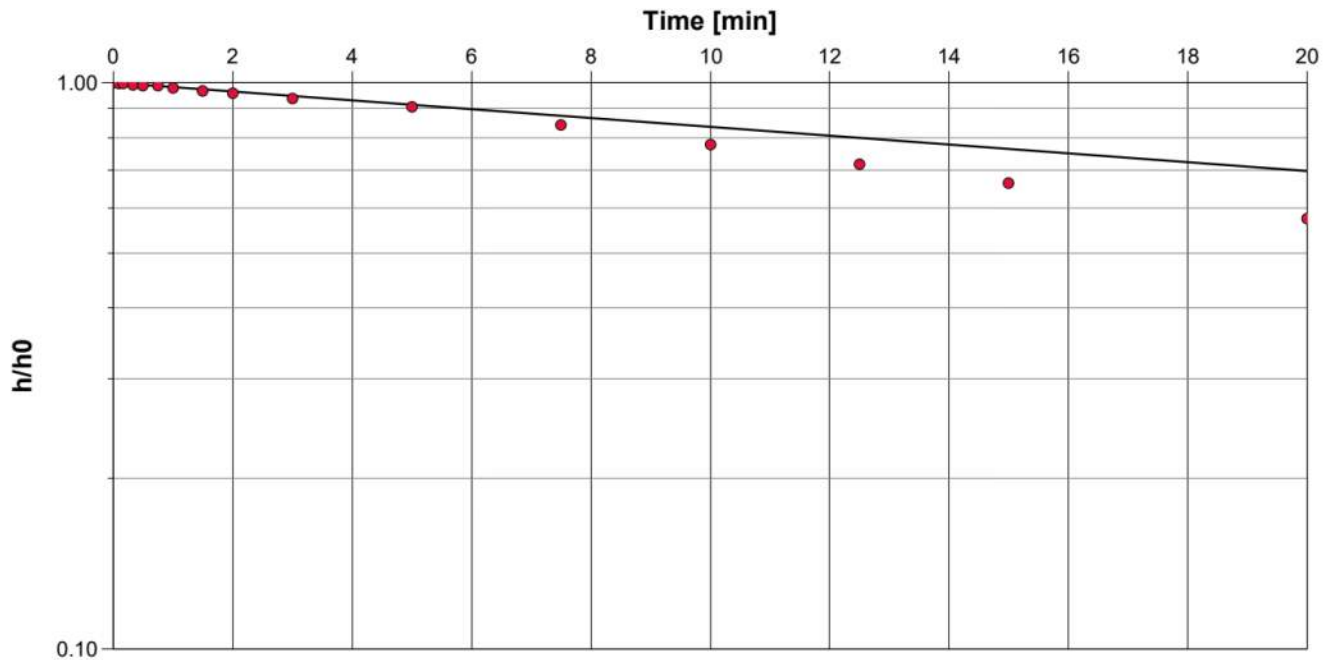
Aquifer Thickness: 4.8 m

Water level at t=0 [m]: 1.62

Static Water Level [m]: 0.38

Water level change at t=0 [m]: 1.24

	Time [min]	Water Level [m]	WL Change [m]
1	0	1.618	1.243
2	0.0833	1.615	1.24
3	0.1667	1.614	1.239
4	0.3333	1.608	1.233
5	0.5	1.603	1.228
6	0.75	1.602	1.227
7	1	1.59	1.215
8	1.5	1.577	1.202
9	2	1.565	1.19
10	3	1.541	1.166
11	5	1.502	1.127
12	7.5	1.421	1.046
13	10	1.34	0.965
14	12.5	1.266	0.891
15	15	1.201	0.826
16	20	1.09	0.715



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH 3	9.73×10^{-8}	



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Response Test - Water Level Data and Analysis

Page 3 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON | Response Test: BH 4D

Test Conducted by: R.S.

Test Date: 2024-05-02

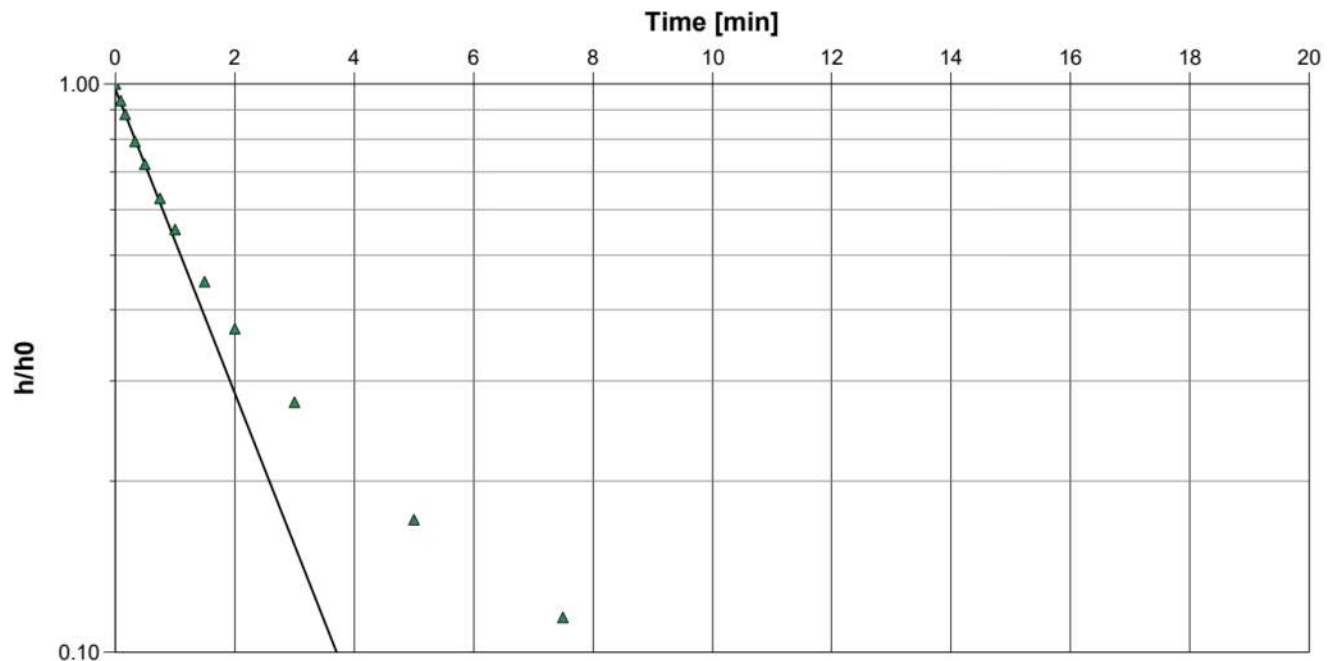
Aquifer Thickness: 1.8 m

Water level at t=0 [m]: 8.82

Static Water Level [m]: 8.21

Water level change at t=0 [m]: 0.61

	Time [min]	Water Level [m]	WL Change [m]
1	0	8.819	0.607
2	0.0833	8.779	0.567
3	0.1667	8.749	0.537
4	0.3333	8.692	0.48
5	0.5	8.65	0.438
6	0.75	8.594	0.382
7	1	8.549	0.337
8	1.5	8.484	0.272
9	2	8.437	0.225
10	3	8.379	0.167
11	5	8.316	0.104
12	7.5	8.282	0.07
13	10	8.262	0.05
14	12.5	8.251	0.039
15	15	8.242	0.03
16	20	8.231	0.019



Calculation using Bouwer & Rice

Observation Well

Hydraulic Conductivity
[m/s]

BH 4D

1.00×10^{-5}



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Response Test - Water Level Data and Analysis

Page 4 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 4S

Test Conducted by: R.S.

Test Date: 2024-05-02

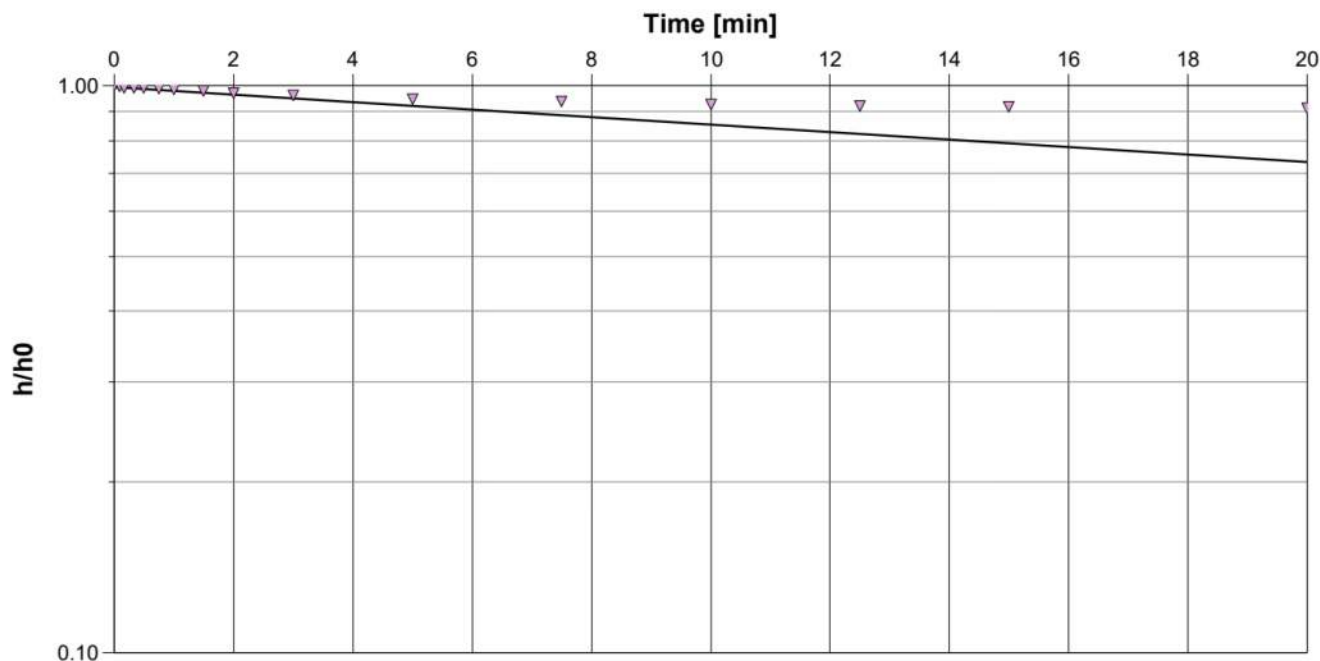
Aquifer Thickness: 2.0 m

Water level at t=0 [m]: 4.33

Static Water Level [m]: 3.76

Water level change at t=0 [m]: 0.57

	Time [min]	Water Level [m]	WL Change [m]
1	0	4.33	0.57
2	0.0833	4.328	0.568
3	0.1667	4.325	0.565
4	0.3333	4.325	0.565
5	0.5	4.324	0.564
6	0.75	4.323	0.563
7	1	4.321	0.561
8	1.5	4.318	0.558
9	2	4.312	0.552
10	3	4.307	0.547
11	5	4.30	0.54
12	7.5	4.294	0.534
13	10	4.288	0.528
14	12.5	4.285	0.525
15	15	4.283	0.523
16	20	4.28	0.52



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 4S	1.19×10^{-7}



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Response Test - Water Level Data and Analysis

Page 5 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 6

Test Conducted by: R.S.

Test Date: 2024-05-02

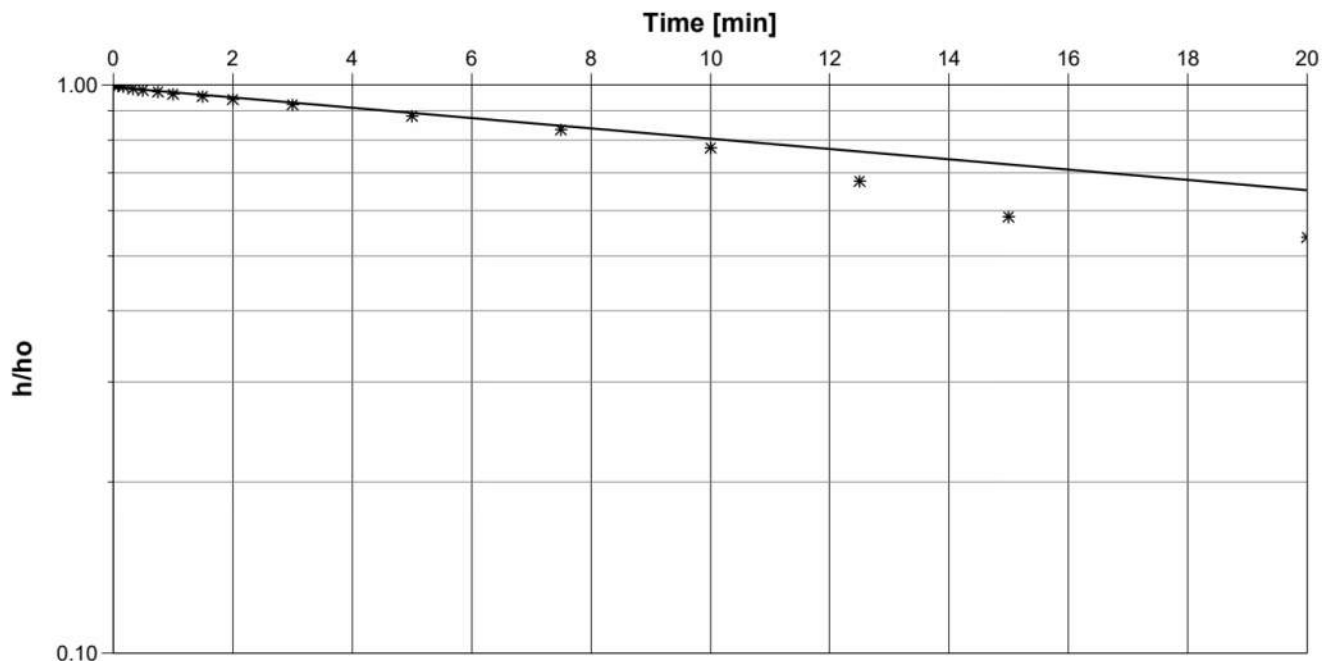
Aquifer Thickness: 6.5 m

Water level at t=0 [m]: 2.57

Static Water Level [m]: 1.21

Water level change at t=0 [m]: 1.35

	Time [min]	Water Level [m]	WL Change [m]
1	0	2.568	1.354
2	0.0833	2.563	1.349
3	0.1667	2.56	1.346
4	0.3333	2.548	1.334
5	0.5	2.541	1.327
6	0.75	2.533	1.319
7	1	2.521	1.307
8	1.5	2.508	1.294
9	2	2.493	1.279
10	3	2.463	1.249
11	5	2.407	1.193
12	7.5	2.345	1.131
13	10	2.263	1.049
14	12.5	2.131	0.917
15	15	2.008	0.794
16	20	1.944	0.73



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 6	1.06×10^{-7}



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519-742-8979

Response Test - Water Level Data and Analysis

Page 6 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 9

Test Conducted by: R.S.

Test Date: 2024-05-01

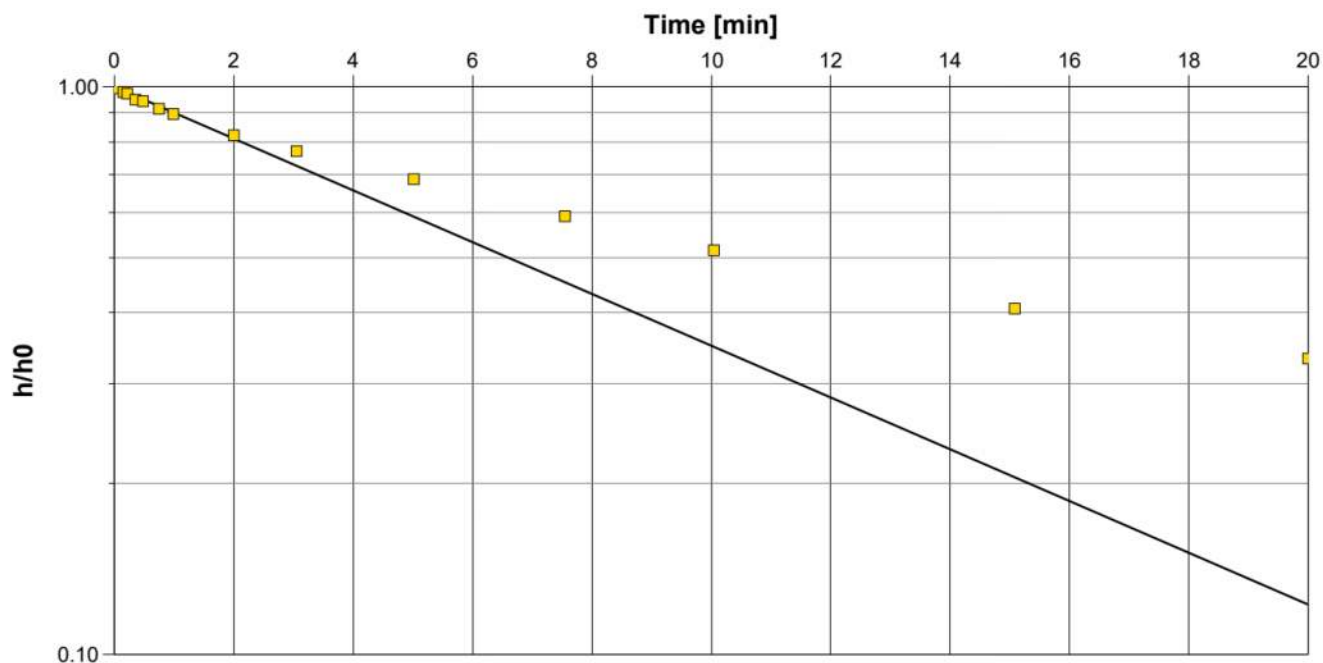
Aquifer Thickness: 1.5 m

Water level at t=0 [m]: 5.01

Static Water Level [m]: 4.03

Water level change at t=0 [m]: 0.99

	Time [min]	Water Level [m]	WL Change [m]
1	0	5.013	0.987
2	0.0667	5.006	0.98
3	0.15	4.993	0.967
4	0.2167	4.987	0.961
5	0.35	4.964	0.938
6	0.4833	4.956	0.93
7	0.75	4.928	0.902
8	0.9833	4.909	0.883
9	2	4.838	0.812
10	3.05	4.787	0.761
11	5.0167	4.705	0.679
12	7.55	4.61	0.584
13	10.05	4.534	0.508
14	15.0833	4.427	0.401
15	20	4.354	0.328



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 9	1.49×10^{-6}

APPENDIX E

Water Chemistry Results (ALS Laboratories of Waterloo, Ontario)



CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: WT2410672	Page	: 1 of 15
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650	Date Samples Received	: 01-May-2024 14:30
PO	: ----	Date Analysis Commenced	: 01-May-2024
C-O-C number	: 17-620411	Issue Date	: 07-May-2024 18:14
Sampler	: R. Soknic		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 6		
No. of samples analysed	: 6		

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
- Guideline Comparison

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.

Signatories	Position	Laboratory Department
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kaitlyn Lammers	Lab Assistant	Microbiology, Waterloo, Ontario
Nik Perkio	Inorganics Analyst	Inorganics, Waterloo, Ontario
Nik Perkio	Inorganics Analyst	Metals, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Inorganics, Waterloo, Ontario



Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
BH 1	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	0.246 mg/L	0.075 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2<100	0.00509 mg/L	0.0009 mg/L
	Water	Copper, total	Based on Hardness < 20 mg/L	ONPWQO	IPWQOT2<100	0.00248 mg/L	0.001 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2<100	<0.050	
	Water	Zinc, total		ONPWQO	IPWQOT2<100	0.0352 mg/L	0.02 mg/L
	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2>100	0.246 mg/L	0.075 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2>100	0.00509 mg/L	0.0009 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2>100	<0.050	
	Water	Zinc, total		ONPWQO	IPWQOT2>100	0.0352 mg/L	0.02 mg/L
	Water	Iron, total		ONPWQO	PWQOT2<100	0.493 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2<100	0.0352 mg/L	0.03 mg/L
	Water	Iron, total		ONPWQO	PWQOT2>100	0.493 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2>100	0.0352 mg/L	0.03 mg/L
	Water						
BH 3	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	18.1 mg/L	0.075 mg/L
	Water	Arsenic, total		ONPWQO	IPWQOT2<100	0.00785 mg/L	0.005 mg/L
	Water	Cadmium, total	Based on Hardness < 100 mg/L	ONPWQO	IPWQOT2<100	0.000882 mg/L	0.0001 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2<100	0.0535 mg/L	0.0009 mg/L
	Water	Copper, total	Based on Hardness < 20 mg/L	ONPWQO	IPWQOT2<100	0.0320 mg/L	0.001 mg/L
	Water	Lead, total	Based on Hardness <30 mg/L	ONPWQO	IPWQOT2<100	0.0207 mg/L	0.001 mg/L
	Water	Nickel, total		ONPWQO	IPWQOT2<100	0.0725 mg/L	0.025 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2<100	1.11 mg/L	0.01 mg/L
	Water	Vanadium, total		ONPWQO	IPWQOT2<100	0.0360 mg/L	0.006 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2<100	0.168 mg/L	0.02 mg/L
	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2>100	18.1 mg/L	0.075 mg/L
	Water	Arsenic, total		ONPWQO	IPWQOT2>100	0.00785 mg/L	0.005 mg/L
	Water	Cadmium, total	Based on Hardness > 100 mg/L	ONPWQO	IPWQOT2>100	0.000882 mg/L	0.0005 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2>100	0.0535 mg/L	0.0009 mg/L
	Water	Copper, total	Based on Hardness > 20 mg/L	ONPWQO	IPWQOT2>100	0.0320 mg/L	0.005 mg/L



SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
	Water	Lead, total	Based on Alkalinity >80 mg/L	ONPWQO	IPWQOT2>100	0.0207 mg/L	0.005 mg/L
	Water	Nickel, total		ONPWQO	IPWQOT2>100	0.0725 mg/L	0.025 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2>100	1.11 mg/L	0.01 mg/L
	Water	Vanadium, total		ONPWQO	IPWQOT2>100	0.0360 mg/L	0.006 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2>100	0.168 mg/L	0.02 mg/L
	Water	Cadmium, total		ONPWQO	PWQOT2<100	0.000882 mg/L	0.0002 mg/L
	Water	Copper, total		ONPWQO	PWQOT2<100	0.0320 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2<100	27.4 mg/L	0.3 mg/L
	Water	Lead, total	Based on Alkalinity <20 mg/L	ONPWQO	PWQOT2<100	0.0207 mg/L	0.005 mg/L
	Water	Nickel, total		ONPWQO	PWQOT2<100	0.0725 mg/L	0.025 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2<100	0.168 mg/L	0.03 mg/L
	Water	Cadmium, total		ONPWQO	PWQOT2>100	0.000882 mg/L	0.0002 mg/L
	Water	Copper, total		ONPWQO	PWQOT2>100	0.0320 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2>100	27.4 mg/L	0.3 mg/L
	Water	Nickel, total		ONPWQO	PWQOT2>100	0.0725 mg/L	0.025 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2>100	0.168 mg/L	0.03 mg/L
BH 4D	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	4.81 mg/L	0.075 mg/L
	Water	Cadmium, total	Based on Hardness < 100 mg/L	ONPWQO	IPWQOT2<100	0.000157 mg/L	0.0001 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2<100	0.00661 mg/L	0.0009 mg/L
	Water	Copper, total		ONPWQO	IPWQOT2<100	0.0124 mg/L	0.001 mg/L
	Water	Lead, total	Based on Hardness <30 mg/L	ONPWQO	IPWQOT2<100	0.00896 mg/L	0.001 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2<100	<0.500	
	Water	Vanadium, total		ONPWQO	IPWQOT2<100	0.00960 mg/L	0.006 mg/L
	Water	Zinc, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	0.0542 mg/L	0.02 mg/L
	Water	Aluminum, total		ONPWQO	IPWQOT2>100	4.81 mg/L	0.075 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2>100	0.00661 mg/L	0.0009 mg/L
	Water	Copper, total	Based on Hardness > 20 mg/L	ONPWQO	IPWQOT2>100	0.0124 mg/L	0.005 mg/L
	Water	Lead, total	Based on Alkalinity >80 mg/L	ONPWQO	IPWQOT2>100	0.00896 mg/L	0.005 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2>100	<0.500	
	Water	Vanadium, total		ONPWQO	IPWQOT2>100	0.00960 mg/L	0.006 mg/L



SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
	Water	Zinc, total	Based on Alkalinity <20 mg/L	ONPWQO	IPWQOT2>100	0.0542 mg/L	0.02 mg/L
	Water	Copper, total		ONPWQO	PWQOT2<100	0.0124 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2<100	7.32 mg/L	0.3 mg/L
	Water	Lead, total		ONPWQO	PWQOT2<100	0.00896 mg/L	0.005 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2<100	0.0542 mg/L	0.03 mg/L
	Water	Copper, total		ONPWQO	PWQOT2>100	0.0124 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2>100	7.32 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2>100	0.0542 mg/L	0.03 mg/L
BH 9	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	3.62 mg/L	0.075 mg/L
	Water	Cadmium, total	Based on Hardness < 100 mg/L	ONPWQO	IPWQOT2<100	0.000232 mg/L	0.0001 mg/L
	Water	Cobalt, total	Based on Hardness < 20 mg/L	ONPWQO	IPWQOT2<100	0.00674 mg/L	0.0009 mg/L
	Water	Copper, total		ONPWQO	IPWQOT2<100	0.00811 mg/L	0.001 mg/L
	Water	Lead, total	Based on Hardness <30 mg/L	ONPWQO	IPWQOT2<100	0.00565 mg/L	0.001 mg/L
	Water	Phosphorus, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	0.262 mg/L	0.01 mg/L
	Water	Vanadium, total		ONPWQO	IPWQOT2<100	0.00726 mg/L	0.006 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2<100	0.0316 mg/L	0.02 mg/L
	Water	Aluminum, total		ONPWQO	IPWQOT2>100	3.62 mg/L	0.075 mg/L
	Water	Cobalt, total	Based on Hardness > 20 mg/L	ONPWQO	IPWQOT2>100	0.00674 mg/L	0.0009 mg/L
	Water	Copper, total		ONPWQO	IPWQOT2>100	0.00811 mg/L	0.005 mg/L
	Water	Lead, total	Based on Alkalinity >80 mg/L	ONPWQO	IPWQOT2>100	0.00565 mg/L	0.005 mg/L
	Water	Phosphorus, total	Based on Alkalinity <20 mg/L	ONPWQO	IPWQOT2>100	0.262 mg/L	0.01 mg/L
	Water	Vanadium, total		ONPWQO	IPWQOT2>100	0.00726 mg/L	0.006 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2>100	0.0316 mg/L	0.02 mg/L
	Water	Cadmium, total		ONPWQO	PWQOT2<100	0.000232 mg/L	0.0002 mg/L
	Water	Copper, total		ONPWQO	PWQOT2<100	0.00811 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2<100	5.26 mg/L	0.3 mg/L
	Water	Lead, total		ONPWQO	PWQOT2<100	0.00565 mg/L	0.005 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2<100	0.0316 mg/L	0.03 mg/L
	Water	Cadmium, total		ONPWQO	PWQOT2>100	0.000232 mg/L	0.0002 mg/L
	Water	Copper, total		ONPWQO	PWQOT2>100	0.00811 mg/L	0.005 mg/L



SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
	Water	Iron, total		ONPWQO	PWQOT2>100	5.26 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2>100	0.0316 mg/L	0.03 mg/L
BH 4S	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	1.81 mg/L	0.075 mg/L
	Water	Cadmium, total	Based on Hardness < 100 mg/L	ONPWQO	IPWQOT2<100	0.000411 mg/L	0.0001 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2<100	0.0212 mg/L	0.0009 mg/L
	Water	Copper, total	Based on Hardness < 20 mg/L	ONPWQO	IPWQOT2<100	0.0112 mg/L	0.001 mg/L
	Water	Lead, total	Based on Hardness <30 mg/L	ONPWQO	IPWQOT2<100	0.00384 mg/L	0.001 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2<100	0.127 mg/L	0.01 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2<100	0.0308 mg/L	0.02 mg/L
	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2>100	1.81 mg/L	0.075 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2>100	0.0212 mg/L	0.0009 mg/L
	Water	Copper, total	Based on Hardness > 20 mg/L	ONPWQO	IPWQOT2>100	0.0112 mg/L	0.005 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2>100	0.127 mg/L	0.01 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2>100	0.0308 mg/L	0.02 mg/L
	Water	Cadmium, total		ONPWQO	PWQOT2<100	0.000411 mg/L	0.0002 mg/L
	Water	Copper, total		ONPWQO	PWQOT2<100	0.0112 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2<100	3.41 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2<100	0.0308 mg/L	0.03 mg/L
	Water	Cadmium, total		ONPWQO	PWQOT2>100	0.000411 mg/L	0.0002 mg/L
	Water	Copper, total		ONPWQO	PWQOT2>100	0.0112 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2>100	3.41 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2>100	0.0308 mg/L	0.03 mg/L
DP 25 (SURFACE WATER)	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2<100	1.37 mg/L	0.075 mg/L
	Water	Cadmium, total	Based on Hardness < 100 mg/L	ONPWQO	IPWQOT2<100	0.000178 mg/L	0.0001 mg/L
	Water	Cobalt, total		ONPWQO	IPWQOT2<100	0.00143 mg/L	0.0009 mg/L
	Water	Copper, total	Based on Hardness < 20 mg/L	ONPWQO	IPWQOT2<100	0.00980 mg/L	0.001 mg/L
	Water	Lead, total	Based on Hardness <30 mg/L	ONPWQO	IPWQOT2<100	0.00175 mg/L	0.001 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2<100	0.671 mg/L	0.01 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2<100	0.0386 mg/L	0.02 mg/L
	Water	Aluminum, total	Based on pH between 6.5 and 9.0	ONPWQO	IPWQOT2>100	1.37 mg/L	0.075 mg/L



SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
	Water	Cobalt, total	Based on Hardness > 20 mg/L	ONPWQO	IPWQOT2>100	0.00143 mg/L	0.0009 mg/L
	Water	Copper, total		ONPWQO	IPWQOT2>100	0.00980 mg/L	0.005 mg/L
	Water	Phosphorus, total		ONPWQO	IPWQOT2>100	0.671 mg/L	0.01 mg/L
	Water	Zinc, total		ONPWQO	IPWQOT2>100	0.0386 mg/L	0.02 mg/L
	Water	Copper, total		ONPWQO	PWQOT2<100	0.00980 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2<100	2.67 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2<100	0.0386 mg/L	0.03 mg/L
	Water	Copper, total		ONPWQO	PWQOT2>100	0.00980 mg/L	0.005 mg/L
	Water	Iron, total		ONPWQO	PWQOT2>100	2.67 mg/L	0.3 mg/L
	Water	Zinc, total		ONPWQO	PWQOT2>100	0.0386 mg/L	0.03 mg/L

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.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
µS/cm	microsiemens per centimetre
CFU/100mL	colony forming units per hundred millilitres
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units



>: greater than.

<: less than.

Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Lavander shading is applied where the LOR itself is greater than the Guideline Upper Limit (or Lower than the Guideline Lower Limit, if applicable).

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
NDOGN	No Data-Total Coliform and/or E.Coli plate overgrown with non-target.



Analytical Results Evaluation

			Client sample ID	BH 1	BH 3	BH 4D	BH 9	BH 4S	----	----
Matrix: Groundwater			Sampling date/time	01-May-2024 11:00	01-May-2024 10:30	01-May-2024 12:15	30-Apr-2024 14:10	30-Apr-2024 15:15	----	----
			Sub-Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	----	----
Analyte	CAS Number	Method/Lab	Unit	WT2410672-001	WT2410672-002	WT2410672-003	WT2410672-004	WT2410672-005	-----	-----
Physical Tests										
Alkalinity, total (as CaCO ₃)	----	E290/WT	mg/L	344	367	341	378	346	----	----
Colour, apparent	----	E330/WT	CU	98.8	1080 ^{DLHC}	283 ^{DLHC}	982 ^{DLHC}	64.1	----	----
Conductivity	----	E100/WT	µS/cm	725	3760	686	573	919	----	----
pH	----	E108/WT	pH units	7.78	7.58	7.71	7.83	7.82	----	----
Solids, total dissolved [TDS]	----	E162/WT	mg/L	428 ^{DLDS}	2230 ^{DLDS}	424 ^{DLDS}	292 ^{DLDS}	574 ^{DLDS}	----	----
Turbidity	----	E121/WT	NTU	52.8	1200	101	455	31.0	----	----
Hardness (as CaCO ₃), dissolved	----	EC100/WT	mg/L	383	902	396	310	479	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/WT	mg/L	0.0158	0.120	0.0591	0.0142	0.0284	----	----
Chloride	16887-00-6	E235.CI/WT	mg/L	5.94	980 ^{DLDS}	13.9	10.8	2.98	----	----
Fluoride	16984-48-8	E235.F/WT	mg/L	0.055	<0.100 ^{DLDS}	0.027	0.056	0.047	----	----
Nitrate (as N)	14797-55-8	E235.NO3/WT	mg/L	8.70	1.10 ^{DLDS}	6.93	0.467	23.6	----	----
Nitrite (as N)	14797-65-0	E235.NO2/WT	mg/L	<0.010	<0.050 ^{DLDS}	<0.010	<0.010	<0.010	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	mg/L	<0.0010	0.0022	<0.0010	<0.0010	<0.0010	----	----
Sulfate (as SO ₄)	14808-79-8	E235.SO4/WT	mg/L	25.1	71.6 ^{DLDS}	21.8	6.04	75.3	----	----
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	----	E012A.EC/WT	CFU/100 mL	Not Detected	Not Detected ^{DLM}	1	Not Detected ^{HTD}	Not Detected	----	----
Coliforms, total	----	E012.TC/WT	CFU/100 mL	10 ^{DLM}	1000 ^{DLM}	Not Detected ^{DLM}	NR ^{NDGN}	NR ^{NDGN}	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/WT	mg/L	0.246	18.1 ^{DLHC}	4.81 ^{DLHC}	3.62	1.81	----	----
Antimony, total	7440-36-0	E420/WT	mg/L	0.00013	<0.00100 ^{DLHC}	<0.00100 ^{DLHC}	0.00010	0.00041	----	----
Arsenic, total	7440-38-2	E420/WT	mg/L	0.00046	0.00785 ^{DLHC}	0.00204 ^{DLHC}	0.00204	0.00293	----	----
Barium, total	7440-39-3	E420/WT	mg/L	0.0306	0.358 ^{DLHC}	0.0660 ^{DLHC}	0.0446	0.0747	----	----
Beryllium, total	7440-41-7	E420/WT	mg/L	0.000022	0.000853 ^{DLHC}	0.000262 ^{DLHC}	0.000188	0.000132	----	----
Bismuth, total	7440-69-9	E420/WT	mg/L	<0.000050	<0.000500 ^{DLHC}	<0.000500 ^{DLHC}	<0.000050	<0.000050	----	----
Boron, total	7440-42-8	E420/WT	mg/L	0.019	<0.100 ^{DLHC}	<0.100 ^{DLHC}	0.013	0.038	----	----



Analytical Results Evaluation

Matrix: Groundwater				Client sample ID		BH 1	BH 3	BH 4D	BH 9	BH 4S	----	----
				Sampling date/time		01-May-2024 11:00	01-May-2024 10:30	01-May-2024 12:15	30-Apr-2024 14:10	30-Apr-2024 15:15	----	----
				Sub-Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	----	----
Analyte	CAS Number	Method/Lab	Unit	WT2410672-001	WT2410672-002	WT2410672-003	WT2410672-004	WT2410672-005	-----	-----		
Total Metals												
Cadmium, total	7440-43-9	E420/WT	mg/L	0.0000820	0.000882 DLHC	0.000157 DLHC	0.000232	0.000411	----	----		
Calcium, total	7440-70-2	E420/WT	mg/L	111	407 DLHC	163 DLHC	147	147	----	----		
Cesium, total	7440-46-2	E420/WT	mg/L	0.000026	0.00139 DLHC	0.000513 DLHC	0.000318	0.000188	----	----		
Chromium, total	7440-47-3	E420/WT	mg/L	0.00155	0.0260 DLHC	0.00815 DLHC	0.00587	0.00589	----	----		
Cobalt, total	7440-48-4	E420/WT	mg/L	0.00509	0.0535 DLHC	0.00661 DLHC	0.00674	0.0212	----	----		
Copper, total	7440-50-8	E420/WT	mg/L	0.00248	0.0320 DLHC	0.0124 DLHC	0.00811	0.0112	----	----		
Iron, total	7439-89-6	E420/WT	mg/L	0.493	27.4 DLHC	7.32 DLHC	5.26	3.41	----	----		
Lead, total	7439-92-1	E420/WT	mg/L	0.000735	0.0207 DLHC	0.00896 DLHC	0.00565	0.00384	----	----		
Lithium, total	7439-93-2	E420/WT	mg/L	0.0022	0.0366 DLHC	<0.0100 DLHC	0.0044	0.0041	----	----		
Magnesium, total	7439-95-4	E420/WT	mg/L	29.7	132 DLHC	46.6 DLHC	44.0	48.0	----	----		
Manganese, total	7439-96-5	E420/WT	mg/L	0.0515	1.05 DLHC	0.280 DLHC	0.233	0.184	----	----		
Molybdenum, total	7439-98-7	E420/WT	mg/L	0.000737	0.00178 DLHC	<0.000500 DLHC	0.000382	0.00194	----	----		
Nickel, total	7440-02-0	E420/WT	mg/L	0.00545	0.0725 DLHC	0.0101 DLHC	0.00788	0.0200	----	----		
Phosphorus, total	7723-14-0	E420/WT	mg/L	<0.050	1.11 DLHC	<0.500 DLHC	0.262	0.127	----	----		
Potassium, total	7440-09-7	E420/WT	mg/L	0.997	6.87 DLHC	2.80 DLHC	1.59	3.07	----	----		
Rubidium, total	7440-17-7	E420/WT	mg/L	0.00126	0.0234 DLHC	0.00833 DLHC	0.00625	0.00510	----	----		
Selenium, total	7782-49-2	E420/WT	mg/L	0.000130	0.000787 DLHC	<0.000500 DLHC	0.000662	0.000295	----	----		
Silicon, total	7440-21-3	E420/WT	mg/L	6.57	34.4 DLHC	14.2 DLHC	10.2	8.66	----	----		
Silver, total	7440-22-4	E420/WT	mg/L	<0.000010	<0.000100 DLHC	<0.000100 DLHC	0.000013	0.000038	----	----		
Sodium, total	7440-23-5	E420/WT	mg/L	7.08	417 DLHC	6.83 DLHC	5.37	15.2	----	----		
Strontium, total	7440-24-6	E420/WT	mg/L	0.158	1.03 DLHC	0.201 DLHC	0.167	0.211	----	----		
Sulfur, total	7704-34-9	E420/WT	mg/L	9.14	28.9 DLHC	9.14 DLHC	2.49	26.9	----	----		
Tellurium, total	13494-80-9	E420/WT	mg/L	<0.00020	<0.00200 DLHC	<0.00200 DLHC	<0.00020	<0.00020	----	----		
Thallium, total	7440-28-0	E420/WT	mg/L	0.000011	0.000212 DLHC	<0.000100 DLHC	0.000052	0.000044	----	----		
Thorium, total	7440-29-1	E420/WT	mg/L	<0.00010	0.00157 DLHC	0.00123 DLHC	0.00100	0.00062	----	----		
Tin, total	7440-31-5	E420/WT	mg/L	0.00022	<0.00100 DLHC	<0.00100 DLHC	0.00015	0.00049	----	----		
Titanium, total	7440-32-6	E420/WT	mg/L	0.00859	0.354 DLHC	0.138 DLHC	0.115	0.0607	----	----		
Tungsten, total	7440-33-7	E420/WT	mg/L	<0.00010	<0.00100 DLHC	<0.00100 DLHC	<0.00010	<0.00010	----	----		
Uranium, total	7440-61-1	E420/WT	mg/L	0.000476	0.00267 DLHC	0.000819 DLHC	0.000444	0.00200	----	----		



Analytical Results Evaluation

Matrix: Groundwater

Matrix: Groundwater				Client sample ID	BH 1	BH 3	BH 4D	BH 9	BH 4S	----	----
				Sampling date/time	01-May-2024 11:00	01-May-2024 10:30	01-May-2024 12:15	30-Apr-2024 14:10	30-Apr-2024 15:15	----	----
				Sub-Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	----	----
Analyte	CAS Number	Method/Lab	Unit	WT2410672-001	WT2410672-002	WT2410672-003	WT2410672-004	WT2410672-005	-----	-----	
Total Metals											
Vanadium, total	7440-62-2	E420/WT	mg/L	0.00086	0.0360 ^{DLHC}	0.00960 ^{DLHC}	0.00726	0.00492	----	----	
Zinc, total	7440-66-6	E420/WT	mg/L	0.0352	0.168 ^{DLHC}	0.0542 ^{DLHC}	0.0316	0.0308	----	----	
Zirconium, total	7440-67-7	E420/WT	mg/L	0.00035	<0.00200 ^{DLHC}	<0.00200 ^{DLHC}	0.00075	0.00088	----	----	
Dissolved Metals											
Calcium, dissolved	7440-70-2	E421/WT	mg/L	104	231 ^{DLHC}	106	83.1	126	----	----	
Magnesium, dissolved	7439-95-4	E421/WT	mg/L	30.0	79.1 ^{DLHC}	31.8	25.0	40.0	----	----	
Dissolved metals filtration location	----	EP421/WT	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory	----	----	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results Evaluation

Matrix: Surface Water				Client sample ID	DP 25 (SURFACE WATER)	----	----	----	----	----	----
				Sampling date/time	30-Apr-2024 16:15	----	----	----	----	----	----
				Sub-Matrix	Surface Water	----	----	----	----	----	----
Analyte	CAS Number	Method/Lab	Unit	WT2410672-006	-----	-----	-----	-----	-----	-----	-----
Physical Tests											
Alkalinity, total (as CaCO ₃)	----	E290/WT	mg/L	173	----	----	----	----	----	----	----
Colour, apparent	----	E330/WT	CU	223	----	----	----	----	----	----	----
Conductivity	----	E100/WT	µS/cm	420	----	----	----	----	----	----	----
pH	----	E108/WT	pH units	8.06	----	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162/WT	mg/L	274 ^{DLDS}	----	----	----	----	----	----	----
Turbidity	----	E121/WT	NTU	24.6	----	----	----	----	----	----	----
Hardness (as CaCO ₃), dissolved	----	EC100/WT	mg/L	193	----	----	----	----	----	----	----
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E298/WT	mg/L	0.0967	----	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl/WT	mg/L	15.9	----	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/WT	mg/L	0.050	----	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO ₃ /WT	mg/L	0.053	----	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO ₂ /WT	mg/L	<0.010	----	----	----	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	mg/L	0.224 ^{DLHC}	----	----	----	----	----	----	----
Sulfate (as SO ₄)	14808-79-8	E235.SO ₄ /WT	mg/L	28.9	----	----	----	----	----	----	----
Microbiological Tests											
Coliforms, Escherichia coli [E. coli]	----	E012A.EC/WT	CFU/100 mL	71	----	----	----	----	----	----	----
Coliforms, total	----	E012.TC/WT	CFU/100 mL	NR ^{DLM, NDGDN}	----	----	----	----	----	----	----
Total Metals											
Aluminum, total	7429-90-5	E420/WT	mg/L	1.37	----	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/WT	mg/L	0.00015	----	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/WT	mg/L	0.00140	----	----	----	----	----	----	----
Barium, total	7440-39-3	E420/WT	mg/L	0.0306	----	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/WT	mg/L	0.000062	----	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/WT	mg/L	<0.000050	----	----	----	----	----	----	----
Boron, total	7440-42-8	E420/WT	mg/L	0.035	----	----	----	----	----	----	----



Analytical Results Evaluation

Matrix: Surface Water				Client sample ID	DP 25 (SURFACE WATER)	----	----	----	----	----	----
				Sampling date/time	30-Apr-2024 16:15	----	----	----	----	----	----
				Sub-Matrix	Surface Water	----	----	----	----	----	----
Analyte	CAS Number	Method/Lab	Unit	WT2410672-006	-----	-----	-----	-----	-----	-----	-----
Total Metals											
Cadmium, total	7440-43-9	E420/WT	mg/L	0.000178	----	----	----	----	----	----	----
Calcium, total	7440-70-2	E420/WT	mg/L	55.8	----	----	----	----	----	----	----
Cesium, total	7440-46-2	E420/WT	mg/L	0.000094	----	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/WT	mg/L	0.00217	----	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/WT	mg/L	0.00143	----	----	----	----	----	----	----
Copper, total	7440-50-8	E420/WT	mg/L	0.00980	----	----	----	----	----	----	----
Iron, total	7439-89-6	E420/WT	mg/L	2.67	----	----	----	----	----	----	----
Lead, total	7439-92-1	E420/WT	mg/L	0.00175	----	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/WT	mg/L	0.0012	----	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/WT	mg/L	13.1	----	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/WT	mg/L	0.334	----	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/WT	mg/L	0.000637	----	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/WT	mg/L	0.00295	----	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/WT	mg/L	0.671	----	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/WT	mg/L	8.65	----	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/WT	mg/L	0.00314	----	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/WT	mg/L	0.000578	----	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/WT	mg/L	10.5	----	----	----	----	----	----	----
Silver, total	7440-22-4	E420/WT	mg/L	0.000014	----	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/WT	mg/L	12.5	----	----	----	----	----	----	----
Strontium, total	7440-24-6	E420/WT	mg/L	0.162	----	----	----	----	----	----	----
Sulfur, total	7704-34-9	E420/WT	mg/L	11.4	----	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/WT	mg/L	<0.00020	----	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/WT	mg/L	0.000017	----	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/WT	mg/L	0.00010	----	----	----	----	----	----	----
Tin, total	7440-31-5	E420/WT	mg/L	<0.00010	----	----	----	----	----	----	----
Titanium, total	7440-32-6	E420/WT	mg/L	0.0381	----	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/WT	mg/L	<0.00010	----	----	----	----	----	----	----



Analytical Results Evaluation

Matrix: Surface Water				Client sample ID	DP 25 (SURFACE WATER)	----	----	----	----	----	----
				Sampling date/time	30-Apr-2024 16:15	----	----	----	----	----	----
				Sub-Matrix	Surface Water	----	----	----	----	----	----
Analyte	CAS Number	Method/Lab	Unit	WT2410672-006	-----	-----	-----	-----	-----	-----	-----
Total Metals											
Uranium, total	7440-61-1	E420/WT	mg/L	0.000735	----	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/WT	mg/L	0.00458	----	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/WT	mg/L	0.0386	----	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/WT	mg/L	0.00045	----	----	----	----	----	----	----
Dissolved Metals											
Calcium, dissolved	7440-70-2	E421/WT	mg/L	55.8	----	----	----	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/WT	mg/L	13.0	----	----	----	----	----	----	----
Dissolved metals filtration location	----	EP421/WT	-	Laboratory	----	----	----	----	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



Summary of Guideline Limits

Analyte	CAS Number	Unit	ONPWQO IPWQOT2<100	ONPWQO IPWQOT2>100	ONPWQO PWQOT2<100	ONPWQO PWQOT2>100			
Physical Tests									
Alkalinity, total (as CaCO3)	----	mg/L	--	--	--	--			
Colour, apparent	----	CU	--	--	--	--			
Conductivity	----	µS/cm	--	--	--	--			
Hardness (as CaCO3), dissolved	----	mg/L	--	--	--	--			
pH	----	pH units	--	--	6.5 - 8.5 pH units	6.5 - 8.5 pH units			
Solids, total dissolved [TDS]	----	mg/L	--	--	--	--			
Turbidity	----	NTU	--	--	--	--			
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	mg/L	--	--	--	--			
Chloride	16887-00-6	mg/L	--	--	--	--			
Fluoride	16984-48-8	mg/L	--	--	--	--			
Nitrate (as N)	14797-55-8	mg/L	--	--	--	--			
Nitrite (as N)	14797-65-0	mg/L	--	--	--	--			
Phosphate, ortho-, dissolved (as P)	14265-44-2	mg/L	--	--	--	--			
Sulfate (as SO4)	14808-79-8	mg/L	--	--	--	--			
Microbiological Tests									
Coliforms, Escherichia coli [E. coli]	----	CFU/100mL	--	--	100 CFU/100mL	100 CFU/100mL			
Coliforms, total	----	CFU/100mL	--	--	--	--			
Total Metals									
Aluminum, total	7429-90-5	mg/L	0.075 mg/L	0.075 mg/L	--	--			
Antimony, total	7440-36-0	mg/L	0.02 mg/L	0.02 mg/L	--	--			
Arsenic, total	7440-38-2	mg/L	0.005 mg/L	0.005 mg/L	0.1 mg/L	0.1 mg/L			
Barium, total	7440-39-3	mg/L	--	--	--	--			
Beryllium, total	7440-41-7	mg/L	--	--	1.1 mg/L	0.011 mg/L			
Bismuth, total	7440-69-9	mg/L	--	--	--	--			
Boron, total	7440-42-8	mg/L	--	--	--	--			
Cadmium, total	7440-43-9	mg/L	0.0001 mg/L	0.0005 mg/L	0.0002 mg/L	0.0002 mg/L			
Calcium, total	7440-70-2	mg/L	--	--	--	--			
Cesium, total	7440-46-2	mg/L	--	--	--	--			
Chromium, total	7440-47-3	mg/L	--	--	--	--			
Cobalt, total	7440-48-4	mg/L	0.0009 mg/L	0.0009 mg/L	--	--			
Copper, total	7440-50-8	mg/L	0.001 mg/L	0.005 mg/L	0.005 mg/L	0.005 mg/L			
Iron, total	7439-89-6	mg/L	--	--	0.3 mg/L	0.3 mg/L			
Lead, total	7439-92-1	mg/L	0.001 mg/L	0.005 mg/L	0.005 mg/L	0.025 mg/L			
Lithium, total	7439-93-2	mg/L	--	--	--	--			



Analyte	CAS Number	Unit	ONPWQO IPWQOT2<100	ONPWQO IPWQOT2>100	ONPWQO PWQOT2<100	ONPWQO PWQOT2>100			
Total Metals - Continued									
Magnesium, total	7439-95-4	mg/L	--	--	--	--			
Manganese, total	7439-96-5	mg/L	--	--	--	--			
Molybdenum, total	7439-98-7	mg/L	0.04 mg/L	0.04 mg/L	--	--			
Nickel, total	7440-02-0	mg/L	0.025 mg/L	0.025 mg/L	0.025 mg/L	0.025 mg/L			
Phosphorus, total	7723-14-0	mg/L	0.01 mg/L	0.01 mg/L	--	--			
Potassium, total	7440-09-7	mg/L	--	--	--	--			
Rubidium, total	7440-17-7	mg/L	--	--	--	--			
Selenium, total	7782-49-2	mg/L	0.1 mg/L	--	0.1 mg/L	0.1 mg/L			
Silicon, total	7440-21-3	mg/L	--	--	--	--			
Silver, total	7440-22-4	mg/L	0.0001 mg/L	0.0001 mg/L	0.0001 mg/L	0.0001 mg/L			
Sodium, total	7440-23-5	mg/L	--	--	--	--			
Strontium, total	7440-24-6	mg/L	--	--	--	--			
Sulfur, total	7704-34-9	mg/L	--	--	--	--			
Tellurium, total	13494-80-9	mg/L	--	--	--	--			
Thallium, total	7440-28-0	mg/L	0.0003 mg/L	0.0003 mg/L	--	--			
Thorium, total	7440-29-1	mg/L	--	--	--	--			
Tin, total	7440-31-5	mg/L	--	--	--	--			
Titanium, total	7440-32-6	mg/L	--	--	--	--			
Tungsten, total	7440-33-7	mg/L	0.03 mg/L	0.03 mg/L	--	--			
Uranium, total	7440-61-1	mg/L	0.005 mg/L	0.005 mg/L	--	--			
Vanadium, total	7440-62-2	mg/L	0.006 mg/L	0.006 mg/L	--	--			
Zinc, total	7440-66-6	mg/L	0.02 mg/L	0.02 mg/L	0.03 mg/L	0.03 mg/L			
Zirconium, total	7440-67-7	mg/L	0.004 mg/L	0.004 mg/L	--	--			
Dissolved Metals									
Calcium, dissolved	7440-70-2	mg/L	--	--	--	--			
Dissolved metals filtration location	----	-	--	--	--	--			
Magnesium, dissolved	7439-95-4	mg/L	--	--	--	--			

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

Key:

ONPWQO	Ontario PWQO (Provincial Water Quality Objectives, JULY, 1994)
IPWQOT2<100	Surface Water T2 Interim PWQOs (Hardness < 100 mg/L)
IPWQOT2>100	Surface Water T2 Interim PWQOs (Hardness > 100 mg/L)
PWQOT2<100	Surface Water T2 PWQOs (Hardness < 100 mg/L)
PWQOT2>100	Surface Water T2 PWQOs (Hardness > 100 mg/L)

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WT2410672	Page	: 1 of 19
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650	Date Samples Received	: 01-May-2024 14:30
PO	: ----	Issue Date	: 07-May-2024 18:12
C-O-C number	: 17-620411		
Sampler	: R. Soknic		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 6		
No. of samples analysed	: 6		

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 Matrix Spike 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)

- Analysis Holding Time Outliers exist - please see following pages for full details.

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: **Water**

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

Analyte Group : Analytical / Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] BH 1	E298	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] BH 3	E298	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] BH 4D	E298	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] BH 4S	E298	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] BH 9	E298	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] DP 25 (SURFACE WATER)	E298	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] BH 1	E235.Cl	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] BH 3	E235.Cl	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] BH 4D	E235.Cl	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] BH 4S	E235.Cl	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] BH 9	E235.Cl	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E235.Cl	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] BH 1	E378-U	01-May-2024	04-May-2024	7 days	3 days	✓	06-May-2024	7 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] BH 3	E378-U	01-May-2024	04-May-2024	7 days	3 days	✓	06-May-2024	7 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] BH 4D	E378-U	01-May-2024	04-May-2024	7 days	3 days	✓	06-May-2024	7 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] BH 4S	E378-U	30-Apr-2024	04-May-2024	7 days	4 days	✓	06-May-2024	7 days	6 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] BH 9	E378-U	30-Apr-2024	04-May-2024	7 days	4 days	✔	06-May-2024	7 days	6 days	✔
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E378-U	30-Apr-2024	04-May-2024	7 days	4 days	✔	06-May-2024	7 days	6 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] BH 1	E235.F	01-May-2024	03-May-2024	28 days	2 days	✔	03-May-2024	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] BH 3	E235.F	01-May-2024	03-May-2024	28 days	2 days	✔	03-May-2024	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] BH 4D	E235.F	01-May-2024	03-May-2024	28 days	2 days	✔	03-May-2024	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] BH 4S	E235.F	30-Apr-2024	03-May-2024	28 days	3 days	✔	03-May-2024	28 days	3 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] BH 9	E235.F	30-Apr-2024	03-May-2024	28 days	3 days	✔	03-May-2024	28 days	3 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E235.F	30-Apr-2024	03-May-2024	28 days	3 days	✔	03-May-2024	28 days	3 days	✔
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] BH 1	E235.NO3	01-May-2024	03-May-2024	7 days	2 days	✔	03-May-2024	7 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] BH 3	E235.NO3	01-May-2024	03-May-2024	7 days	2 days	✓	03-May-2024	7 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] BH 4D	E235.NO3	01-May-2024	03-May-2024	7 days	2 days	✓	03-May-2024	7 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] BH 4S	E235.NO3	30-Apr-2024	03-May-2024	7 days	3 days	✓	03-May-2024	7 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] BH 9	E235.NO3	30-Apr-2024	03-May-2024	7 days	3 days	✓	03-May-2024	7 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E235.NO3	30-Apr-2024	03-May-2024	7 days	3 days	✓	03-May-2024	7 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] BH 1	E235.NO2	01-May-2024	03-May-2024	7 days	2 days	✓	03-May-2024	7 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] BH 3	E235.NO2	01-May-2024	03-May-2024	7 days	2 days	✓	03-May-2024	7 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] BH 4D	E235.NO2	01-May-2024	03-May-2024	7 days	2 days	✓	03-May-2024	7 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] BH 4S	E235.NO2	30-Apr-2024	03-May-2024	7 days	3 days	✓	03-May-2024	7 days	3 days	✓



Matrix: **Water** 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	
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] BH 9	E235.NO2	30-Apr-2024	03-May-2024	7 days	3 days	✓	03-May-2024	7 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E235.NO2	30-Apr-2024	03-May-2024	7 days	3 days	✓	03-May-2024	7 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] BH 1	E235.SO4	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] BH 3	E235.SO4	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] BH 4D	E235.SO4	01-May-2024	03-May-2024	28 days	2 days	✓	03-May-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] BH 4S	E235.SO4	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] BH 9	E235.SO4	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E235.SO4	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE [ON MECP] BH 4D	E421	01-May-2024	03-May-2024	0 hrs	53 hrs	✖ UCP	03-May-2024	0 hrs	53 hrs	✖ UCP



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE [ON MECP] BH 1	E421	01-May-2024	03-May-2024	0 hrs	54 hrs	✖ UCP	03-May-2024	0 hrs	54 hrs	✖ UCP	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE [ON MECP] BH 3	E421	01-May-2024	03-May-2024	0 hrs	54 hrs	✖ UCP	03-May-2024	0 hrs	54 hrs	✖ UCP	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE [ON MECP] DP 25 (SURFACE WATER)	E421	30-Apr-2024	03-May-2024	0 hrs	73 hrs	✖ UCP	03-May-2024	0 hrs	73 hrs	✖ UCP	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE [ON MECP] BH 4S	E421	30-Apr-2024	03-May-2024	0 hrs	74 hrs	✖ UCP	03-May-2024	0 hrs	74 hrs	✖ UCP	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE [ON MECP] BH 9	E421	30-Apr-2024	03-May-2024	0 hrs	75 hrs	✖ UCP	03-May-2024	0 hrs	75 hrs	✖ UCP	
Microbiological Tests : E. coli (MF-mFC-BCIG)											
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 1	E012A.EC	01-May-2024	----	----	----		02-May-2024	48 hrs	21 hrs	✔	
Microbiological Tests : E. coli (MF-mFC-BCIG)											
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 4D	E012A.EC	01-May-2024	----	----	----		02-May-2024	48 hrs	21 hrs	✔	
Microbiological Tests : E. coli (MF-mFC-BCIG)											
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 3	E012A.EC	01-May-2024	----	----	----		02-May-2024	48 hrs	23 hrs	✔	
Microbiological Tests : E. coli (MF-mFC-BCIG)											
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 4S	E012A.EC	30-Apr-2024	----	----	----		02-May-2024	48 hrs	41 hrs	✔	



Matrix: **Water** 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	
Microbiological Tests : E. coli (MF-mFC-BCIG)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] DP 25 (SURFACE WATER)	E012A.EC	30-Apr-2024	----	----	----		02-May-2024	48 hrs	41 hrs	✓
Microbiological Tests : E. coli (MF-mFC-BCIG)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 9	E012A.EC	30-Apr-2024	----	----	----		02-May-2024	48 hrs	42 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 1	E012.TC	01-May-2024	----	----	----		02-May-2024	48 hrs	21 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 4D	E012.TC	01-May-2024	----	----	----		02-May-2024	48 hrs	21 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 3	E012.TC	01-May-2024	----	----	----		02-May-2024	48 hrs	23 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 4S	E012.TC	30-Apr-2024	----	----	----		02-May-2024	48 hrs	41 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] DP 25 (SURFACE WATER)	E012.TC	30-Apr-2024	----	----	----		02-May-2024	48 hrs	41 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] BH 9	E012.TC	30-Apr-2024	----	----	----		02-May-2024	48 hrs	42 hrs	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] BH 1	E290	01-May-2024	03-May-2024	14 days	2 days	✓	04-May-2024	14 days	3 days	✓



Matrix: **Water** 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	
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] BH 3	E290	01-May-2024	03-May-2024	14 days	2 days	✓	04-May-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] BH 4D	E290	01-May-2024	03-May-2024	14 days	2 days	✓	04-May-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] BH 4S	E290	30-Apr-2024	03-May-2024	14 days	3 days	✓	03-May-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] BH 9	E290	30-Apr-2024	03-May-2024	14 days	3 days	✓	03-May-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E290	30-Apr-2024	03-May-2024	14 days	3 days	✓	04-May-2024	14 days	4 days	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] BH 4D	E330	01-May-2024	----	----	----		03-May-2024	48 hrs	49 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] BH 1	E330	01-May-2024	----	----	----		03-May-2024	48 hrs	50 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] BH 3	E330	01-May-2024	----	----	----		03-May-2024	48 hrs	51 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E330	30-Apr-2024	----	----	----		03-May-2024	48 hrs	69 hrs	✖ EHT



Matrix: **Water** 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	
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] BH 4S	E330	30-Apr-2024	----	----	----		03-May-2024	48 hrs	70 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] BH 9	E330	30-Apr-2024	----	----	----		03-May-2024	48 hrs	71 hrs	✖ EHT
Physical Tests : Conductivity in Water										
HDPE [ON MECP] BH 1	E100	01-May-2024	03-May-2024	28 days	2 days	✓	04-May-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] BH 3	E100	01-May-2024	03-May-2024	28 days	2 days	✓	04-May-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] BH 4D	E100	01-May-2024	03-May-2024	28 days	2 days	✓	04-May-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] BH 4S	E100	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] BH 9	E100	30-Apr-2024	03-May-2024	28 days	3 days	✓	03-May-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E100	30-Apr-2024	03-May-2024	28 days	3 days	✓	04-May-2024	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] BH 1	E108	01-May-2024	03-May-2024	14 days	2 days	✓	04-May-2024	14 days	3 days	✓



Matrix: **Water** 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	
Physical Tests : pH by Meter										
HDPE [ON MECP] BH 3	E108	01-May-2024	03-May-2024	14 days	2 days	✓	04-May-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] BH 4D	E108	01-May-2024	03-May-2024	14 days	2 days	✓	04-May-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] BH 4S	E108	30-Apr-2024	03-May-2024	14 days	3 days	✓	03-May-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] BH 9	E108	30-Apr-2024	03-May-2024	14 days	3 days	✓	03-May-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E108	30-Apr-2024	03-May-2024	14 days	3 days	✓	04-May-2024	14 days	4 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] BH 1	E162	01-May-2024	----	----	----		03-May-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] BH 3	E162	01-May-2024	----	----	----		03-May-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] BH 4D	E162	01-May-2024	----	----	----		03-May-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] BH 4S	E162	30-Apr-2024	----	----	----		03-May-2024	7 days	3 days	✓



Matrix: **Water** 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	
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] BH 9	E162	30-Apr-2024	----	----	----		03-May-2024	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E162	30-Apr-2024	----	----	----		03-May-2024	7 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] DP 25 (SURFACE WATER)	E121	30-Apr-2024	----	----	----		02-May-2024	48 hrs	43 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] BH 4S	E121	30-Apr-2024	----	----	----		02-May-2024	48 hrs	44 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] BH 9	E121	30-Apr-2024	----	----	----		02-May-2024	48 hrs	45 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] BH 4D	E121	01-May-2024	----	----	----		03-May-2024	48 hrs	46 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] BH 1	E121	01-May-2024	----	----	----		03-May-2024	48 hrs	47 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] BH 3	E121	01-May-2024	----	----	----		03-May-2024	48 hrs	48 hrs	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) BH 1	E420	01-May-2024	01-May-2024	180 days	0 days	✓	02-May-2024	180 days	1 days	✓



Matrix: **Water** 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	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) BH 3	E420	01-May-2024	01-May-2024	180 days	0 days	✓	02-May-2024	180 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) BH 4D	E420	01-May-2024	01-May-2024	180 days	0 days	✓	02-May-2024	180 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) BH 4S	E420	30-Apr-2024	01-May-2024	180 days	1 days	✓	02-May-2024	180 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) BH 9	E420	30-Apr-2024	01-May-2024	180 days	1 days	✓	02-May-2024	180 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DP 25 (SURFACE WATER)	E420	30-Apr-2024	01-May-2024	180 days	1 days	✓	02-May-2024	180 days	2 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

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

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.



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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1427263	2	27	7.4	5.0	✓
Ammonia by Fluorescence	E298	1426790	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1427269	2	31	6.4	5.0	✓
Colour (Apparent) by Spectrometer	E330	1427423	1	15	6.6	5.0	✓
Conductivity in Water	E100	1427264	2	19	10.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1427771	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1428579	1	20	5.0	5.0	✓
E. coli (MF-mFC-BCIG)	E012A.EC	1425179	3	42	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1427268	2	14	14.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1427266	2	31	6.4	5.0	✓
Nitrite in Water by IC	E235.NO2	1427267	2	19	10.5	5.0	✓
pH by Meter	E108	1427262	2	31	6.4	5.0	✓
Sulfate in Water by IC	E235.SO4	1427265	2	25	8.0	5.0	✓
TDS by Gravimetry	E162	1427819	1	20	5.0	5.0	✓
Total Coliforms (MF-mEndo)	E012.TC	1425180	0	10	0.0	5.0	✗
Total Metals in Water by CRC ICPMS	E420	1424540	1	12	8.3	5.0	✓
Turbidity by Nephelometry	E121	1425427	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1427263	2	27	7.4	5.0	✓
Ammonia by Fluorescence	E298	1426790	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1427269	2	31	6.4	5.0	✓
Colour (Apparent) by Spectrometer	E330	1427423	1	15	6.6	5.0	✓
Conductivity in Water	E100	1427264	2	19	10.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1427771	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1428579	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1427268	2	14	14.2	5.0	✓
Nitrate in Water by IC	E235.NO3	1427266	2	31	6.4	5.0	✓
Nitrite in Water by IC	E235.NO2	1427267	2	19	10.5	5.0	✓
pH by Meter	E108	1427262	2	31	6.4	5.0	✓
Sulfate in Water by IC	E235.SO4	1427265	2	25	8.0	5.0	✓
TDS by Gravimetry	E162	1427819	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1424540	1	12	8.3	5.0	✓
Turbidity by Nephelometry	E121	1425427	2	40	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1427263	2	27	7.4	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
Ammonia by Fluorescence	E298	1426790	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1427269	2	31	6.4	5.0	✔
Colour (Apparent) by Spectrometer	E330	1427423	1	15	6.6	5.0	✔
Conductivity in Water	E100	1427264	2	19	10.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1427771	1	10	10.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1428579	1	20	5.0	5.0	✔
E. coli (MF-mFC-BCIG)	E012A.EC	1425179	3	42	7.1	5.0	✔
Fluoride in Water by IC	E235.F	1427268	2	14	14.2	5.0	✔
Nitrate in Water by IC	E235.NO3	1427266	2	31	6.4	5.0	✔
Nitrite in Water by IC	E235.NO2	1427267	2	19	10.5	5.0	✔
Sulfate in Water by IC	E235.SO4	1427265	2	25	8.0	5.0	✔
TDS by Gravimetry	E162	1427819	1	20	5.0	5.0	✔
Total Coliforms (MF-mEndo)	E012.TC	1425180	2	10	20.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1424540	1	12	8.3	5.0	✔
Turbidity by Nephelometry	E121	1425427	2	40	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1426790	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1427269	2	31	6.4	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1427771	1	10	10.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1428579	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1427268	2	14	14.2	5.0	✔
Nitrate in Water by IC	E235.NO3	1427266	2	31	6.4	5.0	✔
Nitrite in Water by IC	E235.NO2	1427267	2	19	10.5	5.0	✔
Sulfate in Water by IC	E235.SO4	1427265	2	25	8.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1424540	1	12	8.3	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
Total Coliforms (MF-mEndo)	E012.TC ALS Environmental - Waterloo	Water	APHA 9222B (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
E. coli (MF-mFC-BCIG)	E012A.EC ALS Environmental - Waterloo	Water	ON E3433 (mod)	Following filtration (0.45 µm), and incubation at 44.5±0.2°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated.
Conductivity in Water	E100 ALS Environmental - Waterloo	Water	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 water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Waterloo	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Waterloo	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Waterloo	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (Apparent) by Spectrometer	E330 ALS Environmental - Waterloo	Water	APHA 2120 C (mod)	Colour (Apparent) is measured in an unfiltered sample spectrophotometrically using the single wavelength method. The colour contribution of settleable solids are not included in the result. This method is intended for potable waters. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Waterloo	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Waterloo	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Waterloo	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Waterloo	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

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Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Waterloo	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: WT2410672	Page	: 1 of 13
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650	Date Samples Received	: 01-May-2024 14:30
PO	: ----	Date Analysis Commenced	: 01-May-2024
C-O-C number	: 17-620411	Issue Date	: 07-May-2024 18:13
Sampler	: R. Soknic		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 6		
No. of samples analysed	: 6		

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
- Matrix Spike (MS) 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
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Kaitlyn Lammers	Lab Assistant	Waterloo Microbiology, Waterloo, Ontario
Nik Perkio	Inorganics Analyst	Waterloo Inorganics, Waterloo, Ontario
Nik Perkio	Inorganics Analyst	Waterloo Metals, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario

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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: Water					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: 1425427)											
WT2410568-001	Anonymous	Turbidity	----	E121	0.10	NTU	28.8	29.2	1.38%	15%	----
Physical Tests (QC Lot: 1426953)											
WT2410672-001	BH 1	Turbidity	----	E121	0.10	NTU	52.8	51.0	3.46%	15%	----
Physical Tests (QC Lot: 1427262)											
WT2410759-001	Anonymous	pH	----	E108	0.10	pH units	7.83	7.78	0.641%	4%	----
Physical Tests (QC Lot: 1427263)											
WT2410759-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	292	292	0.150%	20%	----
Physical Tests (QC Lot: 1427264)											
WT2410759-001	Anonymous	Conductivity	----	E100	1.0	µS/cm	628	629	0.159%	10%	----
Physical Tests (QC Lot: 1427331)											
WT2410698-001	Anonymous	pH	----	E108	0.10	pH units	7.64	7.64	0.00%	4%	----
Physical Tests (QC Lot: 1427332)											
WT2410698-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	924	933	0.969%	10%	----
Physical Tests (QC Lot: 1427333)											
WT2410683-002	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	11.2	10.8	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 1427423)											
WT2410683-002	Anonymous	Colour, apparent	----	E330	2.0	CU	3.6	4.4	0.9	Diff <2x LOR	----
Physical Tests (QC Lot: 1427819)											
WT2410536-001	Anonymous	Solids, total dissolved [TDS]	----	E162	13	mg/L	24	21	3	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1426790)											
HA2400887-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0500	mg/L	0.531	0.524	1.34%	20%	----
Anions and Nutrients (QC Lot: 1427265)											
WT2410907-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	18.6	18.6	0.0979%	20%	----
Anions and Nutrients (QC Lot: 1427266)											
WT2410907-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.237	0.238	0.152%	20%	----
Anions and Nutrients (QC Lot: 1427267)											
WT2410907-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1427268)											
WT2410907-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1427269)											

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 Client : Chung and Vander Doelen Engineering Ltd.
 Project : 1650



Sub-Matrix: Water					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
Anions and Nutrients (QC Lot: 1427269) - continued											
WT2410907-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	16.9	16.9	0.0711%	20%	----
Anions and Nutrients (QC Lot: 1427334)											
WT2410672-001	BH 1	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.055	0.052	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1427335)											
WT2410672-001	BH 1	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	8.70	8.74	0.469%	20%	----
Anions and Nutrients (QC Lot: 1427336)											
WT2410672-001	BH 1	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1427337)											
WT2410672-001	BH 1	Chloride	16887-00-6	E235.Cl	0.50	mg/L	5.94	5.80	2.32%	20%	----
Anions and Nutrients (QC Lot: 1427338)											
WT2410672-001	BH 1	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	25.1	25.2	0.320%	20%	----
Anions and Nutrients (QC Lot: 1428579)											
WT2410497-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1425179)											
WT2410637-001	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1425312)											
WT2410568-003	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	23	23	0.00%	65%	----
Microbiological Tests (QC Lot: 1427424)											
WT2410824-001	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	6	5	18.2%	65%	----
Total Metals (QC Lot: 1424540)											
WT2410668-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0300	mg/L	0.629	0.619	1.63%	20%	----
		Antimony, total	7440-36-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00100	mg/L	0.00354	0.00331	0.00022	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00100	mg/L	0.110	0.112	2.43%	20%	----
		Beryllium, total	7440-41-7	E420	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.100	mg/L	2.73	2.80	2.62%	20%	----
		Cadmium, total	7440-43-9	E420	0.0000500	mg/L	<0.0000500	<0.0000500	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.500	mg/L	425	438	2.92%	20%	----
		Cesium, total	7440-46-2	E420	0.000100	mg/L	0.000434	0.000427	0.000007	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00100	mg/L	0.00658	0.00630	0.00028	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.100	mg/L	0.850	0.861	0.011	Diff <2x LOR	----



Sub-Matrix: Water					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
Total Metals (QC Lot: 1424540) - continued											
WT2410668-001	Anonymous	Lead, total	7439-92-1	E420	0.000500	mg/L	0.00108	0.00104	0.000034	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0100	mg/L	0.370	0.369	0.210%	20%	----
		Magnesium, total	7439-95-4	E420	0.0500	mg/L	187	187	0.275%	20%	----
		Manganese, total	7439-96-5	E420	0.00100	mg/L	0.0748	0.0726	3.00%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000500	mg/L	0.0154	0.0151	2.30%	20%	----
		Nickel, total	7440-02-0	E420	0.00500	mg/L	0.0344	0.0352	0.00084	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.500	mg/L	<0.500	<0.500	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.500	mg/L	53.9	52.2	3.28%	20%	----
		Rubidium, total	7440-17-7	E420	0.00200	mg/L	0.0507	0.0491	3.06%	20%	----
		Selenium, total	7782-49-2	E420	0.000500	mg/L	0.00104	0.000862	0.000182	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	1.00	mg/L	5.34	5.19	0.15	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.500	mg/L	986	956	3.02%	20%	----
		Strontium, total	7440-24-6	E420	0.00200	mg/L	19.2	19.1	0.630%	20%	----
		Sulfur, total	7704-34-9	E420	5.00	mg/L	456	454	0.436%	20%	----
		Tellurium, total	13494-80-9	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000100	mg/L	0.000577	0.000587	0.000010	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00100	mg/L	0.00113	0.00116	0.00003	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0200	mg/L	<0.0200	0.0205	0.0205	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000100	mg/L	0.00420	0.00408	2.69%	20%	----
		Vanadium, total	7440-62-2	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0300	mg/L	<0.0300	<0.0300	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1427771)											
WT2410672-001	BH 1	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	104	107	2.79%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	30.0	29.9	0.112%	20%	----



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: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1425427)						
Turbidity	---	E121	0.1	NTU	<0.10	---
Physical Tests (QCLot: 1426953)						
Turbidity	---	E121	0.1	NTU	<0.10	---
Physical Tests (QCLot: 1427263)						
Alkalinity, total (as CaCO ₃)	---	E290	1	mg/L	1.0	---
Physical Tests (QCLot: 1427264)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1427332)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1427333)						
Alkalinity, total (as CaCO ₃)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1427423)						
Colour, apparent	---	E330	2	CU	<2.0	---
Physical Tests (QCLot: 1427819)						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
Anions and Nutrients (QCLot: 1426790)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1427265)						
Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1427266)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1427267)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1427268)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1427269)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1427334)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1427335)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1427336)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1427336) - continued						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1427337)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1427338)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1428579)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Microbiological Tests (QCLot: 1425179)						
Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1425180)						
Coliforms, total	----	E012.TC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1425296)						
Coliforms, total	----	E012.TC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1425312)						
Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1427424)						
Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	<1	----
Total Metals (QCLot: 1424540)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1424540) - continued						
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1427771)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----



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: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1425427)									
Turbidity	----	E121	0.1	NTU	200 NTU	103	85.0	115	----
Physical Tests (QCLot: 1426953)									
Turbidity	----	E121	0.1	NTU	200 NTU	99.0	85.0	115	----
Physical Tests (QCLot: 1427262)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1427263)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	106	85.0	115	----
Physical Tests (QCLot: 1427264)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	103	90.0	110	----
Physical Tests (QCLot: 1427331)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1427332)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 1427333)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	99.4	85.0	115	----
Physical Tests (QCLot: 1427423)									
Colour, apparent	----	E330	2	CU	25 CU	112	70.0	130	----
Physical Tests (QCLot: 1427819)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	85.4	85.0	115	----
Anions and Nutrients (QCLot: 1426790)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1427265)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1427266)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	97.6	90.0	110	----
Anions and Nutrients (QCLot: 1427267)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	95.3	90.0	110	----
Anions and Nutrients (QCLot: 1427268)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	96.0	90.0	110	----
Anions and Nutrients (QCLot: 1427269)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1427334)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.8	90.0	110	----
Anions and Nutrients (QCLot: 1427335)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	97.8	90.0	110	----
Anions and Nutrients (QCLot: 1427336)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1427337)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	97.9	90.0	110	----
Anions and Nutrients (QCLot: 1427338)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1428579)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.031 mg/L	107	80.0	120	----
Total Metals (QCLot: 1424540)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	108	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	106	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	110	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.012 mg/L	108	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	106	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	108	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	100	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	105	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	103	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.002 mg/L	104	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.012 mg/L	107	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.012 mg/L	104	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.012 mg/L	106	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	109	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	104	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.012 mg/L	103	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	108	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.012 mg/L	106	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.012 mg/L	105	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	104	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	103	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	106	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1424540) - continued									
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	106	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	111	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	96.8	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	107	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.012 mg/L	102	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	106	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	106	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	99.6	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	104	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.012 mg/L	105	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0 mg/L	104	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	108	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	105	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	98.3	80.0	120	----
Dissolved Metals (QCLot: 1427771)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	2.5 mg/L	101	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	2.5 mg/L	103	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1426790)										
HA2400887-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1427265)										
WT2410907-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1427266)										
WT2410907-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.54 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1427267)										
WT2410907-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.476 mg/L	0.5 mg/L	95.2	75.0	125	----
Anions and Nutrients (QCLot: 1427268)										
WT2410907-001	Anonymous	Fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1427269)										
WT2410907-001	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1427334)										
WT2410672-001	BH 1	Fluoride	16984-48-8	E235.F	0.850 mg/L	1 mg/L	85.0	75.0	125	----
Anions and Nutrients (QCLot: 1427335)										
WT2410672-001	BH 1	Nitrate (as N)	14797-55-8	E235.NO3	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1427336)										
WT2410672-001	BH 1	Nitrite (as N)	14797-65-0	E235.NO2	0.479 mg/L	0.5 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 1427337)										
WT2410672-001	BH 1	Chloride	16887-00-6	E235.Cl	95.9 mg/L	100 mg/L	95.9	75.0	125	----
Anions and Nutrients (QCLot: 1427338)										
WT2410672-001	BH 1	Sulfate (as SO4)	14808-79-8	E235.SO4	96.0 mg/L	100 mg/L	96.0	75.0	125	----
Anions and Nutrients (QCLot: 1428579)										
WT2410497-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0188 mg/L	0.02 mg/L	95.9	70.0	130	----
Total Metals (QCLot: 1424540)										
WT2410672-001	BH 1	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0528 mg/L	0.05 mg/L	106	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0542 mg/L	0.05 mg/L	108	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.00494 mg/L	0.005 mg/L	98.8	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0500 mg/L	0.05 mg/L	100.0	70.0	130	----
		Boron, total	7440-42-8	E420	0.048 mg/L	0.05 mg/L	95.9	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00509 mg/L	0.005 mg/L	102	70.0	130	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Total Metals (QCLot: 1424540) - continued										
WT2410672-001	BH 1	Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00262 mg/L	0.002 mg/L	105	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0130 mg/L	0.012 mg/L	104	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0123 mg/L	0.012 mg/L	98.7	70.0	130	----
		Copper, total	7440-50-8	E420	0.0122 mg/L	0.012 mg/L	98.0	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0243 mg/L	0.025 mg/L	97.3	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0121 mg/L	0.012 mg/L	96.5	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0134 mg/L	0.012 mg/L	107	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0242 mg/L	0.025 mg/L	96.8	70.0	130	----
		Phosphorus, total	7723-14-0	E420	0.552 mg/L	0.5 mg/L	110	70.0	130	----
		Potassium, total	7440-09-7	E420	2.49 mg/L	2.5 mg/L	99.8	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.00540 mg/L	0.005 mg/L	108	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0523 mg/L	0.05 mg/L	104	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00473 mg/L	0.005 mg/L	94.6	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.00516 mg/L	0.005 mg/L	103	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0496 mg/L	0.05 mg/L	99.2	70.0	130	----
		Thorium, total	7440-29-1	E420	0.00495 mg/L	0.005 mg/L	99.0	70.0	130	----
		Tin, total	7440-31-5	E420	0.0262 mg/L	0.025 mg/L	105	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0125 mg/L	0.012 mg/L	100	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.00504 mg/L	0.005 mg/L	101	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0265 mg/L	0.025 mg/L	106	70.0	130	----
		Zinc, total	7440-66-6	E420	ND mg/L	----	ND	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.00485 mg/L	0.005 mg/L	96.9	70.0	130	----
Dissolved Metals (QCLot: 1427771)										
WT2410672-002	BH 3	Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----



N-767

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical
Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 - 620411

Page

Environmental Division
Waterloo

Work Order Reference

WT2410672



Telephone : +1 519 886 6910

Report To		Report Format / Distribution		Select Service Level Below - Contact your AM to c	
Contact and company name below will appear on the final report		Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)		Regular [R] ☒ Standard TAT if received by 3 pm -	
Company:	Chung and Vander Doelen	Quality Control (QC) Report with Report ☒ YES ☐ NO		4 day [P4-20%] ☐	
Contact:	Yaroslav Chudin	☐ Compare Results to Criteria on Report - provide details below if box checked		3 day [P3-25%] ☐	
Phone:	519-717-1867	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX		2 day [P2-50%] ☐	
Company address below will appear on the final report		Email 1 or Fax yaroslav.chudin@cvsengineering.com		1 Business d	
Street:	311 Victoria St. N.	Email 2 r.soknic@cvsengineering.com		Same Day, We	
City/Province:	Kitchener, ON	Email 3 peter.dora@cvsengineering.com		(Laboratory o	
Postal Code:	N2H 5E1				
Invoice To	Same as Report To ☒ YES ☐ NO	Invoice Distribution		Indicate Filtered (F), Preserved (P) or Filtered and F	
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX			
Company:		Email 1 or Fax ap@cvsengineering.com			
Contact:		Email 2			
Project Information		Oil and Gas Required Fields (client use)			
ALS Account # / Quote #:		AFE/Cost Center:		PO#	
Job #:		Major/Minor Code:		Routing Code:	
PO / AFE:		Requisitioner:			
LSD:		Location:			
ALS Lab Work Order # (lab use only): WT2410672		ALS Contact: Andrew Martin		Sampler: Rade Soknic	
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	
	BH 1	01-05-24	11:00am	GW	
	BH 3	01-05-24	10:30am	GW	
	BH 4D	01-05-24	12:15pm	GW	
	BH 9	30-04-24	2:10pm	GW	
	BH 45	30-04-24	3:15pm	GW	
	DP 25 (surface water)	30-04-24	4:15pm	GW	
Drinking Water (DW) Samples ¹ (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)	
Are samples taken from a Regulated DW System? ☐ YES ☒ NO		PWQO		Frozen ☐ SIF Observations Yes ☐ No ☐	
Are samples for human consumption/ use? ☐ YES ☒ NO				Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐	
				Cooling Initiated ☒	
				INITIAL COOLER TEMPERATURES °C	
				FINAL COOLER TEMPERATURES °C	
				12.8	
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)	
Released by:	Date:	Time:	Received by:	Date:	Time:
Rade Soknic	May 1, 2024	1:55pm		01-May-24	14:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2011 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX F

2024 Door-To-Door Private Well Inventory Study

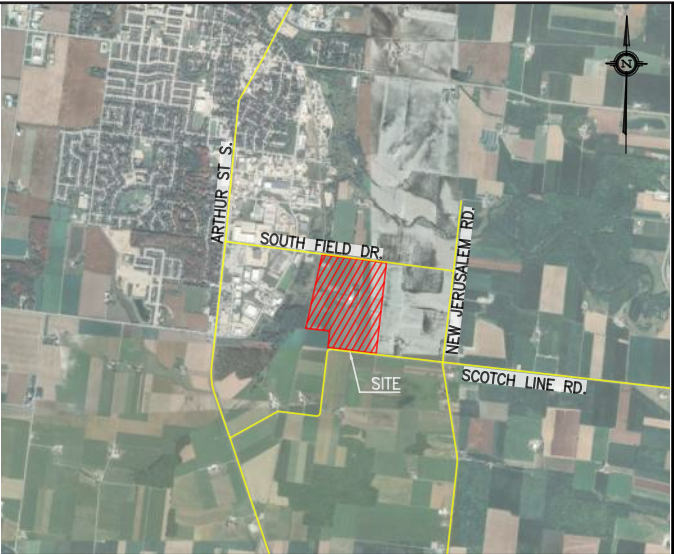
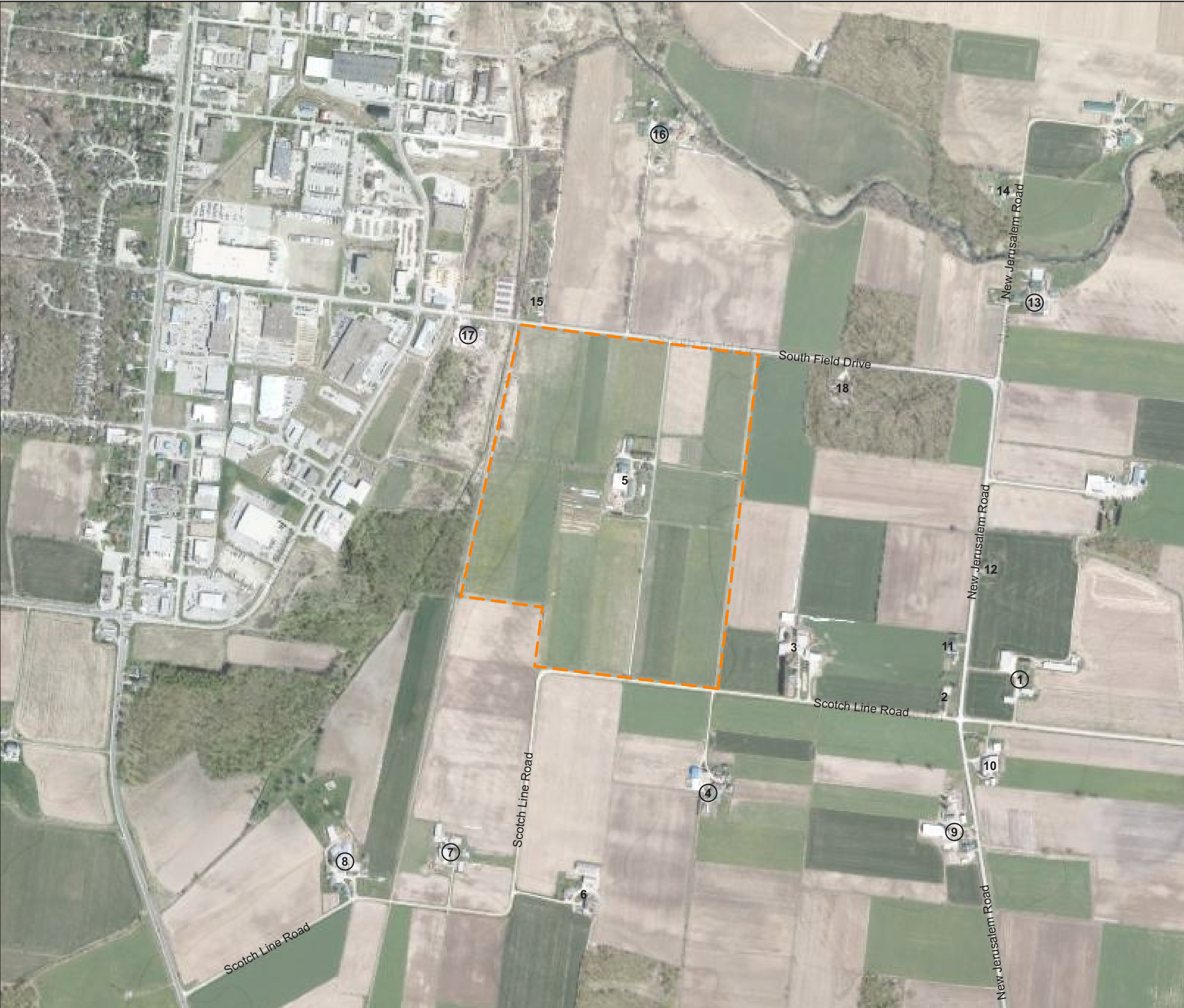


Table 2: 2024 Door-To-Door Private Well Inventory

1665 Scotch Line, Elmira
CVD Engineering
Project: 1650

Total Homes: 11

Property Address	Inventory Number	Potential MECP Well Record (WR) #	Well Type	Wellhead	Potential Depth (ft)	Quality (Well Owner Comments)	Quantity (Well Owner Comments)	CVD Sampled	Septic System (Location, Comments)	General Comments
Scotch Line Road										
1475	1	6509764 (A000883)	Drilled	Pitless	77' (23.5 m) - WR 80' to 90' - Owner	Good	Good	Yes	3 total? -2 east of house -1 beside barn closest to road	1 well in front of house. 1 well in front of barn further from road.
1505 (School)	2	6502754	Drilled	Pitless	88' (26.8 m)	Good, but hard Slight taste	Good	No	West of front of house -extends into field.	Well east of front of house. Uses a UV light.
1575	3	6502755 (A200164)	Drilled	Pitless	104' (31.7 m)	Good, but hard	Good	No	South of house	Well in front of barn
1622	4		Dug	Pit?	40' (12.2 m)	Good	Good	Yes	2 total -1 north of house -1 west of house	Well in front of house. UV previously used.
			Drilled	Pitless	90' (27.4 m)			No		Well in front of barn.
1665	5	6502756 (and 7262649?)			102' (31.1 m)			-		
1814	6	6505069 (and 7369359?)	Drilled	Pitless	132' (40.2 m)	Good	Good	No	By rocks in field? Recently installed.	No filters, but uses UV light.
1857	7	6508824	Drilled	Pitless	110' (33.5 m) - WR 130' (39.6 m) - Owner	Good	Good	Yes	East of house (by front of house)	Dairy farmers using softener. 12 gal/min pumping rate.
1903	8		Drilled?	Pitless?		Good	Good	Yes	West of front side of house	Well inside house (northeast corner of home). Dairy farmers using softener.
New Jerusalem Road										
2240	9	6502758	Drilled	Pit	75' (22.9 m)	Good Owner satisfied with water	Good	Yes	Southwest corner of house.	Well east (front) of house.
2299	10		Drilled	Pitless		Good	Good	No	West of house (behind house).	Well east (front) of house.
2344	11	-	-	-	-	-	-	-	-	No well on property - recieves water from Civic No. 1505 Scotch Line Road.
2371	12	6503018?			60'? (18.3 m?)			No		Owner refused to talk.
2477	13	7346364	Drilled	Pitless	72' (21.9 m)	Good, but hard	Good	Yes	North (behind) house.	Well UV treated - had bacteria 1.5 years ago.
2544	14	6504528 (and 7144267?)			60' to 66'? (18.3 to 20.1 m?)			No		Owner not at home.
South Field Drive										
110	15							No		Owner not at home.
144	16	6507137	Drilled	Pitless	65' (19.8 m)	Good	Good	Yes	West of house.	Old 50' drilled well plugged, chlorinated and filled with "holeplug" due to nitrogen runoff. Water not treated.
95	17	6507241	Drilled	Pitless	51' (15.5 m)	Smells like sulphur	Good	Yes	North (front) of building.	Water for (half of?) building is filtered through reverse osmosis.
289	18	6504647			145' (44.2 m)			No		Owner not at home.



LEGEND

- 1665 Scotch Line Road Property Boundary
- 1** Inventory Number
(see Table 2 in Appendix F for inventory details)
- Private well sampled for Nitrate and Chloride

0 250 500 m
Scale 1:10,000

Image Reference: Region of Waterloo; ESRI; GIS Locator Retrieved November 26, 2024

Figure 6:
Private Well Inventory

Hydrogeological Assessment
Elmira Industrial Subdivision

1665 Scotch Line Road
Elmira, ON

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: WT2432004	Page	: 1 of 9
Amendment	: 1		
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650 (Well Inventory)	Date Samples Received	: 25-Oct-2024 17:30
PO	: ----	Date Analysis Commenced	: 29-Oct-2024
C-O-C number	: 20-956513	Issue Date	: 06-Nov-2024 14:11
Sampler	: R.S.		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 5		
No. of samples analysed	: 5		

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
- Guideline Comparison

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.

Signatories	Position	Laboratory Department
Greg Pokocky	Manager - Inorganics	Inorganics, Waterloo, Ontario
John Tang	Lab Analyst	Inorganics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Inorganics, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Metals, Waterloo, Ontario



Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
1857	Water	Nitrate (as N)	Health basis of MAC: Methaemoglobinaemia (blue baby syndrome) and effects on thyroid gland function in bottle-fed infants. Other: Classified as possible carcinogen under conditions that result in endogenous nitrosation. Systems using chloramine disinfection or that have naturally occurring ammonia should monitor the level of nitrate in the distribution system. Homeowners with a well should test concentration of nitrate in their water supply.	ONDWS	MAC	10.9 mg/L	10 mg/L
1622	Water	Colour, apparent	May interfere with disinfection; removal is important to ensure effective treatment.	ONDWS	AO/OG	16.4 CU	5 CU
	Water	Iron, total	Based on taste and staining of laundry and plumbing fixtures; no evidence exists of dietary iron toxicity in the general population.	ONDWS	AO/OG	1.08 mg/L	0.3 mg/L
2240	Water	Colour, apparent	May interfere with disinfection; removal is important to ensure effective treatment.	ONDWS	AO/OG	229 CU	5 CU
	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	ONDWS	AO/OG	517 mg/L	500 mg/L
	Water	Iron, total	Based on taste and staining of laundry and plumbing fixtures; no evidence exists of dietary iron toxicity in the general population.	ONDWS	AO/OG	0.456 mg/L	0.3 mg/L
	Water	Manganese, total	Based on taste and staining of laundry and plumbing fixtures.	ONDWS	AO/OG	0.0525 mg/L	0.05 mg/L
	Water	Sodium, total	Based on taste; where a sodium-based water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.	ONDWS	MAC	21.8 mg/L	20 mg/L
1903	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	ONDWS	AO/OG	598 mg/L	500 mg/L
	Water	Zinc, total	AO based on taste; water with zinc levels above the AO tends to be opalescent and develops a greasy film when boiled; plumbing should be thoroughly flushed before water is consumed.	ONDWS	AO/OG	5.49 mg/L	5 mg/L



SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
	Water	Nitrate (as N)	Health basis of MAC: Methaemoglobinaemia (blue baby syndrome) and effects on thyroid gland function in bottle-fed infants. Other: Classified as possible carcinogen under conditions that result in endogenous nitrosation. Systems using chloramine disinfection or that have naturally occurring ammonia should monitor the level of nitrate in the distribution system. Homeowners with a well should test concentration of nitrate in their water supply.	ONDWS	MAC	17.3 mg/L	10 mg/L

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.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	Description
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.

<: less than.

Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.



Workorder Comments

Drinking Water Questions not completed on the Analytical Chain of Custody (COC). Please notify Laboratory if the submission is from a Regulated Drinking Water System, and if the samples are for Human Consumption.

Amendment (06/11/2024): This report has been amended to include requested guideline(s). All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLUI	Detection Limit Raised: Unknown interference generated an apparent false positive test result.



Analytical Results Evaluation

Matrix: Water			Client sample ID	1857	1622	1475	2240	1903	----	----
			Sampling date/time	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	----	----
			Sub-Matrix	Water	Water	Water	Water	Water	----	----
Analyte	CAS Number	Method/Lab	Unit	WT2432004-001	WT2432004-002	WT2432004-003	WT2432004-004	WT2432004-005	-----	-----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/WT	mg/L	264	255	244	272	388	----	----
Colour, apparent	----	E330/WT	CU	<2.0	16.4	<2.0	229	<2.0	----	----
Conductivity	----	E100/WT	µS/cm	811	586	721	869	1020	----	----
pH	----	E108/WT	pH units	7.87	7.90	8.04	8.15	8.07	----	----
Solids, total dissolved [TDS]	----	E162/WT	mg/L	482 DLDS	336 DLDS	424 DLDS	517 DLDS	598 DLDS	----	----
Turbidity	----	E121/WT	NTU	<0.10	2.80	<0.10	3.11	<0.10	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/WT	mg/L	<0.0050	0.0194	<0.0050	0.0110	<0.0050	----	----
Chloride	16887-00-6	E235.Cl/WT	mg/L	32.0	9.46	26.9	72.6	47.5 DLDS	----	----
Fluoride	16984-48-8	E235.F/WT	mg/L	0.036	0.075	0.549	0.281	<0.100 DLDS	----	----
Nitrate (as N)	14797-55-8	E235.NO3/WT	mg/L	10.9	5.98	0.960	<0.020	17.3 DLDS	----	----
Nitrite (as N)	14797-65-0	E235.NO2/WT	mg/L	<0.010	<0.010	<0.010	<0.010	<0.050 DLDS	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	mg/L	0.0016	<0.0010	0.0017	<0.0010	0.0048	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WT	mg/L	66.8	17.0	86.1	76.0	27.1 DLDS	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/WT	mg/L	<0.0030	0.0081	0.0085	0.0077	<0.0030	----	----
Antimony, total	7440-36-0	E420/WT	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	----	----
Arsenic, total	7440-38-2	E420/WT	mg/L	0.00017	0.00042	0.00068	0.00431	0.00067	----	----
Barium, total	7440-39-3	E420/WT	mg/L	0.0207	0.0307	0.0388	0.0762	0.0371	----	----
Beryllium, total	7440-41-7	E420/WT	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	----	----
Bismuth, total	7440-69-9	E420/WT	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	0.000538	----	----
Boron, total	7440-42-8	E420/WT	mg/L	0.017	0.026	0.044	0.044	0.015	----	----
Cadmium, total	7440-43-9	E420/WT	mg/L	<0.0000050	0.00249	<0.0000050	<0.0000050	0.0000192	----	----
Calcium, total	7440-70-2	E420/WT	mg/L	103	68.8	84.4	94.1	130	----	----
Cesium, total	7440-46-2	E420/WT	mg/L	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	----	----
Chromium, total	7440-47-3	E420/WT	mg/L	0.00072	0.00076	<0.00050	<0.00050	0.00077	----	----
Cobalt, total	7440-48-4	E420/WT	mg/L	<0.00010	0.00028	<0.00010	0.00017	0.00014	----	----



Analytical Results Evaluation

				Client sample ID	1857	1622	1475	2240	1903	----	----
Matrix: Water				Sampling date/time	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	----	----
				Sub-Matrix	Water	Water	Water	Water	Water	----	----
Analyte	CAS Number	Method/Lab	Unit		WT2432004-001	WT2432004-002	WT2432004-003	WT2432004-004	WT2432004-005	-----	-----
Total Metals											
Copper, total	7440-50-8	E420/WT	mg/L		0.00423	0.0141	0.0375	0.0142	0.386	----	----
Iron, total	7439-89-6	E420/WT	mg/L		<0.010	1.08	<0.010	0.456	<0.010	----	----
Lead, total	7439-92-1	E420/WT	mg/L		0.000306	0.00314	0.000570	0.00483	0.00208	----	----
Lithium, total	7439-93-2	E420/WT	mg/L		0.0012	0.0031	0.0125	0.0117	0.0023	----	----
Magnesium, total	7439-95-4	E420/WT	mg/L		31.5	24.3	27.7	35.3	38.8	----	----
Manganese, total	7439-96-5	E420/WT	mg/L		0.00024	0.0146	0.00046	0.0525	<0.00010	----	----
Molybdenum, total	7439-98-7	E420/WT	mg/L		0.000055	0.000490	0.00106	0.00121	0.000079	----	----
Nickel, total	7440-02-0	E420/WT	mg/L		<0.00050	0.00153	0.00238	<0.00050	0.150	----	----
Phosphorus, total	7723-14-0	E420/WT	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050	----	----
Potassium, total	7440-09-7	E420/WT	mg/L		0.754	1.23	1.66	1.37	1.60	----	----
Rubidium, total	7440-17-7	E420/WT	mg/L		0.00023	0.00086	0.00074	0.00047	0.00042	----	----
Selenium, total	7782-49-2	E420/WT	mg/L		0.000130	0.00115	<0.000050	<0.000050	0.000065	----	----
Silicon, total	7440-21-3	E420/WT	mg/L		5.25	5.82	7.08	8.66	6.95	----	----
Silver, total	7440-22-4	E420/WT	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000013	----	----
Sodium, total	7440-23-5	E420/WT	mg/L		8.16	7.35	11.8	21.8	19.3	----	----
Strontium, total	7440-24-6	E420/WT	mg/L		0.304	0.113	1.73	1.59	0.191	----	----
Sulfur, total	7704-34-9	E420/WT	mg/L		22.3	5.54	28.5	25.4	9.44	----	----
Tellurium, total	13494-80-9	E420/WT	mg/L		<0.00020	<0.00020	0.00029	0.00025	<0.00020	----	----
Thallium, total	7440-28-0	E420/WT	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000033	----	----
Thorium, total	7440-29-1	E420/WT	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	----	----
Tin, total	7440-31-5	E420/WT	mg/L		<0.00010	<0.00010	0.00026	0.00038	<0.00010	----	----
Titanium, total	7440-32-6	E420/WT	mg/L		<0.00030	<0.00050 ^{DLUI}	<0.00040 ^{DLUI}	<0.00030	<0.00030	----	----
Tungsten, total	7440-33-7	E420/WT	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	----	----
Uranium, total	7440-61-1	E420/WT	mg/L		0.000424	0.000366	0.000644	0.000455	0.000388	----	----
Vanadium, total	7440-62-2	E420/WT	mg/L		<0.00050	0.00093	<0.00050	<0.00050	<0.00050	----	----
Zinc, total	7440-66-6	E420/WT	mg/L		0.0061	3.73	0.0969	0.0081	5.49	----	----
Zirconium, total	7440-67-7	E420/WT	mg/L		<0.00020	<0.00020	<0.00020	0.00034	<0.00020	----	----

Page : 7 of 9
Work Order : WT2432004 Amendment 1
Client : Chung and Vander Doelen Engineering Ltd.
Project : 1650 (Well Inventory)



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

Please refer to the Accreditation section for an explanation of analyte accreditations.



Summary of Guideline Limits

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Physical Tests									
Alkalinity, total (as CaCO3)	----	mg/L	30 - 500 mg/L	--					
Colour, apparent	----	CU	5 CU	--					
Conductivity	----	µS/cm	--	--					
pH	----	pH units	6.5 - 8.5 pH units	--					
Solids, total dissolved [TDS]	----	mg/L	500 mg/L	--					
Turbidity	----	NTU	5 NTU	--					
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	mg/L	--	--					
Chloride	16887-00-6	mg/L	250 mg/L	--					
Fluoride	16984-48-8	mg/L	--	1.5 mg/L					
Nitrate (as N)	14797-55-8	mg/L	--	10 mg/L					
Nitrite (as N)	14797-65-0	mg/L	--	1 mg/L					
Phosphate, ortho-, dissolved (as P)	14265-44-2	mg/L	--	--					
Sulfate (as SO4)	14808-79-8	mg/L	500 mg/L	--					
Total Metals									
Aluminum, total	7429-90-5	mg/L	0.1 mg/L	--					
Antimony, total	7440-36-0	mg/L	--	0.006 mg/L					
Arsenic, total	7440-38-2	mg/L	--	0.01 mg/L					
Barium, total	7440-39-3	mg/L	--	1 mg/L					
Beryllium, total	7440-41-7	mg/L	--	--					
Bismuth, total	7440-69-9	mg/L	--	--					
Boron, total	7440-42-8	mg/L	--	5 mg/L					
Cadmium, total	7440-43-9	mg/L	--	0.005 mg/L					
Calcium, total	7440-70-2	mg/L	--	--					
Cesium, total	7440-46-2	mg/L	--	--					
Chromium, total	7440-47-3	mg/L	--	0.05 mg/L					
Cobalt, total	7440-48-4	mg/L	--	--					
Copper, total	7440-50-8	mg/L	1 mg/L	--					
Iron, total	7439-89-6	mg/L	0.3 mg/L	--					
Lead, total	7439-92-1	mg/L	--	0.01 mg/L					
Lithium, total	7439-93-2	mg/L	--	--					
Magnesium, total	7439-95-4	mg/L	--	--					
Manganese, total	7439-96-5	mg/L	0.05 mg/L	--					
Molybdenum, total	7439-98-7	mg/L	--	--					
Nickel, total	7440-02-0	mg/L	--	--					
Phosphorus, total	7723-14-0	mg/L	--	--					



Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Total Metals - Continued									
Potassium, total	7440-09-7	mg/L	--	--					
Rubidium, total	7440-17-7	mg/L	--	--					
Selenium, total	7782-49-2	mg/L	--	0.05 mg/L					
Silicon, total	7440-21-3	mg/L	--	--					
Silver, total	7440-22-4	mg/L	--	--					
Sodium, total	7440-23-5	mg/L	200 mg/L	20 mg/L					
Strontium, total	7440-24-6	mg/L	--	--					
Sulfur, total	7704-34-9	mg/L	--	--					
Tellurium, total	13494-80-9	mg/L	--	--					
Thallium, total	7440-28-0	mg/L	--	--					
Thorium, total	7440-29-1	mg/L	--	--					
Tin, total	7440-31-5	mg/L	--	--					
Titanium, total	7440-32-6	mg/L	--	--					
Tungsten, total	7440-33-7	mg/L	--	--					
Uranium, total	7440-61-1	mg/L	--	0.02 mg/L					
Vanadium, total	7440-62-2	mg/L	--	--					
Zinc, total	7440-66-6	mg/L	5 mg/L	--					
Zirconium, total	7440-67-7	mg/L	--	--					

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

Key:

ONDWS	Ontario Drinking Water Regulation (JAN, 2020)
AO/OG	Aesthetic Objective/Operational Guideline (2006)
MAC	Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WT2432004	Page	: 1 of 16
Amendment	: 1		
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650 (Well Inventory)	Date Samples Received	: 25-Oct-2024 17:30
PO	: ----	Issue Date	: 06-Nov-2024 15:20
C-O-C number	: 20-956513		
Sampler	: R.S.		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 5		
No. of samples analysed	: 5		

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 Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Page : 3 of 16
Work Order : WT2432004 Amendment 1
Client : Chung and Vander Doelen Engineering Ltd.
Project : 1650 (Well Inventory)



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Anions and Nutrients	QC-1738238-001	----	Ammonia, total (as N)	7664-41-7	E298	0.0052 ^B mg/L	0.005 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier *Description*

B *Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*



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: **Water**

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

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 1475	E298	25-Oct-2024	29-Oct-2024	28 days	5 days	✓	31-Oct-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 1622	E298	25-Oct-2024	29-Oct-2024	28 days	5 days	✓	31-Oct-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 1857	E298	25-Oct-2024	29-Oct-2024	28 days	5 days	✓	31-Oct-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 1903	E298	25-Oct-2024	29-Oct-2024	28 days	5 days	✓	31-Oct-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 2240	E298	25-Oct-2024	29-Oct-2024	28 days	5 days	✓	31-Oct-2024	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 1475	E235.Cl	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 1622	E235.Cl	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓



Matrix: **Water** 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	
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 1857	E235.Cl	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 1903	E235.Cl	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 2240	E235.Cl	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 1475	E378-U	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	30-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 1622	E378-U	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	30-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 1857	E378-U	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	30-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 1903	E378-U	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	30-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 2240	E378-U	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	30-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 1475	E235.F	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓



Matrix: **Water** Evaluation: **x** = 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	
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 1622	E235.F	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 1857	E235.F	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 1903	E235.F	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 2240	E235.F	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 1475	E235.NO3	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 1622	E235.NO3	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 1857	E235.NO3	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 1903	E235.NO3	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 2240	E235.NO3	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓



Matrix: **Water** Evaluation: **x** = 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	
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 1475	E235.NO2	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 1622	E235.NO2	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 1857	E235.NO2	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 1903	E235.NO2	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 2240	E235.NO2	25-Oct-2024	30-Oct-2024	7 days	6 days	✓	31-Oct-2024	7 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 1475	E235.SO4	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 1622	E235.SO4	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 1857	E235.SO4	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 1903	E235.SO4	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓



Matrix: **Water** 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	
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 2240	E235.SO4	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 1475	E290	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 1622	E290	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 1857	E290	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 1903	E290	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 2240	E290	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 1475	E330	25-Oct-2024	----	----	----		01-Nov-2024	48 hrs	175 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 1622	E330	25-Oct-2024	----	----	----		01-Nov-2024	48 hrs	175 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 1857	E330	25-Oct-2024	----	----	----		01-Nov-2024	48 hrs	175 hrs	✖ EHT



Matrix: **Water** 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	
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 1903	E330	25-Oct-2024	----	----	----		01-Nov-2024	48 hrs	175 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 2240	E330	25-Oct-2024	----	----	----		01-Nov-2024	48 hrs	175 hrs	✖ EHT
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 1475	E100	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 1622	E100	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 1857	E100	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 1903	E100	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 2240	E100	25-Oct-2024	30-Oct-2024	28 days	6 days	✓	31-Oct-2024	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 1475	E108	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 1622	E108	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓



Matrix: **Water** 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	
Physical Tests : pH by Meter										
HDPE [ON MECP] 1857	E108	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 1903	E108	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 2240	E108	25-Oct-2024	30-Oct-2024	14 days	6 days	✓	31-Oct-2024	14 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 1475	E162	25-Oct-2024	----	----	----		29-Oct-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 1622	E162	25-Oct-2024	----	----	----		29-Oct-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 1857	E162	25-Oct-2024	----	----	----		29-Oct-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 1903	E162	25-Oct-2024	----	----	----		29-Oct-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 2240	E162	25-Oct-2024	----	----	----		29-Oct-2024	7 days	5 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 1475	E121	25-Oct-2024	----	----	----		29-Oct-2024	48 hrs	105 hrs	✖ EHT



Matrix: **Water** 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	
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 1622	E121	25-Oct-2024	----	----	----		29-Oct-2024	48 hrs	105 hrs	✖ EHT
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 1857	E121	25-Oct-2024	----	----	----		29-Oct-2024	48 hrs	105 hrs	✖ EHT
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 1903	E121	25-Oct-2024	----	----	----		29-Oct-2024	48 hrs	105 hrs	✖ EHT
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 2240	E121	25-Oct-2024	----	----	----		29-Oct-2024	48 hrs	105 hrs	✖ EHT
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 1475	E420	25-Oct-2024	29-Oct-2024	180 days	4 days	✓	31-Oct-2024	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 1622	E420	25-Oct-2024	29-Oct-2024	180 days	4 days	✓	31-Oct-2024	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 1857	E420	25-Oct-2024	29-Oct-2024	180 days	4 days	✓	31-Oct-2024	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 1903	E420	25-Oct-2024	29-Oct-2024	180 days	4 days	✓	31-Oct-2024	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 2240	E420	25-Oct-2024	29-Oct-2024	180 days	4 days	✓	31-Oct-2024	180 days	7 days	✓

[Legend & Qualifier Definitions](#)

Page : 12 of 16
Work Order : WT2432004 Amendment 1
Client : Chung and Vander Doelen Engineering Ltd.
Project : 1650 (Well Inventory)



EHT: Exceeded ALS recommended hold time prior to analysis.

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: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1740103	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	1738238	2	20	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	1740098	1	17	5.8	5.0	✓
Colour (Apparent) by Spectrometer	E330	1744372	2	24	8.3	5.0	✓
Conductivity in Water	E100	1740104	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1740105	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	1740095	1	14	7.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1740096	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1740097	1	13	7.6	5.0	✓
pH by Meter	E108	1740102	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1740099	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1737757	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1736622	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1737068	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1740103	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	1738238	2	20	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	1740098	1	17	5.8	5.0	✓
Colour (Apparent) by Spectrometer	E330	1744372	2	24	8.3	5.0	✓
Conductivity in Water	E100	1740104	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1740105	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	1740095	1	14	7.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1740096	1	18	5.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1740097	1	13	7.6	5.0	✓
pH by Meter	E108	1740102	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1740099	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1737757	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1736622	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1737068	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1740103	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	1738238	2	20	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	1740098	1	17	5.8	5.0	✓
Colour (Apparent) by Spectrometer	E330	1744372	2	24	8.3	5.0	✓
Conductivity in Water	E100	1740104	1	11	9.0	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1740105	1	6	16.6	5.0	✔
Fluoride in Water by IC	E235.F	1740095	1	14	7.1	5.0	✔
Nitrate in Water by IC	E235.NO3	1740096	1	18	5.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1740097	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1740099	1	17	5.8	5.0	✔
TDS by Gravimetry	E162	1737757	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1736622	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	1737068	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1738238	2	20	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	1740098	1	17	5.8	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1740105	1	6	16.6	5.0	✔
Fluoride in Water by IC	E235.F	1740095	1	14	7.1	5.0	✔
Nitrate in Water by IC	E235.NO3	1740096	1	18	5.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1740097	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1740099	1	17	5.8	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1736622	1	20	5.0	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 Water	E100 ALS Environmental - Waterloo	Water	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 water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^\circ\text{C}$). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Waterloo	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Waterloo	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at $180 \pm 2^\circ\text{C}$ for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Ammonia by Fluorescence	E298 ALS Environmental - Waterloo	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (Apparent) by Spectrometer	E330 ALS Environmental - Waterloo	Water	APHA 2120 C (mod)	Colour (Apparent) is measured in an unfiltered sample spectrophotometrically using the single wavelength method. The colour contribution of settleable solids are not included in the result. This method is intended for potable waters. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Waterloo	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 ALS Environmental - Waterloo	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

QUALITY CONTROL REPORT

Work Order	: WT2432004	Page	: 1 of 13
Amendment	: 1		
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650 (Well Inventory)	Date Samples Received	: 25-Oct-2024 17:30
PO	: ----	Date Analysis Commenced	: 29-Oct-2024
C-O-C number	: 20-956513	Issue Date	: 06-Nov-2024 14:12
Sampler	: R.S.		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 5		
No. of samples analysed	: 5		

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
- Matrix Spike (MS) 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
John Tang	Lab Analyst	Waterloo Inorganics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario



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: Water					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: 1737068)											
HA2402676-001	Anonymous	Turbidity	----	E121	0.10	NTU	0.94	0.94	0.002	Diff <2x LOR	----
Physical Tests (QC Lot: 1737757)											
WT2431865-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	786	792	0.887%	20%	----
Physical Tests (QC Lot: 1740102)											
WT2432004-001	1857	pH	----	E108	0.10	pH units	7.87	7.88	0.127%	4%	----
Physical Tests (QC Lot: 1740103)											
WT2432004-001	1857	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	264	264	0.227%	20%	----
Physical Tests (QC Lot: 1740104)											
WT2432004-001	1857	Conductivity	----	E100	1.0	µS/cm	811	815	0.492%	10%	----
Physical Tests (QC Lot: 1744372)											
FJ2403254-001	Anonymous	Colour, apparent	----	E330	2.0	CU	6.8	6.0	0.8	Diff <2x LOR	----
Physical Tests (QC Lot: 1744374)											
HA2402713-001	Anonymous	Colour, apparent	----	E330	2.0	CU	<2.0	<2.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1738238)											
WT2431829-004	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0615	0.0615	0.00%	20%	----
Anions and Nutrients (QC Lot: 1740095)											
WT2432000-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.610	0.606	0.716%	20%	----
Anions and Nutrients (QC Lot: 1740096)											
WT2432000-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.318	0.316	0.658%	20%	----
Anions and Nutrients (QC Lot: 1740097)											
WT2432000-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1740098)											
WT2432000-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	25.7	25.7	0.0810%	20%	----
Anions and Nutrients (QC Lot: 1740099)											
WT2432000-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	26.4	26.4	0.0162%	20%	----
Anions and Nutrients (QC Lot: 1740105)											
WT2432004-002	1622	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1745335)											
WT2431829-005	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0207	0.0201	0.0006	Diff <2x LOR	----
Total Metals (QC Lot: 1736622)											



Sub-Matrix: Water					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
Total Metals (QC Lot: 1736622) - continued											
VA24C8367-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0136	0.0129	0.0007	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00039	0.00039	0.000003	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0739	0.0727	1.64%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.024	0.025	0.0007	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000110	0.0000083	0.0000027	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	43.0	43.9	2.17%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00013	0.00014	0.000002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00249	0.00258	0.00009	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.089	0.090	0.002	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0017	0.0017	0.00005	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	13.7	13.7	0.0116%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0552	0.0556	0.854%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00151	0.00156	3.49%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00164	0.00165	0.000008	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	1.68	1.68	0.264%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00058	0.00062	0.00004	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000097	0.000089	0.000008	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	5.71	5.64	1.20%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	13.6	13.5	0.568%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.479	0.489	2.10%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	8.67	8.49	2.10%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00070	mg/L	<0.00070	<0.00070	0	Diff <2x LOR	----



Sub-Matrix: Water					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
Total Metals (QC Lot: 1736622) - continued											
VA24C8367-001	Anonymous	Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00223	0.00226	1.23%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00020	<0.00020	0.000002	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: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1737068)						
Turbidity	---	E121	0.1	NTU	<0.10	---
Physical Tests (QCLot: 1737757)						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
Physical Tests (QCLot: 1740103)						
Alkalinity, total (as CaCO ₃)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1740104)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1744372)						
Colour, apparent	---	E330	2	CU	<2.0	---
Physical Tests (QCLot: 1744374)						
Colour, apparent	---	E330	2	CU	<2.0	---
Anions and Nutrients (QCLot: 1738238)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	# 0.0052	B
Anions and Nutrients (QCLot: 1740095)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1740096)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1740097)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
Anions and Nutrients (QCLot: 1740098)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 1740099)						
Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1740105)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1745335)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Total Metals (QCLot: 1736622)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1736622) - continued						
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----



Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.



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: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1737068)									
Turbidity	----	E121	0.1	NTU	200 NTU	93.0	85.0	115	----
Physical Tests (QCLot: 1737757)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	85.6	85.0	115	----
Physical Tests (QCLot: 1740102)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1740103)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1740104)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	104	90.0	110	----
Physical Tests (QCLot: 1744372)									
Colour, apparent	----	E330	2	CU	25 CU	104	70.0	130	----
Physical Tests (QCLot: 1744374)									
Colour, apparent	----	E330	2	CU	25 CU	103	70.0	130	----
Anions and Nutrients (QCLot: 1738238)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100.0	85.0	115	----
Anions and Nutrients (QCLot: 1740095)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1740096)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	98.7	90.0	110	----
Anions and Nutrients (QCLot: 1740097)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1740098)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1740099)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1740105)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.05 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1745335)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Total Metals (QCLot: 1736622)									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1736622) - continued									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	97.5	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	103	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	107	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.012 mg/L	105	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	103	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	102	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	93.9	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	101	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.002 mg/L	107	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.012 mg/L	97.4	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.012 mg/L	95.4	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.012 mg/L	94.3	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	96.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	105	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.012 mg/L	101	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	105	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.012 mg/L	101	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.012 mg/L	101	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	94.3	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	107	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	100	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	96.5	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	104	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	93.6	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	101	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.012 mg/L	103	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	96.0	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	106	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	106	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	102	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.012 mg/L	94.0	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	100	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0 mg/L	111	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1736622) - continued									
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	99.0	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	97.6	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	98.2	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1738238)										
WT2431829-004	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1740095)										
WT2432000-001	Anonymous	Fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1740096)										
WT2432000-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.50 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1740097)										
WT2432000-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.488 mg/L	0.5 mg/L	97.5	75.0	125	----
Anions and Nutrients (QCLot: 1740098)										
WT2432000-001	Anonymous	Chloride	16887-00-6	E235.Cl	99.4 mg/L	100 mg/L	99.4	75.0	125	----
Anions and Nutrients (QCLot: 1740099)										
WT2432000-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	99.9 mg/L	100 mg/L	99.9	75.0	125	----
Anions and Nutrients (QCLot: 1740105)										
WT2432004-002	1622	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0180 mg/L	0.02 mg/L	92.1	70.0	130	----
Anions and Nutrients (QCLot: 1745335)										
WT2431829-005	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Total Metals (QCLot: 1736622)										
VA24C8367-002	Anonymous	Aluminum, total	7429-90-5	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0539 mg/L	0.05 mg/L	108	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0535 mg/L	0.05 mg/L	107	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.00513 mg/L	0.005 mg/L	102	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0500 mg/L	0.05 mg/L	99.9	70.0	130	----
		Boron, total	7440-42-8	E420	0.048 mg/L	0.05 mg/L	96.3	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00509 mg/L	0.005 mg/L	102	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00277 mg/L	0.002 mg/L	111	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0120 mg/L	0.012 mg/L	96.2	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0117 mg/L	0.012 mg/L	93.5	70.0	130	----
		Copper, total	7440-50-8	E420	0.0116 mg/L	0.012 mg/L	92.6	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0256 mg/L	0.025 mg/L	102	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0130 mg/L	0.012 mg/L	104	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0129 mg/L	0.012 mg/L	104	70.0	130	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1736622) - continued										
VA24C8367-002	Anonymous	Nickel, total	7440-02-0	E420	0.0229 mg/L	0.025 mg/L	91.6	70.0	130	----
		Phosphorus, total	7723-14-0	E420	0.529 mg/L	0.5 mg/L	106	70.0	130	----
		Potassium, total	7440-09-7	E420	2.58 mg/L	2.5 mg/L	103	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.00519 mg/L	0.005 mg/L	104	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0490 mg/L	0.05 mg/L	98.0	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00464 mg/L	0.005 mg/L	92.9	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.00508 mg/L	0.005 mg/L	102	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0504 mg/L	0.05 mg/L	101	70.0	130	----
		Thorium, total	7440-29-1	E420	0.00540 mg/L	0.005 mg/L	108	70.0	130	----
		Tin, total	7440-31-5	E420	0.0259 mg/L	0.025 mg/L	103	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0126 mg/L	0.012 mg/L	100	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.00514 mg/L	0.005 mg/L	103	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0248 mg/L	0.025 mg/L	99.0	70.0	130	----
		Zinc, total	7440-66-6	E420	0.0234 mg/L	0.025 mg/L	93.8	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.00503 mg/L	0.005 mg/L	101	70.0	130	----

Report To		Contact and company name below will appear on the final report		Reports / Recipients		Turnaround Time (TAT) Requested	
Company: Chung and Vander Doelen Engineering		Select Report Format: ☒ PDF ☒ EXCEL ☐ EXD (DIGITAL)		Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A		☒ Routine [R] if received by 3pm M-F - no surcharges apply	
Contact: Yaroslav Chudin		Compare Results to Criteria of Report - provide details below if box checked		Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX		☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge mini	
Phone: 619-717-1867		Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX		Email 1 or Fax peter.dan@cvdengineering.com		☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge mini	
Company address below will appear on the final report		Email 2 yaroslav.chudin@cvdengineering.com		Email 3 r.soknic@cvdengineering.com		☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge mini	
Street: 311 Victoria St., N.		Invoice Recipients		Date and Time Required for all E&P TATs:		☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge mini	
City/Province: Kitchener ON		Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX		Analysis		☐ Same day [E2] if received by 10am M-S - 200% rush surcharge, /	
Postal Code: N2H 5E1		Email 1 or Fax ap@cvdengineering.com		Indicate Filtered (F), Preserved (P) or Filter			
Invoice To: Same as Report To ☒ YES ☐ NO		Email 2		NUMBER OF CONTAINERS			
Copy of Invoice with Report ☐ YES ☐ NO		Oil and Gas Required Fields (client use)		General Chem 1			
Company:		AFE/Cost Center:		Routing Code:			
Contact:		Major/Minor Code:		Requisitioner:			
Project Information		Location:		SUSPECTED HAZARD (see notes)			
ALS Account # / Quote #: Q84362		ALS Contact: A.M.		Sampler: R.S.			
Job #: 1650 (Well Inventory)		Date (dd-mmm-yy)		Time (hh:mm)			
PO / AFE:		Sample Type		SUSPECTED HAZARD (see notes)			
LSD:		1857		25-10-24		Water	
ALS Lab Work Order # (ALS use only): WT2432004 CP		1622		25-10-24		Water	
ALS Sample # (ALS use only)		1475		25-10-24		Water	
Sample Identification and/or Coordinates (This description will appear on the report)		2240		25-10-24		Water	
1903		25-10-24		25-10-24		Water	
Drinking Water (DW) Samples ¹ (client use)		Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)		SAMPLE RECEIPT DETAILS (ALS use only)			
Are samples taken from a Regulated DW System?		PWQO		Cooling Method: ☒ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED			
Are samples for human consumption/ use?				Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO			
				Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A			
				INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (ALS use only)		FINAL SHIPMENT RECEPTION (ALS use only)			
Released by: Rade Soknic		Received by: R		Received by: R			
Date: Oct 25, 2024		Date: 25 Oct 24		Date: 25 Oct 24			
Time: 5pm		Time: 17:30		Time: 17:30			

GC-079

MM-350

N-358

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: WT2432294	Page	: 1 of 8
Amendment	: 1		
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650 Well Inventory (PART 2)	Date Samples Received	: 29-Oct-2024 16:10
PO	: ----	Date Analysis Commenced	: 30-Oct-2024
C-O-C number	: 20-956203	Issue Date	: 06-Nov-2024 15:21
Sampler	: R.S		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 3		
No. of samples analysed	: 3		

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
- Guideline Comparison

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.

Signatories	Position	Laboratory Department
Greg Pokocky	Manager - Inorganics	Inorganics, Waterloo, Ontario
Greg Pokocky	Manager - Inorganics	Metals, Waterloo, Ontario



Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
144 (INDOOR FAUCET)	Water	Hardness (as CaCO ₃), dissolved	Hardness levels between 80 and 100 mg/L (as CaCO ₃) provide acceptable balance between corrosion and incrustation; where a water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.	ONDWS	AO/OG	429 mg/L	80-100 mg/L
2477 (OUTDOOR FAUCET)	Water	Hardness (as CaCO ₃), dissolved	Hardness levels between 80 and 100 mg/L (as CaCO ₃) provide acceptable balance between corrosion and incrustation; where a water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.	ONDWS	AO/OG	349 mg/L	80-100 mg/L
	Water	Manganese, total	Based on taste and staining of laundry and plumbing fixtures.	ONDWS	AO/OG	0.0835 mg/L	0.05 mg/L
95 (OUTDOOR FAUCET)	Water	Colour, apparent	May interfere with disinfection; removal is important to ensure effective treatment.	ONDWS	AO/OG	50.0 CU	5 CU
	Water	Hardness (as CaCO ₃), dissolved	Hardness levels between 80 and 100 mg/L (as CaCO ₃) provide acceptable balance between corrosion and incrustation; where a water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.	ONDWS	AO/OG	646 mg/L	80-100 mg/L
	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	ONDWS	AO/OG	722 mg/L	500 mg/L
	Water	Turbidity	Filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU. Particles can harbour microorganisms, protecting them from disinfection, and can entrap heavy metals and biocides; elevated or fluctuating turbidity in filtered water can indicate a problem with the water treatment process and a potential increased risk of pathogens in treated water.	ONDWS	AO/OG	11.1 NTU	5 NTU
	Water	Chloride	Based on taste and potential for corrosion in the distribution system.	ONDWS	AO/OG	304 mg/L	250 mg/L
	Water	Manganese, total	Based on taste and staining of laundry and plumbing fixtures.	ONDWS	AO/OG	0.435 mg/L	0.05 mg/L
	Water	Sodium, total	Based on taste; where a sodium-based water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.	ONDWS	MAC	63.8 mg/L	20 mg/L



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.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	Description
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.

<: less than.

Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Workorder Comments

Amendment (06/11/2024): This report has been amended to include requested guideline(s). All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLUI	Detection Limit Raised: Unknown interference generated an apparent false positive test result.



Analytical Results Evaluation

Matrix: Water				Client sample ID	144 (INDOOR FAUCET)	2477 (OUTDOOR FAUCET)	95 (OUTDOOR FAUCET)	----	----	----	----
				Sampling date/time	29-Oct-2024 13:30	29-Oct-2024 14:00	29-Oct-2024 14:30	----	----	----	----
				Sub-Matrix	Water	Water	Water	----	----	----	----
Analyte	CAS Number	Method/Lab	Unit		WT2432294-001	WT2432294-002	WT2432294-003	-----	-----	-----	-----
Physical Tests											
Alkalinity, total (as CaCO3)	----	E290/WT	mg/L		328	236	292	----	----	----	----
Colour, apparent	----	E330/WT	CU		<2.0	<2.0	50.0	----	----	----	----
Conductivity	----	E100/WT	µS/cm		818	716	1630	----	----	----	----
pH	----	E108/WT	pH units		8.22	8.37	8.15	----	----	----	----
Solids, total dissolved [TDS]	----	E162/WT	mg/L		436 ^{DLDS}	400 ^{DLDS}	722 ^{DLDS}	----	----	----	----
Turbidity	----	E121/WT	NTU		<0.10	<0.10	11.1	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/WT	mg/L		429	349	646	----	----	----	----
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E298/WT	mg/L		<0.0050	0.101	0.0746	----	----	----	----
Chloride	16887-00-6	E235.CI/WT	mg/L		17.6	16.0	304 ^{DLDS}	----	----	----	----
Fluoride	16984-48-8	E235.F/WT	mg/L		0.078	0.456	0.139 ^{DLDS}	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3/WT	mg/L		4.70	0.453	<0.100 ^{DLDS}	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2/WT	mg/L		<0.010	<0.010	<0.050 ^{DLDS}	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	mg/L		0.0017	0.0042	<0.0010	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WT	mg/L		72.1	117	59.0 ^{DLDS}	----	----	----	----
Total Metals											
Aluminum, total	7429-90-5	E420/WT	mg/L		<0.0030	<0.0030	0.0072	----	----	----	----
Antimony, total	7440-36-0	E420/WT	mg/L		<0.00010	<0.00010	<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/WT	mg/L		0.00029	0.00063	0.00025	----	----	----	----
Barium, total	7440-39-3	E420/WT	mg/L		0.0548	0.0628	0.163	----	----	----	----
Beryllium, total	7440-41-7	E420/WT	mg/L		<0.000020	<0.000020	<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420/WT	mg/L		<0.000050	<0.000050	<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/WT	mg/L		0.012	0.054	0.041	----	----	----	----
Cadmium, total	7440-43-9	E420/WT	mg/L		<0.0000050	<0.0000050	<0.0000050	----	----	----	----
Calcium, total	7440-70-2	E420/WT	mg/L		107	93.4	153	----	----	----	----
Cesium, total	7440-46-2	E420/WT	mg/L		<0.000010	<0.000010	<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420/WT	mg/L		<0.00050	<0.00050	<0.00050	----	----	----	----



Analytical Results Evaluation

				Client sample ID	144 (INDOOR FAUCET)	2477 (OUTDOOR FAUCET)	95 (OUTDOOR FAUCET)	----	----	----	----
Matrix: Water				Sampling date/time	29-Oct-2024 13:30	29-Oct-2024 14:00	29-Oct-2024 14:30	----	----	----	----
				Sub-Matrix	Water	Water	Water	----	----	----	----
Analyte	CAS Number	Method/Lab	Unit		WT2432294-001	WT2432294-002	WT2432294-003	-----	-----	-----	-----
Total Metals											
Cobalt, total	7440-48-4	E420/WT	mg/L		<0.00010	<0.00010	0.00013	----	----	----	----
Copper, total	7440-50-8	E420/WT	mg/L		0.0197	0.00251	0.00623	----	----	----	----
Iron, total	7439-89-6	E420/WT	mg/L		<0.010	<0.010	0.250	----	----	----	----
Lead, total	7439-92-1	E420/WT	mg/L		0.000628	0.000113	0.000581	----	----	----	----
Lithium, total	7439-93-2	E420/WT	mg/L		0.0044	0.0076	0.0085	----	----	----	----
Magnesium, total	7439-95-4	E420/WT	mg/L		35.9	27.0	60.0	----	----	----	----
Manganese, total	7439-96-5	E420/WT	mg/L		<0.00010	0.0835	0.435	----	----	----	----
Molybdenum, total	7439-98-7	E420/WT	mg/L		0.000249	0.00159	0.000754	----	----	----	----
Nickel, total	7440-02-0	E420/WT	mg/L		0.00087	<0.00050	0.00076	----	----	----	----
Phosphorus, total	7723-14-0	E420/WT	mg/L		<0.050	<0.050	<0.050	----	----	----	----
Potassium, total	7440-09-7	E420/WT	mg/L		1.03	1.35	1.88	----	----	----	----
Rubidium, total	7440-17-7	E420/WT	mg/L		0.00034	<0.00020	0.00063	----	----	----	----
Selenium, total	7782-49-2	E420/WT	mg/L		0.000175	<0.000050	<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420/WT	mg/L		6.68	7.87	8.56	----	----	----	----
Silver, total	7440-22-4	E420/WT	mg/L		<0.000010	<0.000010	<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/WT	mg/L		7.24	11.6	63.8	----	----	----	----
Strontium, total	7440-24-6	E420/WT	mg/L		0.362	1.92	1.43	----	----	----	----
Sulfur, total	7704-34-9	E420/WT	mg/L		24.4	40.2	20.2	----	----	----	----
Tellurium, total	13494-80-9	E420/WT	mg/L		<0.00020	0.00028	0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/WT	mg/L		<0.000010	<0.000010	<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/WT	mg/L		<0.00010	<0.00010	<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/WT	mg/L		<0.00010	<0.00010	0.00034	----	----	----	----
Titanium, total	7440-32-6	E420/WT	mg/L		<0.00030	<0.00030	<0.00040 ^{DLUI}	----	----	----	----
Tungsten, total	7440-33-7	E420/WT	mg/L		<0.00010	<0.00010	<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/WT	mg/L		0.000670	0.000404	0.000999	----	----	----	----
Vanadium, total	7440-62-2	E420/WT	mg/L		<0.00050	<0.00050	<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420/WT	mg/L		0.0378	0.0208	0.0094	----	----	----	----
Zirconium, total	7440-67-7	E420/WT	mg/L		<0.00020	<0.00020	<0.00020	----	----	----	----

Page : 6 of 8
Work Order : WT2432294 Amendment 1
Client : Chung and Vander Doelen Engineering Ltd.
Project : 1650 Well Inventory (PART 2)



Please refer to the [General Comments](#) section for an explanation of any result qualifiers detected.

Please refer to the [Accreditation](#) section for an explanation of analyte accreditations.



Summary of Guideline Limits

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Physical Tests									
Alkalinity, total (as CaCO ₃)	----	mg/L	30 - 500 mg/L	--					
Colour, apparent	----	CU	5 CU	--					
Conductivity	----	µS/cm	--	--					
Hardness (as CaCO ₃), dissolved	----	mg/L	80 - 100 mg/L	--					
pH	----	pH units	6.5 - 8.5 pH units	--					
Solids, total dissolved [TDS]	----	mg/L	500 mg/L	--					
Turbidity	----	NTU	5 NTU	--					
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	mg/L	--	--					
Chloride	16887-00-6	mg/L	250 mg/L	--					
Fluoride	16984-48-8	mg/L	--	1.5 mg/L					
Nitrate (as N)	14797-55-8	mg/L	--	10 mg/L					
Nitrite (as N)	14797-65-0	mg/L	--	1 mg/L					
Phosphate, ortho-, dissolved (as P)	14265-44-2	mg/L	--	--					
Sulfate (as SO ₄)	14808-79-8	mg/L	500 mg/L	--					
Total Metals									
Aluminum, total	7429-90-5	mg/L	0.1 mg/L	--					
Antimony, total	7440-36-0	mg/L	--	0.006 mg/L					
Arsenic, total	7440-38-2	mg/L	--	0.01 mg/L					
Barium, total	7440-39-3	mg/L	--	1 mg/L					
Beryllium, total	7440-41-7	mg/L	--	--					
Bismuth, total	7440-69-9	mg/L	--	--					
Boron, total	7440-42-8	mg/L	--	5 mg/L					
Cadmium, total	7440-43-9	mg/L	--	0.005 mg/L					
Calcium, total	7440-70-2	mg/L	--	--					
Cesium, total	7440-46-2	mg/L	--	--					
Chromium, total	7440-47-3	mg/L	--	0.05 mg/L					
Cobalt, total	7440-48-4	mg/L	--	--					
Copper, total	7440-50-8	mg/L	1 mg/L	--					
Iron, total	7439-89-6	mg/L	0.3 mg/L	--					
Lead, total	7439-92-1	mg/L	--	0.01 mg/L					
Lithium, total	7439-93-2	mg/L	--	--					
Magnesium, total	7439-95-4	mg/L	--	--					
Manganese, total	7439-96-5	mg/L	0.05 mg/L	--					
Molybdenum, total	7439-98-7	mg/L	--	--					
Nickel, total	7440-02-0	mg/L	--	--					



Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Total Metals - Continued									
Phosphorus, total	7723-14-0	mg/L	--	--					
Potassium, total	7440-09-7	mg/L	--	--					
Rubidium, total	7440-17-7	mg/L	--	--					
Selenium, total	7782-49-2	mg/L	--	0.05 mg/L					
Silicon, total	7440-21-3	mg/L	--	--					
Silver, total	7440-22-4	mg/L	--	--					
Sodium, total	7440-23-5	mg/L	200 mg/L	20 mg/L					
Strontium, total	7440-24-6	mg/L	--	--					
Sulfur, total	7704-34-9	mg/L	--	--					
Tellurium, total	13494-80-9	mg/L	--	--					
Thallium, total	7440-28-0	mg/L	--	--					
Thorium, total	7440-29-1	mg/L	--	--					
Tin, total	7440-31-5	mg/L	--	--					
Titanium, total	7440-32-6	mg/L	--	--					
Tungsten, total	7440-33-7	mg/L	--	--					
Uranium, total	7440-61-1	mg/L	--	0.02 mg/L					
Vanadium, total	7440-62-2	mg/L	--	--					
Zinc, total	7440-66-6	mg/L	5 mg/L	--					
Zirconium, total	7440-67-7	mg/L	--	--					

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

Key:

ONDWS	Ontario Drinking Water Regulation (JAN, 2020)
AO/OG	Aesthetic Objective/Operational Guideline (2006)
MAC	Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WT2432294	Page	: 1 of 12
Amendment	: 1		
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650 Well Inventory (PART 2)	Date Samples Received	: 29-Oct-2024 16:10
PO	: ----	Issue Date	: 06-Nov-2024 14:14
C-O-C number	: 20-956203		
Sampler	: R.S		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 3		
No. of samples analysed	: 3		

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 Laboratory Control Sample (LCS) outliers occur
- Method Blank value outliers occur - please see following pages for full details.
- Duplicate outliers occur - please see following pages for full details.
- Matrix Spike outliers occur - please see following pages for full details.
- 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)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: Water

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-1741548-001	----	Magnesium, total	7439-95-4	E420	0.0212 ^B mg/L	0.005 mg/L	Blank result exceeds permitted value
Total Metals	QC-1741548-001	----	Molybdenum, total	7439-98-7	E420	0.000230 ^B mg/L	0.00005 mg/L	Blank result exceeds permitted value
Total Metals	QC-1741548-001	----	Silver, total	7440-22-4	E420	0.000011 ^B mg/L	0.00001 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

Duplicate (DUP) RPDs

Total Metals	Anonymous	Anonymous	Copper, total	7440-50-8	E420	23.0 % ^{DUP-H}	20%	Duplicate RPD does not meet the DQO for this test.
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Result Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Matrix Spike (MS) Recoveries

Total Metals	Anonymous	Anonymous	Thorium, total	7440-29-1	E420	51.1 % ^K	70.0-130%	Recovery less than lower data quality objective
Total Metals	Anonymous	Anonymous	Zirconium, total	7440-67-7	E420	42.5 % ^K	70.0-130%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
K	Matrix Spike recovery outside ALS DQO due to sample matrix effects.



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: **Water**

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

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 144 (INDOOR FAUCET)	E298	29-Oct-2024	30-Oct-2024	28 days	1 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 2477 (OUTDOOR FAUCET)	E298	29-Oct-2024	30-Oct-2024	28 days	1 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] 95 (OUTDOOR FAUCET)	E298	29-Oct-2024	30-Oct-2024	28 days	1 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E235.Cl	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E235.Cl	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E235.Cl	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E378-U	29-Oct-2024	31-Oct-2024	7 days	2 days	✓	01-Nov-2024	7 days	3 days	✓



Matrix: **Water** 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	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E378-U	29-Oct-2024	31-Oct-2024	7 days	2 days	✓	01-Nov-2024	7 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E378-U	29-Oct-2024	31-Oct-2024	7 days	2 days	✓	01-Nov-2024	7 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E235.F	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E235.F	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E235.F	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E235.NO3	29-Oct-2024	31-Oct-2024	7 days	2 days	✓	01-Nov-2024	7 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E235.NO3	29-Oct-2024	31-Oct-2024	7 days	2 days	✓	01-Nov-2024	7 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E235.NO3	29-Oct-2024	31-Oct-2024	7 days	2 days	✓	01-Nov-2024	7 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E235.NO2	29-Oct-2024	31-Oct-2024	7 days	2 days	✓	01-Nov-2024	7 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E235.NO2	29-Oct-2024	31-Oct-2024	7 days	2 days	✔	01-Nov-2024	7 days	3 days	✔
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E235.NO2	29-Oct-2024	31-Oct-2024	7 days	2 days	✔	01-Nov-2024	7 days	3 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E235.SO4	29-Oct-2024	31-Oct-2024	28 days	2 days	✔	01-Nov-2024	28 days	3 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E235.SO4	29-Oct-2024	31-Oct-2024	28 days	2 days	✔	01-Nov-2024	28 days	3 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E235.SO4	29-Oct-2024	31-Oct-2024	28 days	2 days	✔	01-Nov-2024	28 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E290	29-Oct-2024	31-Oct-2024	14 days	2 days	✔	01-Nov-2024	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E290	29-Oct-2024	31-Oct-2024	14 days	2 days	✔	01-Nov-2024	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E290	29-Oct-2024	31-Oct-2024	14 days	2 days	✔	01-Nov-2024	14 days	3 days	✔
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E330	29-Oct-2024	----	----	----		04-Nov-2024	48 hrs	137 hrs	✖ EHT



Matrix: **Water** 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	
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E330	29-Oct-2024	----	----	----		04-Nov-2024	48 hrs	138 hrs	✖ EHT
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E330	29-Oct-2024	----	----	----		04-Nov-2024	48 hrs	138 hrs	✖ EHT
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E100	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E100	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E100	29-Oct-2024	31-Oct-2024	28 days	2 days	✓	01-Nov-2024	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E108	29-Oct-2024	31-Oct-2024	14 days	2 days	✓	01-Nov-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E108	29-Oct-2024	31-Oct-2024	14 days	2 days	✓	01-Nov-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E108	29-Oct-2024	31-Oct-2024	14 days	2 days	✓	01-Nov-2024	14 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E162	29-Oct-2024	----	----	----		31-Oct-2024	7 days	2 days	✓



Matrix: **Water** 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	
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E162	29-Oct-2024	----	----	----		31-Oct-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E162	29-Oct-2024	----	----	----		31-Oct-2024	7 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 95 (OUTDOOR FAUCET)	E121	29-Oct-2024	----	----	----		31-Oct-2024	48 hrs	43 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 144 (INDOOR FAUCET)	E121	29-Oct-2024	----	----	----		31-Oct-2024	48 hrs	44 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] 2477 (OUTDOOR FAUCET)	E121	29-Oct-2024	----	----	----		31-Oct-2024	48 hrs	44 hrs	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 144 (INDOOR FAUCET)	E420	29-Oct-2024	31-Oct-2024	180 days	2 days	✓	31-Oct-2024	180 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 2477 (OUTDOOR FAUCET)	E420	29-Oct-2024	31-Oct-2024	180 days	2 days	✓	31-Oct-2024	180 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 95 (OUTDOOR FAUCET)	E420	29-Oct-2024	31-Oct-2024	180 days	2 days	✓	31-Oct-2024	180 days	2 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

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: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1741866	1	13	7.6	5.0	✔
Ammonia by Fluorescence	E298	1741292	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1741872	1	19	5.2	5.0	✔
Colour (Apparent) by Spectrometer	E330	1747905	1	20	5.0	5.0	✔
Conductivity in Water	E100	1741864	1	14	7.1	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1741873	1	12	8.3	5.0	✔
Fluoride in Water by IC	E235.F	1741868	1	14	7.1	5.0	✔
Nitrate in Water by IC	E235.NO3	1741869	1	19	5.2	5.0	✔
Nitrite in Water by IC	E235.NO2	1741870	1	19	5.2	5.0	✔
pH by Meter	E108	1741865	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1741871	1	16	6.2	5.0	✔
TDS by Gravimetry	E162	1742983	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1741548	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	1742181	1	19	5.2	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1741866	1	13	7.6	5.0	✔
Ammonia by Fluorescence	E298	1741292	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1741872	1	19	5.2	5.0	✔
Colour (Apparent) by Spectrometer	E330	1747905	1	20	5.0	5.0	✔
Conductivity in Water	E100	1741864	1	14	7.1	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1741873	1	12	8.3	5.0	✔
Fluoride in Water by IC	E235.F	1741868	1	14	7.1	5.0	✔
Nitrate in Water by IC	E235.NO3	1741869	1	19	5.2	5.0	✔
Nitrite in Water by IC	E235.NO2	1741870	1	19	5.2	5.0	✔
pH by Meter	E108	1741865	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1741871	1	16	6.2	5.0	✔
TDS by Gravimetry	E162	1742983	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1741548	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	1742181	1	19	5.2	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1741866	1	13	7.6	5.0	✔
Ammonia by Fluorescence	E298	1741292	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1741872	1	19	5.2	5.0	✔
Colour (Apparent) by Spectrometer	E330	1747905	1	20	5.0	5.0	✔
Conductivity in Water	E100	1741864	1	14	7.1	5.0	✔



Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1741873	1	12	8.3	5.0	✔
Fluoride in Water by IC	E235.F	1741868	1	14	7.1	5.0	✔
Nitrate in Water by IC	E235.NO3	1741869	1	19	5.2	5.0	✔
Nitrite in Water by IC	E235.NO2	1741870	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1741871	1	16	6.2	5.0	✔
TDS by Gravimetry	E162	1742983	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1741548	2	20	10.0	5.0	✔
Turbidity by Nephelometry	E121	1742181	1	19	5.2	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1741292	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1741872	1	19	5.2	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1741873	1	12	8.3	5.0	✔
Fluoride in Water by IC	E235.F	1741868	1	14	7.1	5.0	✔
Nitrate in Water by IC	E235.NO3	1741869	1	19	5.2	5.0	✔
Nitrite in Water by IC	E235.NO2	1741870	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1741871	1	16	6.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1741548	1	20	5.0	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 Water	E100 ALS Environmental - Waterloo	Water	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 water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^\circ\text{C}$). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Waterloo	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Waterloo	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at $180 \pm 2^\circ\text{C}$ for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 ALS Environmental - Waterloo	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (Apparent) by Spectrometer	E330 ALS Environmental - Waterloo	Water	APHA 2120 C (mod)	Colour (Apparent) is measured in an unfiltered sample spectrophotometrically using the single wavelength method. The colour contribution of settleable solids are not included in the result. This method is intended for potable waters. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Waterloo	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Waterloo	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Waterloo	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Waterloo	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .

QUALITY CONTROL REPORT

Work Order	: WT2432294	Page	: 1 of 13
Amendment	: 1		
Client	: Chung and Vander Doelen Engineering Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Yaroslav Chudin	Account Manager	: Andrew Martin
Address	: 311 Victoria St. N. Kitchener ON Canada N2H 5E1	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 742 8979	Telephone	: +1 519 886 6910
Project	: 1650 Well Inventory (PART 2)	Date Samples Received	: 29-Oct-2024 16:10
PO	: ----	Date Analysis Commenced	: 30-Oct-2024
C-O-C number	: 20-956203	Issue Date	: 06-Nov-2024 14:15
Sampler	: R.S		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 3		
No. of samples analysed	: 3		

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
- Matrix Spike (MS) 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
Greg Pokocky	Manager - Inorganics	Waterloo Metals, Waterloo, Ontario



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: Water					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: 1741864)											
WT2432284-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	754	755	0.132%	10%	----
Physical Tests (QC Lot: 1741865)											
WT2432284-001	Anonymous	pH	----	E108	0.10	pH units	7.90	7.87	0.380%	4%	----
Physical Tests (QC Lot: 1741866)											
WT2432284-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	136	136	0.177%	20%	----
Physical Tests (QC Lot: 1742181)											
WT2432224-001	Anonymous	Turbidity	----	E121	0.10	NTU	21.5	21.5	0.00%	15%	----
Physical Tests (QC Lot: 1742983)											
WT2432000-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	134	132	2	Diff <2x LOR	----
Physical Tests (QC Lot: 1747905)											
HA2402722-001	Anonymous	Colour, apparent	----	E330	20.0	CU	422	387	8.70%	20%	----
Anions and Nutrients (QC Lot: 1741292)											
VA24C8763-012	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1741868)											
WT2432262-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.314	0.311	0.865%	20%	----
Anions and Nutrients (QC Lot: 1741869)											
WT2432262-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	1.79	1.80	0.324%	20%	----
Anions and Nutrients (QC Lot: 1741870)											
WT2432262-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	0.014	0.014	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1741871)											
WT2432262-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	58.0	57.9	0.162%	20%	----
Anions and Nutrients (QC Lot: 1741872)											
WT2432262-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	93.6	93.3	0.308%	20%	----
Anions and Nutrients (QC Lot: 1741873)											
WT2432262-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Total Metals (QC Lot: 1741548)											
WT2432144-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0300	mg/L	0.305	0.295	0.0100	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00100	mg/L	0.00344	0.00254	0.00090	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00100	mg/L	0.0320	0.0300	6.36%	20%	----



Sub-Matrix: Water					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
Total Metals (QC Lot: 1741548) - continued											
WT2432144-001	Anonymous	Beryllium, total	7440-41-7	E420	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000500	mg/L	0.00251	0.00181	0.000704	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000500	mg/L	0.0000550	<0.0000500	0.0000050	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.500	mg/L	39.6	38.8	2.06%	20%	----
		Cesium, total	7440-46-2	E420	0.000100	mg/L	0.000128	0.000106	0.000022	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00500	mg/L	0.161	0.127	23.0%	20%	DUP-H
		Iron, total	7439-89-6	E420	0.100	mg/L	0.338	0.244	0.094	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000500	mg/L	0.000733	0.000501	0.000232	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0500	mg/L	10.5	10.4	0.622%	20%	----
		Manganese, total	7439-96-5	E420	0.00100	mg/L	0.0286	0.0272	4.79%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000500	mg/L	0.00290	0.00197	0.000929	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00500	mg/L	0.00519	<0.00500	0.00019	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.500	mg/L	9.76	9.51	2.59%	20%	----
		Potassium, total	7440-09-7	E420	0.500	mg/L	30.7	30.0	2.41%	20%	----
		Rubidium, total	7440-17-7	E420	0.00200	mg/L	0.0178	0.0176	0.00020	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	1.00	mg/L	8.02	7.66	0.36	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000100	mg/L	<0.000100	0.000120	0.000020	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.500	mg/L	165	165	0.129%	20%	----
		Strontium, total	7440-24-6	E420	0.00200	mg/L	0.380	0.370	2.74%	20%	----
		Sulfur, total	7704-34-9	E420	5.00	mg/L	21.0	19.7	1.32	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000100	mg/L	0.000878	0.000764	0.000114	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0300	mg/L	0.0800	0.0535	0.0264	Diff <2x LOR	----



Sub-Matrix: Water					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
Total Metals (QC Lot: 1741548) - continued											
WT2432144-001	Anonymous	Zirconium, total	7440-67-7	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.



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: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1741864)						
Conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 1741866)						
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1742181)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1742983)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1747905)						
Colour, apparent	----	E330	2	CU	<2.0	----
Anions and Nutrients (QCLot: 1741292)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1741868)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1741869)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1741870)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1741871)						
Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1741872)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1741873)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Total Metals (QCLot: 1741548)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1741548) - continued						
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	# 0.0212	B
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	# 0.000230	B
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	# 0.000011	B
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 1744482)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1744482) - continued						
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1744482) - continued						
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----

Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.



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: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1741864)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	106	90.0	110	----
Physical Tests (QCLot: 1741865)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1741866)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	99.9	85.0	115	----
Physical Tests (QCLot: 1742181)									
Turbidity	----	E121	0.1	NTU	200 NTU	93.0	85.0	115	----
Physical Tests (QCLot: 1742983)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	91.1	85.0	115	----
Physical Tests (QCLot: 1747905)									
Colour, apparent	----	E330	2	CU	25 CU	102	70.0	130	----
Anions and Nutrients (QCLot: 1741292)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 1741868)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1741869)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	98.2	90.0	110	----
Anions and Nutrients (QCLot: 1741870)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1741871)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1741872)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1741873)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.05 mg/L	101	80.0	120	----
Total Metals (QCLot: 1741548)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	98.8	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	108	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.012 mg/L	110	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1741548) - continued									
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	104	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	105	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	94.6	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	103	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.002 mg/L	112	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.012 mg/L	97.6	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.012 mg/L	97.2	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.012 mg/L	95.8	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	97.1	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	107	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.012 mg/L	98.9	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	103	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.012 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.012 mg/L	105	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	95.4	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	107	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	103	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	107	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	99.2	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	102	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	97.1	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	99.4	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.012 mg/L	109	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	94.8	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	114	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	109	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	106	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.012 mg/L	94.5	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	104	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0 mg/L	113	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	101	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	99.9	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	103	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1741292)										
VA24C8763-012	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1741868)										
WT2432262-001	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1741869)										
WT2432262-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.44 mg/L	2.5 mg/L	97.4	75.0	125	----
Anions and Nutrients (QCLot: 1741870)										
WT2432262-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.501 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1741871)										
WT2432262-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	97.1 mg/L	100 mg/L	97.1	75.0	125	----
Anions and Nutrients (QCLot: 1741872)										
WT2432262-001	Anonymous	Chloride	16887-00-6	E235.Cl	97.1 mg/L	100 mg/L	97.1	75.0	125	----
Anions and Nutrients (QCLot: 1741873)										
WT2432262-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0179 mg/L	0.02 mg/L	91.4	70.0	130	----
Total Metals (QCLot: 1741548)										
WT2432284-001	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0524 mg/L	0.05 mg/L	105	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0546 mg/L	0.05 mg/L	109	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.00508 mg/L	0.005 mg/L	102	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0511 mg/L	0.05 mg/L	102	70.0	130	----
		Boron, total	7440-42-8	E420	0.048 mg/L	0.05 mg/L	95.8	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00521 mg/L	0.005 mg/L	104	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00276 mg/L	0.002 mg/L	110	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0123 mg/L	0.012 mg/L	98.1	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0120 mg/L	0.012 mg/L	96.4	70.0	130	----
		Copper, total	7440-50-8	E420	0.0116 mg/L	0.012 mg/L	92.6	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0255 mg/L	0.025 mg/L	102	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0122 mg/L	0.012 mg/L	97.9	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0126 mg/L	0.012 mg/L	100	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0236 mg/L	0.025 mg/L	94.6	70.0	130	----
		Phosphorus, total	7723-14-0	E420	0.494 mg/L	0.5 mg/L	98.8	70.0	130	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Total Metals (QCLot: 1741548) - continued										
WT2432284-001	Anonymous	Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0504 mg/L	0.05 mg/L	101	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00462 mg/L	0.005 mg/L	92.5	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.00516 mg/L	0.005 mg/L	103	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0511 mg/L	0.05 mg/L	102	70.0	130	----
		Thorium, total	7440-29-1	E420	0.00255 mg/L	0.005 mg/L	51.1	70.0	130	K
		Tin, total	7440-31-5	E420	0.0236 mg/L	0.025 mg/L	94.2	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	----	ND	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.00503 mg/L	0.005 mg/L	100	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0256 mg/L	0.025 mg/L	102	70.0	130	----
		Zinc, total	7440-66-6	E420	0.0240 mg/L	0.025 mg/L	96.1	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.00213 mg/L	0.005 mg/L	42.5	70.0	130	K

Qualifiers

Qualifier	Description
K	Matrix Spike recovery outside ALS DQO due to sample matrix effects.



COC Number: 20 - 956203

Canada Toll Free: 1 800 668 9878

Page 1 of 1

Environmental Division
Waterloo

Work Order Reference
WT2432294



Telephone : + 1 519 886 6910

[illegible]

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

4112 J. CLARK ET AL.



Ontario

WATER WELL RECORD

40P/10E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

6504647

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65005

CON.

GCT

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON., BLOCK, TRACT, SURVEY, ETC.

DATE COMPLETED

DAY 18 MO 07 YR 76

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BLACK			TOP SOIL	0	02
BROWN			CLAY	2	08
YELLOW			SANDY CLAY	8	16
BLUE			"	16	72
GREY			HARD PAN	72	110
YELLOW			SOME SANDY CLAY	110	112
BLUE			CLAY	112	135
BROWN			WATER BEARING SAND	135	145

31

0002802

0008605

001650581

0072305

0110214

01250581

32

0135305

014562891

41

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0135	1 ☒ FRESH 3 ☐ SULPHUR
0145	2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR
	2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR
	2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR
	2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR
	2 ☐ SALTY 4 ☐ MINERAL

5

CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
05	1 ☒ STEEL	1/4	0
	2 ☐ GALVANIZED		133
	3 ☐ CONCRETE		0134
	4 ☐ OPEN HOLE		
17-18	1 ☐ STEEL		20-23
	2 ☐ GALVANIZED		
	3 ☐ CONCRETE		
	4 ☐ OPEN HOLE		
24-25	1 ☐ STEEL		27-30
	2 ☐ GALVANIZED		
	3 ☐ CONCRETE		
	4 ☐ OPEN HOLE		

SCREEN

SIZE (S) OF OPENING (SLOT NO. 1)	014
4" PIPE	014006
MATERIAL AND TYPE	STAINLESS
DEPTH TO TOP OF SCREEN	0134

61

PLUGGING & SEALING RECORD

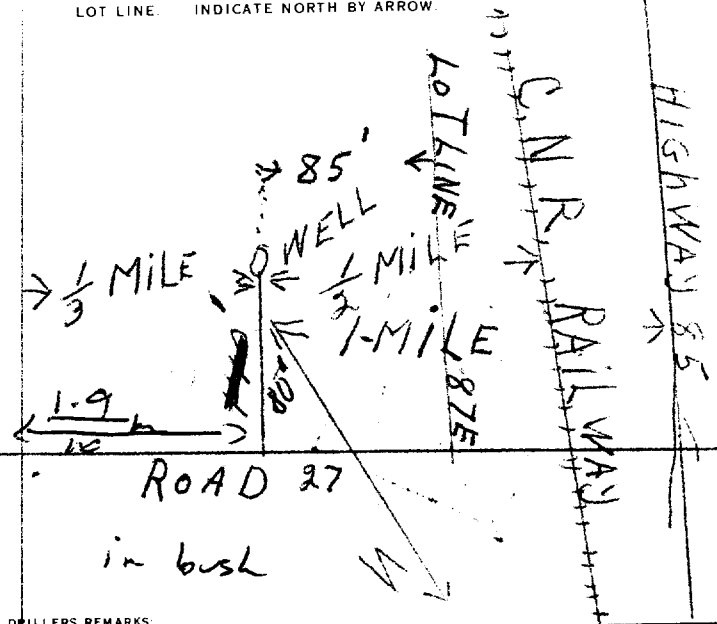
DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM TO	
10-13	14-17
18-21	22-25
26-29	30-33

71

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0011	20 15-16 00 17-18
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
018	019	15 MINUTES 26-28 30 MINUTES 29-31 45 MINUTES 32-34 60 MINUTES 35-37
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
	GPM	1 ☐ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	065	0011

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL	1 ☒ WATER SUPPLY	5 ☐ ABANDONED, INSUFFICIENT SUPPLY
	2 ☐ OBSERVATION WELL	6 ☐ ABANDONED, POOR QUALITY
	3 ☐ TEST HOLE	7 ☐ UNFINISHED
	4 ☐ RECHARGE WELL	
WATER USE	1 ☒ DOMESTIC	5 ☐ COMMERCIAL
	2 ☐ STOCK	6 ☐ MUNICIPAL
	3 ☐ IRRIGATION	7 ☐ PUBLIC SUPPLY
	4 ☐ INDUSTRIAL	8 ☐ COOLING OR AIR CONDITIONING
	☐ OTHER	9 ☐ NOT USED
METHOD OF DRILLING	1 ☒ CABLE TOOL	6 ☐ BORING
	2 ☐ ROTARY (CONVENTIONAL)	7 ☐ DIAMOND
	3 ☐ ROTARY (REVERSE)	8 ☐ JETTING
	4 ☐ ROTARY (AIR)	9 ☐ DRIVING
	5 ☐ AIR PERCUSSION	

CONTRACTOR	NAME OF WELL CONTRACTOR	LICENCE NUMBER
	SAUDER WELL DRILLING	4725
	ADDRESS	
	RIMILL BANK ONT NOKILO	
	NAME OF DRILLER OR BORER	LICENCE NUMBER
	SAME	4725
	SIGNATURE OF CONTRACTOR	SUBMISSION DATE
	John Sauder	DAY 6 MO 6 YR 76

OFFICE USE ONLY	DATA SOURCE	CONTRACTOR	DATE RECEIVED
	1	4725	220877
	DATE OF INSPECTION	INSPECTOR	
	June 7/78	74	
	REMARKS		
		CSS.S8	P
			WI



6505069

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GCT

40P/10 EAST

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2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON., BLOCK, TRACT, SURVEY, ETC

LOT 25-27

WATERLOO

Wookwich.

G. C. T.

084

ADDRESS

RR#2 ELMIRA

DATE COMPLETED

DAY 30 MO JUNE YR. 79

 UTM ZONE 17 EASTING 536450 NORTHING 4823850 RC 5 ELEVATION 1145 RC 5 BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BLACK	TOP SOIL			0	2
BROWN	SAND	BOULDERS, CLAY,	HARD, LAYERED	2	32
GREY	CLAY	BOULDERS,	HARD	32	60
BROWN	CLAY	BOULDERS,	HARD	60	104
BROWN	SAND	SILT	LAYERED	104	126
BROWN	SAND		LOOSE	126	130
BROWN	GRAVEL	SAND,	COARSE	130	132

[illegible]

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER	
10-13 130	1 ☒ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERAL
15-18	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERAL
20-23	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERAL
25-28	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERAL
30-33	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11 6 5/8	☒ STEEL ☒ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	12 .244	0	13-16 132
17-18	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	19		20-23
24-25	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	26		27-30

SIZE(S) OF OPENING (SLOT NO.)	31-33	DIAMETER	34-38	LENGTH	39-40
----------------------------------	-------	----------	-------	--------	-------

SCREEN	INCHES		FEET	
	MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN	41-44	8
			FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET		MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM	TO	
10-13	14-17	
18-21	22-25	
26-29	30-33	80

PUMPING TEST METHOD	1 ☐ PUMP 2 ☒ BAILER		PUMPING RATE 10 GPM.		DURATION OF PUMPING 2 15-16 HOURS 17-18 MINS	
	STATIC LEVEL	WATER LEVEL END OF PUMPING	25 WATER LEVELS DURING 1 ☐ PUMPING 2 ☒ RECOVERY			
	19-21 40 FEET	22-24 50 FEET	15 MINUTES 26-28 40 FEET	30 MINUTES 29-31 — FEET	45 MINUTES 32-34 FEET	60 MINUTES 35-37 FEET
	IF FLOWING, GIVE RATE	38-41 GPM	PUMP INTAKE SET AT FEET		WATER AT END OF TEST 1 ☒ CLEAR 2 ☐ CLOUDY	
	RECOMMENDED PUMP TYPE ☐ SHALLOW ☒ DEEP	RECOMMENDED PUMP SETTING 70 FEET	43-45 FEET	RECOMMENDED PUMPING RATE 10 GPM.		
	50-53 ——— GPM. / FT. SPECIFIC CAPACITY					

FINAL STATUS OF WELL	54 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL	5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE	55-56 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER	5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING	57 1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION	6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

LOCATION OF WELL

CONTRACTOR	NAME OF WELL CONTRACTOR		LICENCE NUMBER
	McLAUGHLIN WATER WELLS		3518
	ADDRESS		
	38 DOLMAN ST BRESLAU Ont.		
	NAME OF DRILLER OR BORER		LICENCE NUMBER
	Don McLaughlin		
	SIGNATURE OF CONTRACTOR	SUBMISSION DATE	
	R. McLaughlin	DAY 6 MO AUG YR 70	

OFFICE USE ONLY	DATA SOURCE	58	CONTRACTOR	59-62	DATE RECEIVED	63-68	8
	DATE OF INSPECTION		INSPECTOR				
	REMARKS:		P WI 68888				



The Ontario Water Resources Act

6507241

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65005

CON.
|G|C|T|

1 PRINT ONLY IN SPACES PROVIDED

2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON BLOCK, TRACT, SURVEY, ETC

LOT	25-27
-----	-------

Woolwich Twp.

Con. G.C.T.

86

R. 2, Elmira, Ontario. N3B 2Z2

DATE COMPLETED	48-53
----------------	-------

DAY 21 MO Nov. YR. 91.

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

[illegible]

31

32

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
10-13 47-51	1 ☒ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS	14	
15-18	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS	19	
20-23	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS	24	
25-28	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS	29	
30-33	1 ☐ FRESH 2 ☐ SALTY	3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS	34	

CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	☒ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE ☐ PLASTIC	12		13-16
6		.188	0	47700
17-18	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☒ OPEN HOLE ☐ PLASTIC	19		20-23
6			47-0	51
24-25	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE ☐ PLASTIC	26		27-30

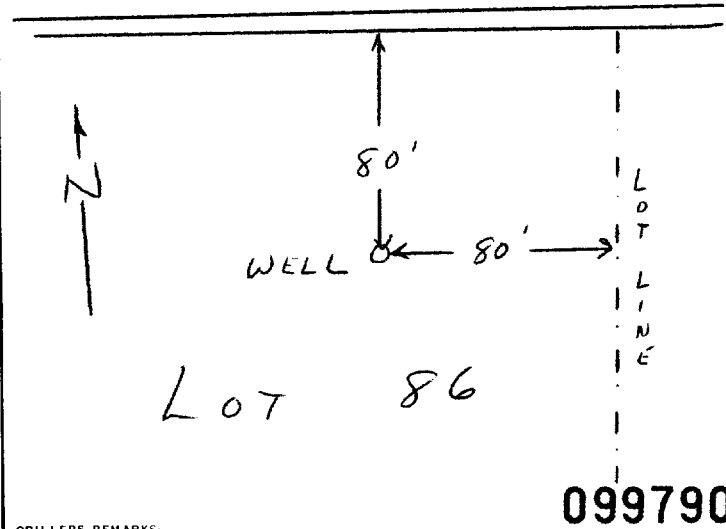
PLUGGING & SEALING RECORD

DEPTH SET AT - FEET		MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC)
FROM	TO	
10-13	14-17	
18-21	22-25	
26-29	30-33	80

PUMPING TEST	1 ☒ PUMP 2 ☐ BAILER		20 GPM		15-16 HOURS		17-18 MINS		
	STATIC LEVEL		WATER LEVEL END OF PUMPING		25		1 ☐ PUMPING 2 ☒ RECOVERY		
	19-21		22-24		15 MINUTES		30 MINUTES		
	28-28		29-31		45 MINUTES		60 MINUTES		
	15 FEET		25 FEET		18 FEET		15 FEET		
IF FLOWING, GIVE RATE		38-41 GPM		PUMP INTAKE SET AT 35 FEET		WATER AT END OF TEST		42	
RECOMMENDED PUMP TYPE		RECOMMENDED PUMP SETTING		43-45		RECOMMENDED PUMPING RATE		46-48	
☐ SHALLOW ☒ DEEP		35 FEET		35 FEET		1 ☒ CLEAR 2 ☐ CLOUDY		10 GPM	
50-53									

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



099790

FINAL STATUS OF WELL	54 1 ☒ WATER SUPPLY 2 ☒ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL	5 ☐ ABANDONEED. INSUFFICIENT SUPPLY 6 ☐ ABANDONEED POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING
WATER USE	55-56 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER _____	5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF CONSTRUCTION	57 1 ☐ CABLE TOOL 2 ☒ ROTARY (CONVENTIONAL) 3 ☒ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION	6 ☐ BORING 7 ☐ DIAMONO 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR	NAME OF WELL CONTRACTOR		WELL CONTRACTOR'S LICENCE NUMBER	
	Davidson Well Drilling Limited		1737	
	ADDRESS			
	Box 486, Wingham, Ontario. N0G 2W0			
	NAME OF WELL TECHNICIAN		WELL TECHNICIAN'S LICENCE NUMBER	
K. Lang		T0446		
SIGNATURE OF TECHNICIAN/CONTRACTOR			SUBMISSION DATE	
			DAY 3 MO Dec. YR. 9	

OFFICE USE ONLY	DATA SOURCE	58 CONTRACTOR	59-62	DATE RECEIVED	63-68
		1737		FEB 10 1992	
	DATE OF INSPECTION		INSPECTOR		
	REMARKS				
	CSS.ES				

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11

6508824

Municipality
65005

Con.
GCT

County or District Waterloo	Township/Borough/City/Town/Village Woolwich Twp.	Con block tract survey, etc. Con. GCT	Lot 85
Address R.R. 2, Elmira, Ontario N3B 2Z2		Date completed 31 July 00	
Northing		RC	Elevation
Basin Code		II	III

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)					
General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
Brown	Clay		Soft	0	9
Grey	Clay		Hard	9	25
Brown	Gravel		Coarse	25	63
Brown	Clay		Soft	63	68
Brown	Sand		Med.	68	97
Brown	Clay		Soft	97	106
Grey	Clay		Soft	106	110

31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

WATER RECORD			
Water found at - feet	Kind of water		
93-96	1 ☒ Fresh	3 ☐ Sulphur	14
	2 ☐ Salty	4 ☐ Minerals	
		5 ☐ Gas	
15-18	1 ☐ Fresh	3 ☐ Sulphur	19
	2 ☐ Salty	4 ☐ Minerals	
		5 ☐ Gas	
20-23	1 ☐ Fresh	3 ☐ Sulphur	24
	2 ☐ Salty	4 ☐ Minerals	
		5 ☐ Gas	
25-28	1 ☐ Fresh	3 ☐ Sulphur	29
	2 ☐ Salty	4 ☐ Minerals	
		5 ☐ Gas	
30-33	1 ☐ Fresh	3 ☐ Sulphur	34
	2 ☐ Salty	4 ☐ Minerals	
		5 ☐ Gas	

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
10-11	1 ☒ Steel			
	2 ☐ Galvanized			
	3 ☐ Concrete			
	4 ☐ Open hole			
	5 ☐ Plastic			
6		.188	+2-0	94
17-18	1 ☐ Steel			20-23
	2 ☐ Galvanized			
	3 ☐ Concrete			
	4 ☐ Open hole			
	5 ☐ Plastic			
24-25	1 ☐ Steel			27-30
	2 ☐ Galvanized			
	3 ☐ Concrete			
	4 ☐ Open hole			
	5 ☐ Plastic			

SCREEN		
Sizes of opening (Slot No.) # 16 slot	Diameter 5.75 inches	Length 3 feet
Material and type Stainless Steel Telescopic		Depth at top of screen 93 feet

PLUGGING & SEALING RECORD		
☐ Annular space ☐ Abandonment		
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)
From	To	
10-13	14-17	
18-21	22-25	
26-29	30-33	

PUMPING TEST		Pumping rate	Duration of pumping
71	1 ☒ Pump 2 ☐ Bailor	20 GPM	2 Hours 30 Mins
Static level	Water level end of pumping	Water levels during	
31 feet	50 feet	1 ☐ Pumping	2 ☒ Recovery
15 minutes	30 minutes	45 minutes	60 minutes
33 feet	31 feet	31 feet	31 feet
It flowing give rate	Pump intake set at	Water at end of test	
GPM	50 feet	☒ Clear ☐ Cloudy	
Recommended pump type	Recommended pump setting	Recommended pump rate	
☐ Shallow ☒ Deep	50 feet	15 GPM	

FINAL STATUS OF WELL			
1 ☒ Water supply	5 ☐ Abandoned, insufficient supply	9 ☐ Unfinished	
2 ☐ Observation well	6 ☐ Abandoned, poor quality	10 ☐ Replacement well	
3 ☐ Test hole	7 ☐ Abandoned (Other)		
4 ☐ Recharge well	8 ☐ Dewatering		
WATER USE			
1 ☒ Domestic	5 ☐ Commercial	9 ☐ Not use	
2 ☐ Stock	6 ☐ Municipal	10 ☐ Other	
3 ☐ Irrigation	7 ☐ Public supply		
4 ☐ Industrial	8 ☐ Cooling & air conditioning		
METHOD OF CONSTRUCTION			
1 ☐ Cable tool	5 ☐ Air percussion	9 ☐ Driving	
2 ☒ Rotary (conventional)	6 ☐ Boring	10 ☐ Digging	
3 ☐ Rotary (reverse)	7 ☐ Diamond	11 ☐ Other	
4 ☐ Rotary (air)	8 ☐ Jetting		

LOCATION OF WELL	
In diagram below show distances of well from road and lot line. Indicate north by arrow.	
217889	

Name of Well Contractor Davidson Well Drilling Limited	Well Contractor's Licence No. 1737
Address Box 486, Wingham, Ontario NOG 2W0	
Name of Well Technician D. Fenton	Well Technician's Licence No. T2003
Signature of Technician/Contractor <i>D. Fenton</i>	Submission date 09 Aug 00

MINISTRY USE ONLY	Data source 1737	Contractor 1737	Date received JAN 30 2001
	Date of inspection		
	Inspector		
	Remarks		
CSS.ES1			

Print only in spaces provided.

Mark correct box with a checkmark, where applicable.

11

6509418

Municipality

65005

Con.

GCT

County or District
Waterloo

Township/Borough/City/Town/Village

Woolwich Twp.

Con block tract survey, etc.

Con. GCT

Lot

83

Address

Address 1505 Jerusalem Rd.
North America R.R. 2. Elmira. Ont

Date _____

20 Feb 03
day month year

Northing

RC

Elevation

BC

Basin Code

ii

iii

iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

[illegible]

31

32

41		WATER RECORD				42	
Water found at - feet		Kind of water					
85 ⁰⁻¹³		1 ☒ Fresh	3	☐ Sulphur			14
		2 ☐ Salty	4	☐ Minerals			
			6	☐ Gas			
15-18		1 ☐ Fresh	3	☐ Sulphur			19
		2 ☐ Salty	4	☐ Minerals			
			6	☐ Gas			
20-23		1 ☐ Fresh	3	☐ Sulphur			24
		2 ☐ Salty	4	☐ Minerals			
			6	☐ Gas			
25-28		1 ☐ Fresh	3	☐ Sulphur			29
		2 ☐ Salty	4	☐ Minerals			
			6	☐ Gas			
30-33		1 ☐ Fresh	3	☐ Sulphur			34
		2 ☐ Salty	4	☐ Minerals			
			6	☐ Gas			

51 CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Well thickness inches	Depth - feet	
			From	To
10-11 6	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+1-6	13-16 86
17-18	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			20-23
24-25	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			27-30

SCREEN	54	65	75	80		
	Sizes of opening (Slot No.)	31-33	Diameter	34-38	Length	39-40
	# 18 slot		5.75 inches		3 feet	
	Material and type	Depth at top of screen			30	
	Stainless Steel	86			41-44 feet	

61				PLUGGING & SEALING RECORD			
☒ Annular space				☐ Abandonment			
Depth set et - feet		Material end type (Cement grout, bentonite, etc.)					
From	To						
89 ¹⁰⁻¹³	20 ¹⁴⁻¹⁷	Bentonite grout					
20 ¹⁸⁻²¹	0 ²²⁻²⁵	Holeplug					
26-29	30-33	80					

PUMPING TEST	Pumping test method ¹⁰ ☒ Pump ² ☐ Bailer		Pumping rate ¹¹⁻¹⁴ 10 GPM		Duration of pumping ¹⁷⁻¹⁸ 4 Hours 15 Mins	
	Static level ¹⁹⁻²¹		Water level end of pumping ²²⁻²⁴		Water levels during ²⁵ ☒ Pumping ² ☐ Recovery	
			15 minutes ²⁶⁻²⁸		30 minutes ²⁹⁻³¹	
	42 feet		59 feet		60 feet	
			45 minutes ³²⁻³⁴		60 minutes ³⁵⁻³⁷	
	61 feet		61 feet		61 feet	
If flowing give rate ³⁸⁻⁴¹ GPM			Pump intake set et ⁴² 60 feet		Water et end of test ⁴³ ☒ Clear ☐ Cloudy	
Recommended pump type ⁴⁴⁻⁴⁵ ☐ Shallow ☒ Deep			Recommended pump setting ⁴⁶⁻⁴⁹ 65 feet		Recommended pump rate ⁵⁰⁻⁵³ 10 GPM	

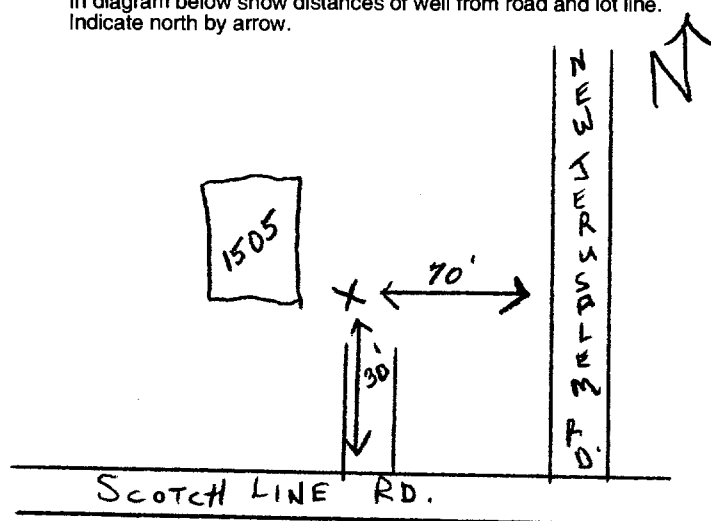
FINAL STATUS OF WELL			54
1 ☒ Water supply	5 ☐ Abandoned, insufficient supply	9 ☐ Unfinished	
2 ☐ Observation well	6 ☐ Abandoned, poor quality	10 ☐ Replacement well	
3 ☐ Test hole	7 ☐ Abandoned (Other)		
4 ☐ Recharge well	8 ☐ Dewatering		

WATER USE			55-56
1 ☐ Domestic	5 ☐ Commercial	9 ☐ Not use	
2 ☐ Stock	6 ☐ Municipal	10 ☐ Other	
3 ☐ Irrigation	7 ☒ Public supply		
4 ☐ Industrial	8 ☐ Cooling & air conditioning		

METHOD OF CONSTRUCTION			57
1 ☐ Cable tool	5 ☐ Air percussion	9 ☐ Driving	
2 ☒ Rotary (conventional)	6 ☐ Boring	10 ☐ Digging	
3 ☐ Rotary (reverse)	7 ☐ Diamond	11 ☐ Other	
4 ☐ Rotary (air)	8 ☐ Jetting		

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



249683

Name of Well Contractor Davidson Well Drilling Ltd.	Well Contractor's Licence No. 1737
Address Box 486, Wingham, Ontario NOG 2W0	
Name of Well Technician J. Pickering	Well Technician's Licence No. T2824
Signature of Technician/Contractor <i>D.W. Davidson</i> per: <i>J.C. Davidson</i>	Submission date 25 day Feb mo 03 yr

MINISTRY USE ONLY	Data source	58	Contractor	59-62	Date received	63-68	80
			1737		AUG 05 2003		
	Date of inspection		Inspector				
	Remarks						

Print only in spaces provided.

Mark correct box with a checkmark, where applicable.

6509530

Municipality Con.

65005 GC

10 14 15 22 23 24

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
	Woolwich Twp.	Con. GCT	83
	Address of Well Location	Date completed	
	70 Northside Dr. St. Jacobs, Ont.	27 day 03 month year	

21	Zone	Easting	Northing	RC	Elevation	RC	Basin Code	ii	iii	iv
	UTM	10	12	13	14	15	16	17	18	19

[illegible][illegible]

41		10 15		14 15		21	
WATER RECORD							
Water found at - feet		Kind of water					
87-90	10-15	1	☐ Fresh	3	☐ Sulphur	14	
	2	☐ Salty	4	☐ Minerals			
15-18		2	☐ Salty	6	☐ Gas		
		1	☐ Fresh	3	☐ Sulphur	19	
		2	☐ Salty	4	☐ Minerals		
				6	☐ Gas		
20-23		1	☐ Fresh	3	☐ Sulphur	24	
		2	☐ Salty	4	☐ Minerals		
				6	☐ Gas		
		1	☐ Fresh	3	☐ Sulphur	29	
25-28		2	☐ Salty	4	☐ Minerals		
				6	☐ Gas		
30-33		1	☐ Fresh	3	☐ Sulphur	34	
		2	☐ Salty	4	☐ Minerals		
				6	☐ Gas		

51 CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
10-11 6	1 ☐ Steel ¹² 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+2	13-16 86
17-18	1 ☐ Steel ¹⁹ 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			20-23
24-25	1 ☐ Steel ²⁶ 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			27-30

SCREEN	Sizes of opening (Slot No.)	31-33	Diameter	34-38	Length	39-40
	# 25 slot		5.75	inches	3	feet
	Material and type			Depth at top of screen		
	Stainless Steel			87		

61	PLUGGING & SEALING RECORD			
☒ Annular space		☐ Abandonment		
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)		
From	To			
13-13 25	14-17 5	Bentonite		
18-21 5	22-25 0	Sand		
26-29	30-33	80		

PUMPING TEST	71 Pumping test method ¹⁰		Pumping rate ¹¹⁻¹⁴		Duration of pumping	
	1 ☒ Pump 2 ☐ Bailer		10 GPM		1 ¹⁵⁻¹⁶ Hours ¹⁷⁻¹⁸ Mins	
	Static level		Water level during		1 ☒ Pumping 2 ☐ Recovery	
	Water level end of pumping		25			
	19-21		22-24		15 minutes ²⁶⁻²⁸	
	27-8 feet		24-3 feet		26-8 feet	
18 feet		27-4 feet		27-8 feet		
If flowing give rate ³⁸⁻⁴¹		Pump intake set at		Water at end of test ⁴²		
GPM		60 feet		1 ☒ Clear ☐ Cloudy		
Recommended pump type		Recommended pump setting		Recommended pump rate ⁴⁶⁻⁴⁹		
☐ Shallow ☒ Deep		75 feet		10 GPM		

FINAL STATUS OF WELL			54
1 ☒ Water supply	5 ☐ Abandoned, insufficient supply	9 ☐ Unfinished	
2 ☐ Observation well	6 ☐ Abandoned, poor quality	10 ☐ Replacement well	
3 ☐ Test hole	7 ☒ Abandoned (Other)		
4 ☐ Recharge well	8 ☐ Dewatering		

WATER USE			55-56
1 ☐ Domestic	5 ☐ Commercial	9 ☐ Not use	
2 ☒ Stock	6 ☐ Municipal	10 ☐ Other	
3 ☐ Irrigation	7 ☐ Public supply		
4 ☐ Industrial	8 ☐ Cooling & air conditioning		

METHOD OF CONSTRUCTION			57
1 ☐ Cable tool	5 ☐ Air percussion	9 ☐ Driving	
2 ☒ Rotary (conventional)	6 ☐ Boring	10 ☐ Digging	
3 ☐ Rotary (reverse)	7 ☐ Diamond	11 ☐ Other	
4 ☐ Rotary (air)	8 ☐ Jetting		

LOCATION OF WELL

In diagram below show distances of well from road and lot line.
Indicate north by arrow.

N 43° 43.510
W 080° 32.027

261835

Name of Well Contractor	Well Contractor's Licence No.
Davidson Well Drilling Ltd. 1737	
Address	
Box 486, Wingham, Ontario NOG 2W0	
Name of Well Technician	Well Technician's Licence No.
G. Reavie	To156
Signature of Technician/Contractor	Submission date
<i>G. Reavie</i>	31 Oct yr 03

MINISTRY USE ONLY	Data source	58 Contractor	59-62	Date received	63-66	67-70
		1737		DEC 05 2003		
	Date of inspection	Inspector				
	Remarks					

Address of Well Location (Street Number/Name) 1665 SCOTCH LINE RD.		Township WOOLWICH	Lot 83	Concession GCT
County/District/Municipality WATERLOO		City/Town/Village ELMIRA	Province Ontario	Postal Code N3B2Z2
UTM Coordinates NAD 83	Zone 17	Easting 536614	Northings 4825312	Municipal Plan and Sublot Number

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)				
General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From To
CASING EXTENSION				

Annular Space		
Depth Set at (m/ft) From To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)

Method of Construction	Well Use
☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Other, specify _____	☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, specify _____

Construction Record - Casing				Status of Well
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From To	
15.875	STEEL	0.444	1.61 1.63	☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify _____ ☐ Other, specify _____

Construction Record - Screen				Status of Well
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From To	
				☐ Other, specify _____

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify _____	Depth (m/ft) From To	Diameter (cm/in)
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify _____		
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify _____		

Well Contractor and Well Technician Information			
Business Name of Well Contractor MARTIN'S WATER SYSTEMS LTD.		Well Contractor's Licence No. 6231	
Business Address (Street Number/Name) 3090 BRICKER SCHOOL LINE		Municipality ELMIRA	
Province ONT.	Postal Code N3B2Z3	Business E-mail Address leroy@martinswater.ca	
Bus. Telephone No. (inc. area code) 519 664 2580		Name of Well Technician (Last Name, First Name) MARTIN RICHARD	
Well Technician's Licence No. 1188		Signature of Technician and/or Contractor [Signature]	
		Date Submitted 20160429	

Results of Well Yield Testing				
After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify _____	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:	Static Level			
	1		1	
Pump intake set at (m/ft)	2		2	
Pumping rate (l/min / GPM)	3		3	
Duration of pumping hrs + min	4		4	
Final water level end of pumping (m/ft)	5		5	
If flowing give rate (l/min / GPM)	10		10	
	15		15	
Recommended pump depth (m/ft)	20		20	
	25		25	
Recommended pump rate (l/min / GPM)	30		30	
	40		40	
Well production (l/min / GPM)	50		50	
Disinfected? ☐ Yes ☐ No	60		60	

Map of Well Location	
Please provide a map below following instructions on the back.	
SOUTH FIELD DR. 322 M 890 M NEW JERUSALEM RD.	

Well owner's information package delivered ☐ Yes ☐ No	Date Package Delivered Y Y Y Y M M D D 20160421	Date Work Completed 20160421
Ministry Use Only Audit No. 2227046		Received MAY 05 2016



A 000883

A000883

Instructions for Completing Form

- For use in the Province of Ontario only. This document is a permanent legal document. Please retain for future reference.
- All Sections must be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- All metre measurements shall be reported to 1/10th of a metre.
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN 65095 CON 667 LOT 82

Address of Well Location (County/District/Municipality)

Waterloo Region

RR#/Street Number/Name

70 Northside Dr.

GPS Reading

NAD

Zone

Easting

Northing

813

17

0537658

48

24794

Woolwich Twp.

City/Town/Village

St. Jacobs

Unit Make/Model

Garmin eTREX Venture

Mode of Operation:

☒ Undifferentiated

☐ Averaged

☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Metres To
Brown	Clay	Sand		0	18
Grey	Clay			18	44
Grey	Clay	Stones		44	69
Brown	Sand	Gravel		69	77

Hole Diameter		
Depth From	Metres To	Diameter Centimetres
0	77'	8"

Water Record	
Water found at	Kind of Water
77' m	☒ Fresh ☐ Sulphur
☐ Gas ☐ Salty ☐ Minerals	
☐ Other:	
☐ m ☐ Fresh ☐ Sulphur	
☐ Gas ☐ Salty ☐ Minerals	
☐ Other:	
☐ m ☐ Fresh ☐ Sulphur	
☐ Gas ☐ Salty ☐ Minerals	
☐ Other:	
After test of well yield, water was	
☒ Clear and sediment free	
☐ Other, specify	
Chlorinated ☒ Yes ☐ No	

Construction Record				
Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To
Casing				
6"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.188"	0	74'
Screen				
Outside diam	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
6"		30	74'	77'
No Casing or Screen				
☐ Open hole				

Test of Well Yield				
Pumping test method	Draw Down	Recovery	Time min	Water Level Metres
Pump intake set at - (metres) 40'	Static Level			
Pumping rate - (litres/min) 12 gpm	1	22-7	1	20-9
Duration of pumping 1 hrs + min	2	22-8	2	20-8
Final water level end of pumping 23' metres	3	22-9	3	20-7
Recommended pump type. ☐ Shallow ☒ Deep	4	22-9	4	20-7
Recommended pump depth. 50' metres	5	22-9	5	20-7
Recommended pump rate. 12 gpm (litres/min)	10	22-9	10	20-6.5
If flowing give rate - (litres/min)	15	22-9	15	20-6
	20	22-9	20	20-6
	25		25	20-6
If pumping discontinued, give reason.	30	23'	30	20-6
	40	23'	40	20-6
	50	23'	50	20-6
	60	23'	60	20-6

Plugging and Sealing Record		☒ Annular space	☐ Abandonment
Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
70	0	Benseal Grout	

Method of Construction	
☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging	
☒ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other	
☐ Rotary (reverse) ☐ Boring ☐ Driving	

Water Use	
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other	
☒ Stock ☐ Commercial ☐ Not used	
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning	

Final Status of Well	
☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)	
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering	
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well	

Well Contractor/Technician Information	
Name of Well Contractor	Well Contractor's Licence No.
Davidson Well Drilling Limited	1737
Business Address (street name, number, city etc.)	
147 North St. W. Wingham, Ontario NOG 2W0	
Name of Well Technician (last name, first name)	Well Technician's Licence No.
LoSCH Kim	T0927
Signature of Technician/Contractor	Date Submitted
X J.C. Davidson	200403/01

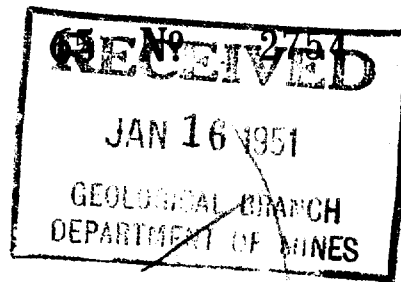
Location of Well	
In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.	
Audit No.	Date Well Completed
Z 11542	2004 02 25
Was the well owner's information package delivered? ☒ Yes ☐ No	Date Delivered
	200402/25

Ministry Use Only	
Data Source	Contractor
	1737
Date Received	Date of Inspection
SEP 29 2004	
Remarks	Well Record Number
	6509764

UTM 17 537425 5 4824450
 Elev. 5 1135
 Basin 23



The Well Drillers Act
 Department of Mines, Province of Ontario



Conc- G. C. T.
 Lot- 83.

Water Well Record

County or Territorial District Natrol Township, Village, Town or City Woolwich
 Con. 476 Lot 83 Street and Number (if in Village, Town or City) R.R. No 2, Elmira Ont.
 Owner S.S. No 12 Woolwich Address R.R. No 2, Elmira Ont.
 Date Completed 12 Oct 1950 Cost of Well (excluding pump) 4.70 per ft.

Pipe and Casing Record

Pumping Test

Casing diameter(s) 4 C.D. Date Oct. 10, 1950
 Length(s) of casing(s) 82' Static level 15 ft.
 Type of screen homemade 3/4" casing Pumping level 900 gals per hr.
 Length of screen 6 1/2 inches Pumping rate 900 gals per hr.
 Distance from top of screen to ground level 82' Duration of test 13 hrs.
 Is well a gravel-wall type? Yes Distance from cylinder or bowls to ground level 7.8 ft.

Water Record

Kind (fresh or mineral)	Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
<u>Fresh</u>	<u>82</u>	<u>Fresh</u>	<u>67</u>
Quality (hard, soft, contains iron, sulphur, etc.) <u>soft</u>			
Appearance (clear, cloudy, coloured) <u>clear</u>			
For what purpose(s) is the water to be used? <u>school</u>			
How far is well from possible source of contamination? <u>80 ft.</u>			
What is the source of contamination? <u>puddles</u>			
Enclose a copy of any mineral analysis that has been made of water			

Well Log

Overburden and Bedrock Record

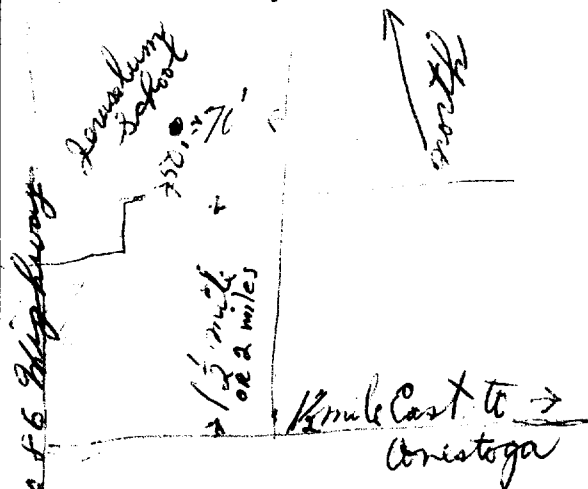
From

To

<u>gravel</u>	<u>0 ft.</u>	<u>1. ft.</u>
<u>ashes</u>	<u>1'</u>	<u>2'</u>
<u>brown clay</u>	<u>2'</u>	<u>10'</u>
<u>blue clay</u>	<u>10'</u>	<u>73'</u>
<u>sand</u>	<u>73'</u>	<u>80'</u>
<u>waterbearing sand</u>	<u>80'</u>	<u>88'</u>

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Situation: Is well on upland, in valley, or on hillside? upland
 Drilling Firm John H. Sander Dial 2313 Elmira Ont.
 Address R.R. 1, St. Jacobs, Ontario
 Name of Driller John H. Sander Address R.R. 1, St. Jacobs
 Date January 16, 1951 Licence Number 216
 Signature of Licensee John H. Sander

lev. 5R

11145

basin 23

County or District Waterloo

Township, Village, Town or City Woolwich

Con. C.G.T.

Lot

completed 26 MAY 1969

Address RR. 2 ELMIRA ONT.

56

Casing and Screen Record

Pumping Test

Inside diameter of casing 6 3/8

Static level 7

Total length of casing 60

Test-pumping rate 15 G.P.M.

Type of screen

Pumping level 15 ft

Length of screen

Duration of test pumping 6 hrs

Depth to top of screen

Water clear or cloudy at end of test clear

Diameter of finished hole 6 5/8

Recommended pumping rate 15 or less G.P.M.

with pump setting of 20 feet below ground surface

Well Log			Water Record	
Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
CLAY	0	30		
CLAY + HARD PAN	30	59		
GRAVEL	59	60	FRESH	
			59'-60'	

For what purpose(s) is the water to be used? HOUSE

Is well on upland, in valley, or on hillside? UPLAND

Drilling or Boring Firm

McLAUGHLIN WATER WELLS & SUPPLY LTD

Address DOLMAN ST.

BRESLAU ONT.

Licence Number 3428

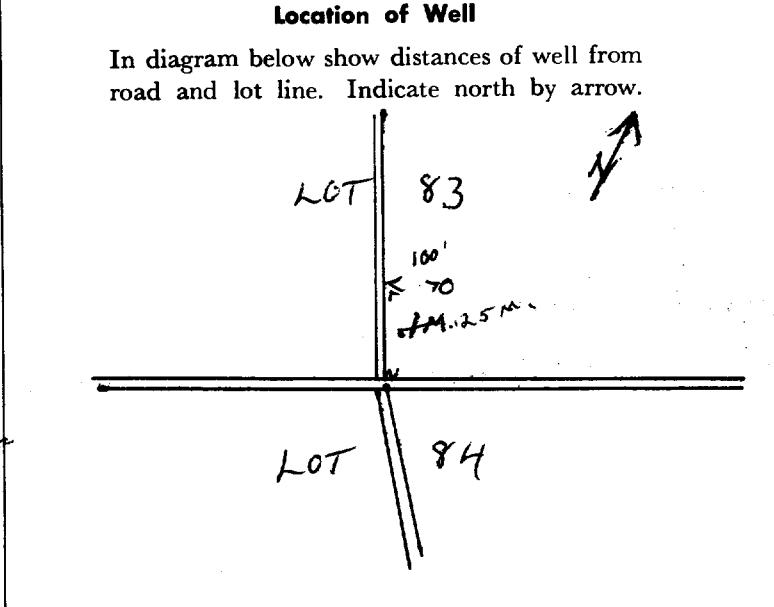
Name of Driller or Borer Bryan Carey

Address 425 Erb st W Waterloo

Date May 26 1969

R. McLoughlin

(Signature of Licensed Drilling or Boring Contractor)



A264764

Address of Well Location (Street Number/Name)		Township		Lot	Concession
2477 New Jerusalem Rd		Woolwich		82	GCT
County/District/Municipality		City/Town/Village		Province	Postal Code
Waterloo		Elmira		Ontario	N3B2Z2
UTM Coordinates Zone Easting Northing		Municipal Plan and Sublot Number		Other	
NAD 83 17T 577605 4825757					

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)					
General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
From	To				
Br clay	clay	Topsoil	Soft	0	4
Br clay	clay	stones	Hard	4	27
Br gravel	gravel	stones	Course	27	35
grey clay	clay	stones	Hard	35	49
Br gravel	gravel	sand stones	Course	49	72
grey clay	clay		Hard	72	

Annular Space				Results of Well Yield Testing				
Depth Set at (m/ft) From To		Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	After test of well yield, water was: ☒ Clear and sand free ☐ Other, specify _____	Draw Down		Recovery	
0	20	Hole plug	9 bgs	If pumping discontinued, give reason:	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
					Static Level	24.6		24.3
				Pump intake set at (m/ft) 50	1	24.9	1	25.
					2	24.9	2	24.9
					3	24.9	3	24.9

Method of Construction	Well Use
☐ Cable Tool ☒ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Other, specify	☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Public ☒ Domestic ☐ Livestock ☐ Irrigation ☐ Industrial ☐ Other, specify
	☐ Commercial ☐ Municipal ☐ Test Hole ☐ Cooling & Air Conditioning ☐ Not used ☐ Dewatering ☐ Monitoring

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	From	To
6 1/8	steel	188	43	66	

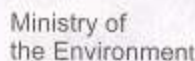
Construction Record - Screen				Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	From	To
5	steel	35	71	66-6	

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☒ Untested	Depth (m/ft)	Diameter (cm/in)
	☐ Gas ☐ Other, specify 71	From To	
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested	0 20	10
	☐ Gas ☐ Other, specify	20 71	8 3/4
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested	0 72	6 1/8
	☐ Gas ☐ Other, specify		

Well Contractor and Well Technician Information			
Business Name of Well Contractor		Well Contractor's Licence No.	
Well Initiatives		72 21	
Business Address (Street Number/Name)		Municipality	
15 Town line Oranville			
Province	Postal Code	Business E-mail Address	
Ont	L9A3R4	info@wellinitatives.com	
Bus. Telephone No. (inc. area code)		Name of Well Technician (Last Name, First Name)	
519 8968289		Fenton Doug	
Well Technician's Licence No.		Signature of Technician and/or Contractor	
72 003		Doug Fenton	
		Date Submitted	
		2019 10 27	

Map of Well Location			
Please provide a map below following instructions on the back.			
Comments:			

Well owner's information package delivered	Date Package Delivered	Ministry Use Only	
☐ Yes ☐ No	Y Y Y Y M M D D	Audit No.	324611
	Date Work Completed		NOV 04 2019
	2019 10 27	Received	



Measurements recorded in: ☐ Metric ☐ Imperial

We _____ (Print Below)

A 092110

Well Record

Regulation 903 Ontario Water Resources Act

Page of

P E R F O R M A N C E

Address of Well Location (Street Number/Name)

Address of Well Location (Street Number/Name)
2544 NEW JERUSALEM RD.

Township

Township WOOLWICH

Lot

Lot 82

Concession

Concession
GCT

County/District/Municipality

WATERLOO

City/Town/Village

ELMTRA

Province

Ontario

Postal Code

Postal Code
M3B 2Z2

UTM Coordinates

Zone, Easting

Northing

	South		East			North		
NAD	8	3	17	53	75	73	48	26044

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

[illegible]

Annular Space			
Depth Set at (m/ft)		Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)
From	To		

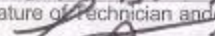
Method of Construction		Well Use		
☐ Cable Tool	☐ Diamond	☐ Public	☐ Commercial	☐ Not used
☐ Rotary (Conventional)	☐ Jetting	☐ Domestic	☐ Municipal	☐ Dewatering
☐ Rotary (Reverse)	☐ Driving	☐ Livestock	☐ Test Hole	☐ Monitoring
☐ Boring	☐ Digging	☐ Irrigation	☐ Cooling & Air Conditioning	
☐ Air percussion		☐ Industrial		
☐ Other, <i>specify</i> _____		☐ Other, <i>specify</i> _____		

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned,
			From	To	
15.875	STEEL	.477	1.53	7.60	

Construction Record - Screen				
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To

☐ Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify _____
☐ Other, specify _____

Water Details		Hole Diameter	
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify	Depth (m/ft) From	Diameter (cm/in) To
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify		
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify		

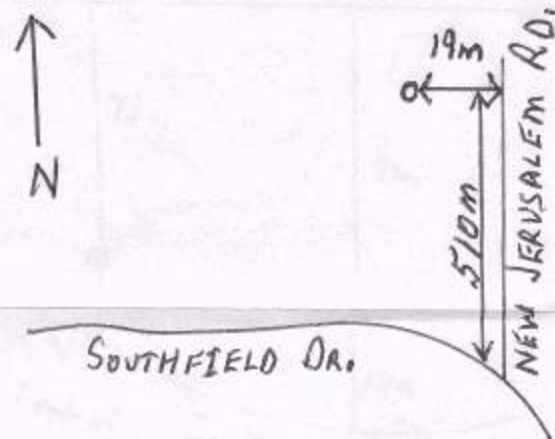
Well Contractor and Well Technician Information			
Business Name of Well Contractor		Well Contractor's Licence No.	
MARTIN'S WATER SYSTEMS LTD		6231	
Business Address (Street Number/Name)		Municipality	
3090 BRICKER SCHOOL LINE		WATERLOO	
Province	Postal Code	Business E-mail Address	
ONT-	N3B2Z3	-	
Bus. Telephone No. (inc. area code)		Name of Well Technician (Last Name, First Name)	
519 664 2580		MARTIN LEADY	
Well Technician's Licence No.	Signature of Technician and/or Contractor		Date Submitted
1186			20100427

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, <i>specify</i>	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:	Static Level			
	1		1	
Pump intake set at (m/ft)	2		2	
Pumping rate (l/min / GPM)	3		3	
	4		4	
Duration of pumping ____ hrs + ____ min	5		5	
Final water level end of pumping (m/ft)	10		10	
If flowing give rate (l/min / GPM)	15		15	
	20		20	
Recommended pump depth (m/ft)	25		25	
Recommended pump rate (l/min / GPM)	30		30	
	40		40	
Well production (l/min / GPM)	50		50	
Disinfected? ☐ Yes ☐ No	60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered	Date Package Delivered	Ministry Use Only Audit No. Z106287 MAY 03 2010
	Date Work Completed 20100426	

85 55

40P10E



UTM 17 Z 536625 E

GROUND WATER
65 No 2756

5 R 4825075 N

Elev. 5 R 1150

The Ontario Water Resources Commission Act

WATER WELL RECORD

Basin 23 WATERLOO

County or District Township, Village, Town or City

Con. G.C.T. Lot 83

Date completed 11 October 1962
(day month year)

Address R.R.# 2, Elmira, Ont.

Casing and Screen Record

Inside diameter of casing 6 5/8 in.

Total length of casing 103 ft.

Type of screen

Length of screen

Depth to top of screen

Diameter of finished hole 7" O.D.

Pumping Test

Static level 35 ft.

Test-pumping rate 15 G.P.M.

Pumping level 40 ft.

Duration of test pumping 12 hrs.

Water clear or cloudy at end of test clear

Recommended pumping rate 12 or less G.P.M.

with pump setting of 45 feet below ground surface

Well Log

Water Record

Overburden and Bedrock Record

	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
top soil	0	3		
sand and clay	3	20		
dry gravel	20	65		
clay	65	80		
hardpan	80	99		
gravel	99	102	99 ft.	FRESH

For what purpose(s) is the water to be used?

household & farm

Is well on upland, in valley, or on hillside? upland

Drilling or Boring Firm

McLaughlin Well Drilling

Address 236 Erb St. W.,

Waterloo, Ont.

Licence Number 601

Name of Driller or Borer Russel McLaughlin

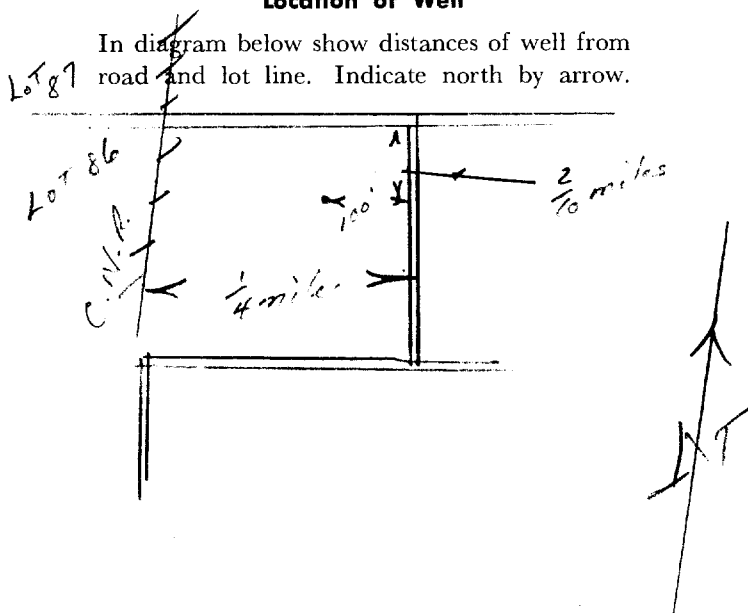
Address 236 Erb St. W., Waterloo, Ont.

Date Dec. 29, 1962

(Signature of Licensed Drilling or Boring Contractor)

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



✓

UTM 17 Z 9999999 E
9 R 9999999 N
 Elev. 9 R _____
 Basin 23 _____ **Dep**

The Well Drillers Act
Department of Mines, Province of Ontario

Water Well Record

Deepened

GET (German Tract)
 Con. Lot Pt. Lot. &
 # 4 Elmira Ont. Acres 1 -
 (including pump)

Pipe and Casing Record	Pumping Test
Casing diameter(s) . . . 8 1/4"	Date . . . Sept. 7, 1950
Length(s) of casing(s) . . . 98 ft	Developed Capacity . . . 15 G. P. M.
Length of screen	Duration of Test 8 hrs
Type of screen	Pumping Rate 15 G. P. M.
Type of pump . . . deep well plunger	Drawdown 15 ft
Capacity of pump . . . 120 G. P. Hr	Static level of completed well . . 22 ft
Depth of pump setting . . 80 ft	Is well a gravel-wall type? . . . gravel

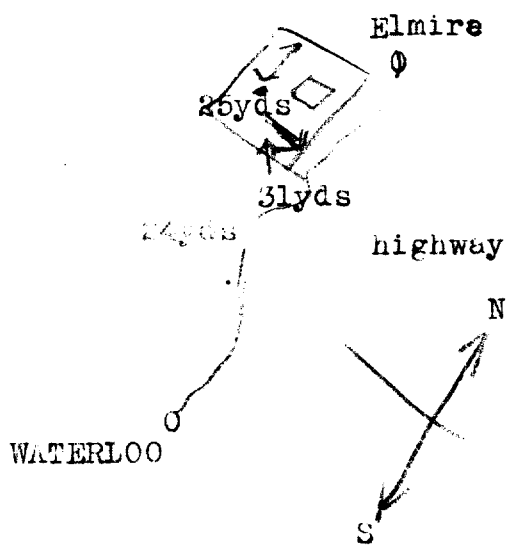
Water Record

Kind (fresh or mineral)	fresh	Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
Quality (hard, soft, contains iron, sulphur etc.)	-	98 ft	fresh	70
Appearance (clear, cloudy, coloured)	clear			
For what purpose(s) is the water to be used?	house			
How far is well from possible source of contamination?	none			
What is source of contamination?				
Enclose a copy of any mineral analysis that has been made of water				

[illegible]

Location of Well

In diagram below show distances of well from road and lot line



Situation: Is well on upland, in valley, or on hillside?..valley.....
Drilling Firm..JL. GRAHAM.....
Address...R. R. # 3 Guelph Ontario.....
Recorded by Henderson.....J. W.....Address..R. R. # 1 Ariss.....
Date....Sept. 7th. 1950.....Licence Number..102.....

ENCLOSURES



Soil Abbreviations and Terms Used on Record of Borehole Sheets

TERMINOLOGY DESCRIBING COMMON SOIL TYPES:

Topsoil	-	mixture of soil and humus capable of supporting vegetation
Peat	-	mixture of visible and invisible fragments of decayed organic matter
Till	-	unstratified glacial deposit which may range from clay to boulders
Fill	-	soil materials identified as being placed anthropologically

CLASSIFICATION (UNIFIED SYSTEM)

Clay	<0.002mm	
Silt	0.002 to .075mm	
Sand	0.075 to 4.75mm	
	Fine	0.075 to 0.425 mm
	Medium	0.425 to 2.0 mm
	Coarse	2.0 to 4.75 mm
Gravel	4.75 to 75mm	
	Fine	4.75 to 19 mm
	Coarse	19 to 75 mm
Cobbles	75 to 300mm	
Boulders	>300mm	

TERMINOLOGY

Soil Composition	% by Weight
"traces"	<10%
"some"(eg. some silt)	10-20%
Adjective (eg. sandy)	20-35%
"and"(eg. sand and gravel)	35-50%

Standard Penetration Resistance (SPT): Standard Penetration Resistance ('N' Values) refers to the number of blows required to advance a standard (ASTM D1586) 51 mm Ø (2 inch) split-spoon sampler by the use of a free falling, 63.5 Kg (140lbs) hammer. The number of blows from the drop weight is recorded for every 15 cm (6 inches). The hammer is dropped from a distance of 0.76m (30 inches) providing 474.5 Joules per blow. When the sampler is driven a total of 45 cm (18 inches) into the soil, the standard penetration index ('N' Value) is the total number of blows for the last 30 cm (12 inches).

Dynamic Cone Penetration Resistance (DCPT): Dynamic Cone Penetration Resistance is similar to a SPT with the 474.5 Joule/blow impulse provided by the free falling hammer where the split-spoon sampler is replaced by a 51 mm Ø, 60° conical point and the number of blows is recorded continuously for every 30 cm (12 inches).

COHESIVE SOILS CONSISTENCY

	(kPa)	(P.S.F.)	Nominal 'N' Value
Very Soft	<12	<250	0-2
Soft	12-25	250-500	2-4
Firm	25-50	500-1000	4-8
Stiff	50-100	1000-2000	8-15
Very Stiff	100-200	2000-4000	15-30
Hard	>200	>4000	>30

RELATIVE DENSITY OF COHESIONLESS SOIL

	'N' Value
Very Loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

MOISTURE CONDITIONS:

Cohesive Soil
DTPL- Drier than plastic limit
APL- About plastic limit
WTPL- Wetter than plastic limit
MWTPL- Much wetter than plastic limit

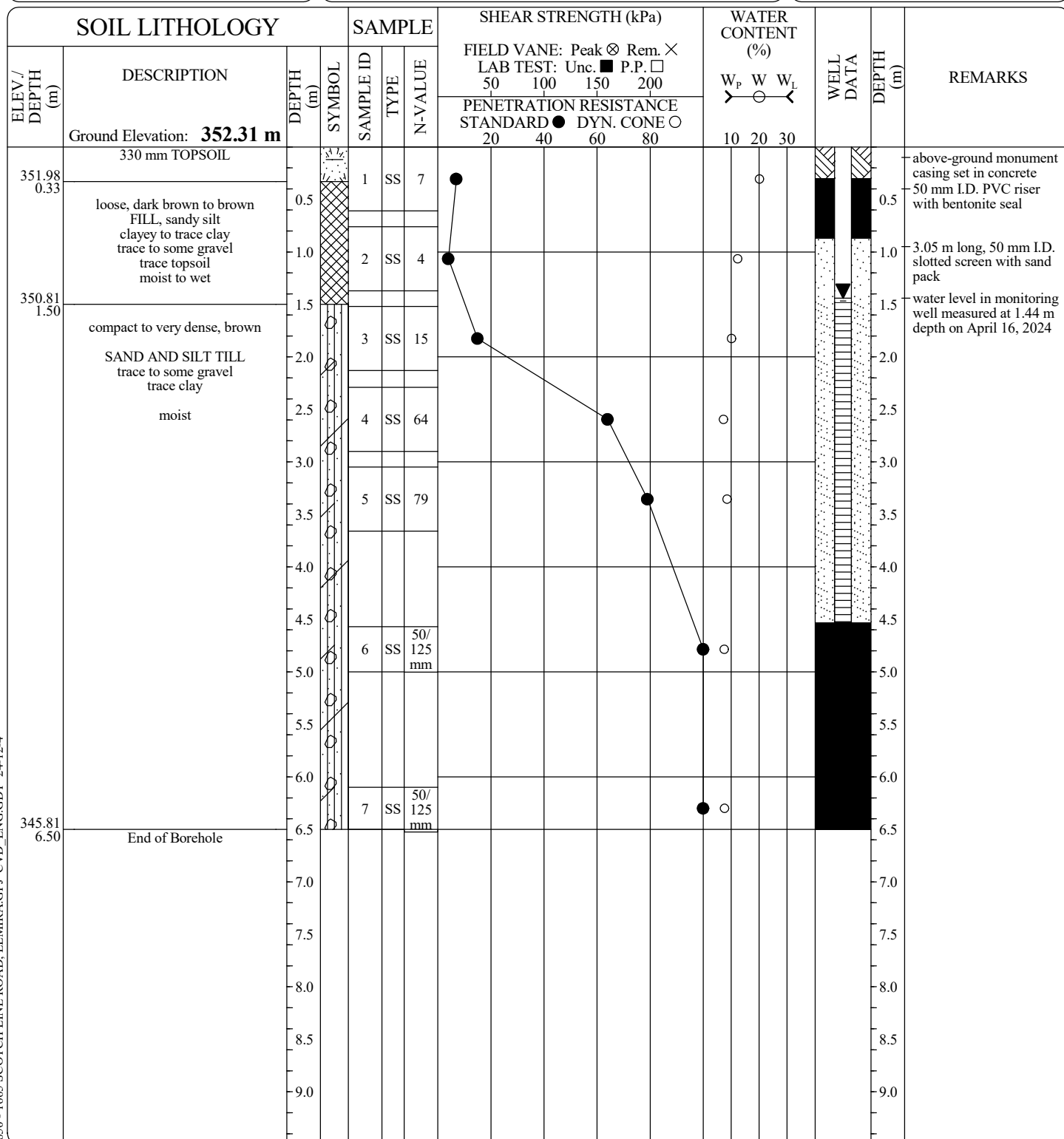
Cohesionless Soil
Damp
Moist
Wet
Saturated

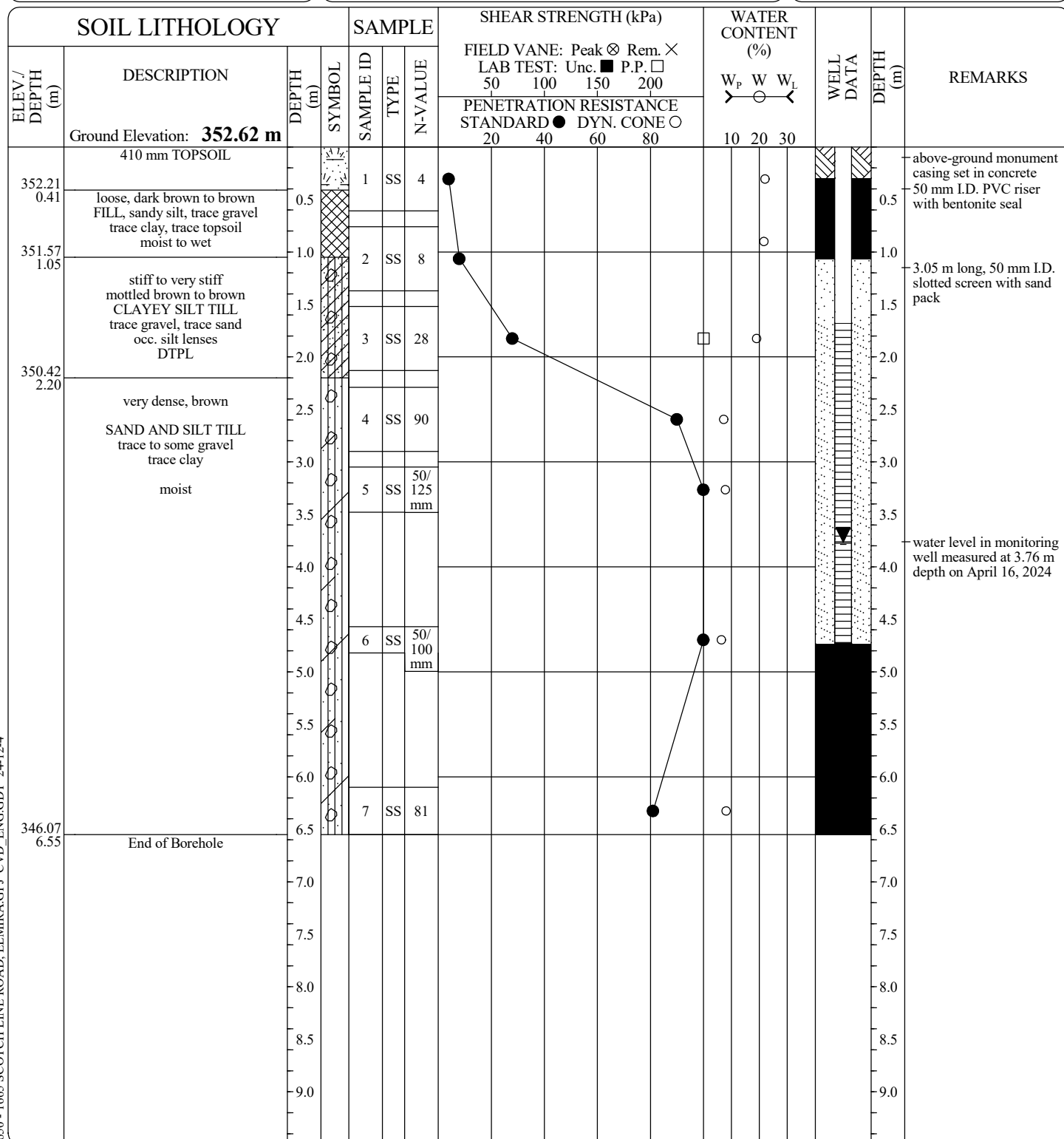
SAMPLE TYPES AND ADDITIONAL FIELD TESTS

SS	Split Spoon Sample (obtained from SPT)	GS	Grab Sample	PP	Pocket Penetrometer
AS	Auger Sample	BS	Bulk Sample	VANE	Peak & Remolded shear
		TW	Thin Wall Sample or Shelby Tube	DMT	Flat Plate Dilatometer

LABORATORY TESTS

SG	Specific Gravity	S	Sieve Analysis	W	Water Content
H	Hydrometer	P	Field Permeability	K	Lab Permeability
W_p	Plastic Limit	W_l	Liquid Limit	I_p	Plasticity Index
GSA	Grain Size Analysis	C	Consolidation	UNC	Unconfined compression

FILE No: 1650**BOREHOLE No. 1**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650**BOREHOLE No. 2**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

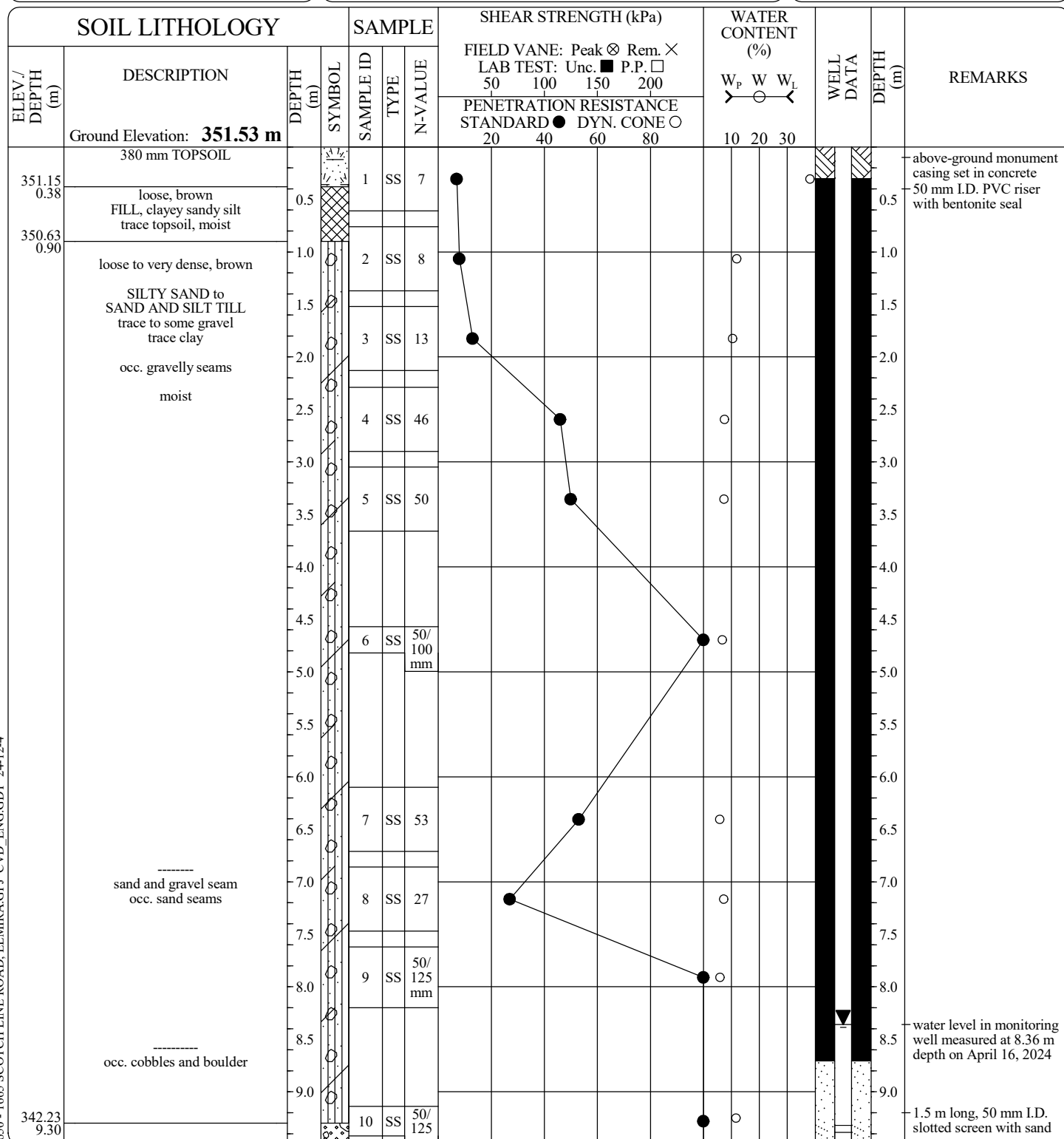
FILE No: 1650**BOREHOLE No. 3**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □				PENETRATION RESISTANCE					
											STANDARD ● DYN. CONE ○					
	Ground Elevation: 350.21 m						20	40	60	80	10	20	30			
349.91 0.30	300 mm TOPSOIL															above-ground monument casing set in concrete well measured at 0.34 m depth on April 16, 2024 50 mm I.D. PVC riser with bentonite seal
349.46 0.75	loose, brown FILL, sand and silt trace gravel, trace topsoil	0.5		1	SS	6	●						○			
	very stiff to hard mottled brown to brown	1.0		2	SS	18	●				□	○				
	CLAYEY SILT TILL some sand to sandy trace gravel occ. sand lenses occ. cobbles	1.5														
	DTPL	2.0		3	SS	18	●				□	○				
	trace to some sand occ. silt lenses	2.5		4	SS	18	●				□	○				
		3.0														3.05 m long, 50 mm I.D. slotted screen with sand pack
		3.5		5	SS	19	●				□	○				
		4.0														
		4.5														
	some sand to sandy	5.0		6	SS	33	●				□	○				
345.01 5.20	End of Borehole	5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 4D**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**

Machine: **CME-55 Track**
 Method: **Hollow Stem Augers**
 Size: **108 mm I.D.**
 Date: **Mar 28 - 24 TO Mar 28 - 24**

PROJECT MANAGER: **EYC**
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FILE No: 1650**BOREHOLE No. 4D**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Hollow Stem Augers**Size: **108 mm I.D.**Date: **Mar 28 - 24 TO Mar 28 - 24**

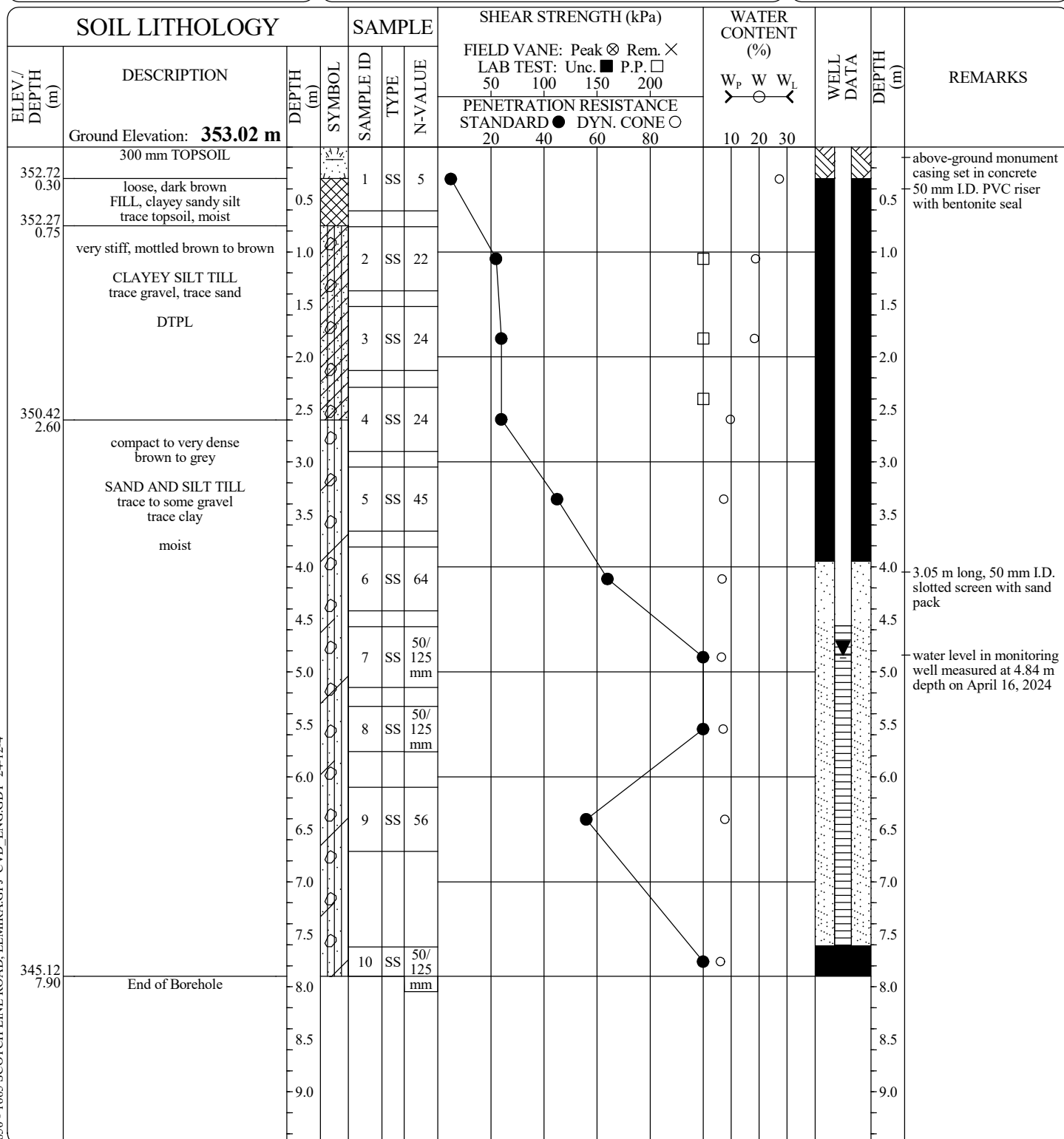
SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS		
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _P W W _L							
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				↗ ○ ↖ 10 20 30							
341.33 10.20	very dense, brown GRAVELLY SILTY SAND saturated	10.0				mm										pack		
339.08 12.45	very dense, grey to brown	10.5		11	SS	50/ 100 mm												
	SANDY SILT TILL to SAND AND SILT TILL trace to some gravel	11.0																
	occ. sand lenses	11.5																
	moist	12.0																
		12.5																
	End of Borehole	12.5		12	SS	50/ 125 mm												
		13.0																
		13.5																
		14.0																
		14.5																
		15.0																
		15.5																
		16.0																
		16.5																
		17.0																
		17.5																
		18.0																
		18.5																

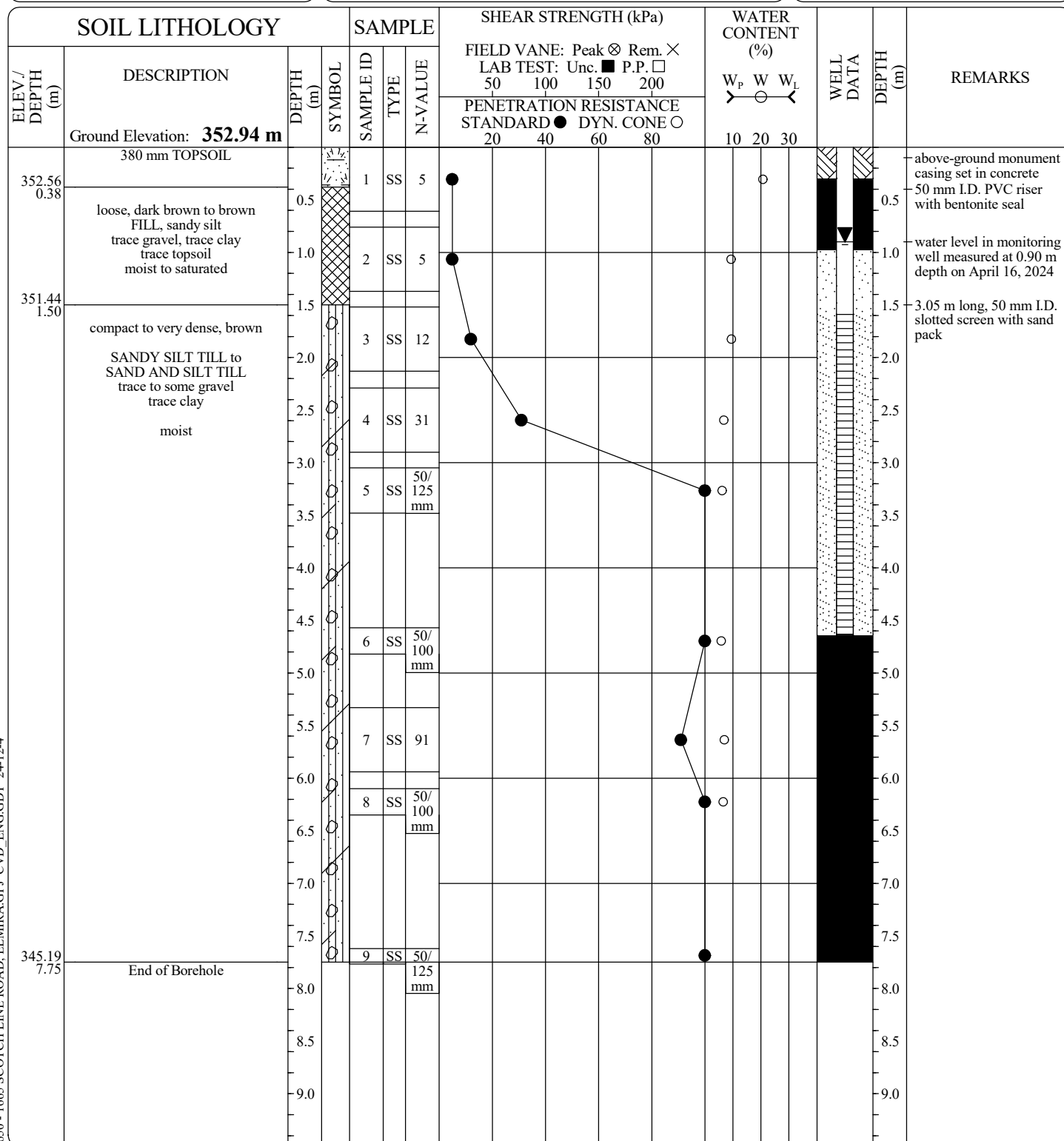
PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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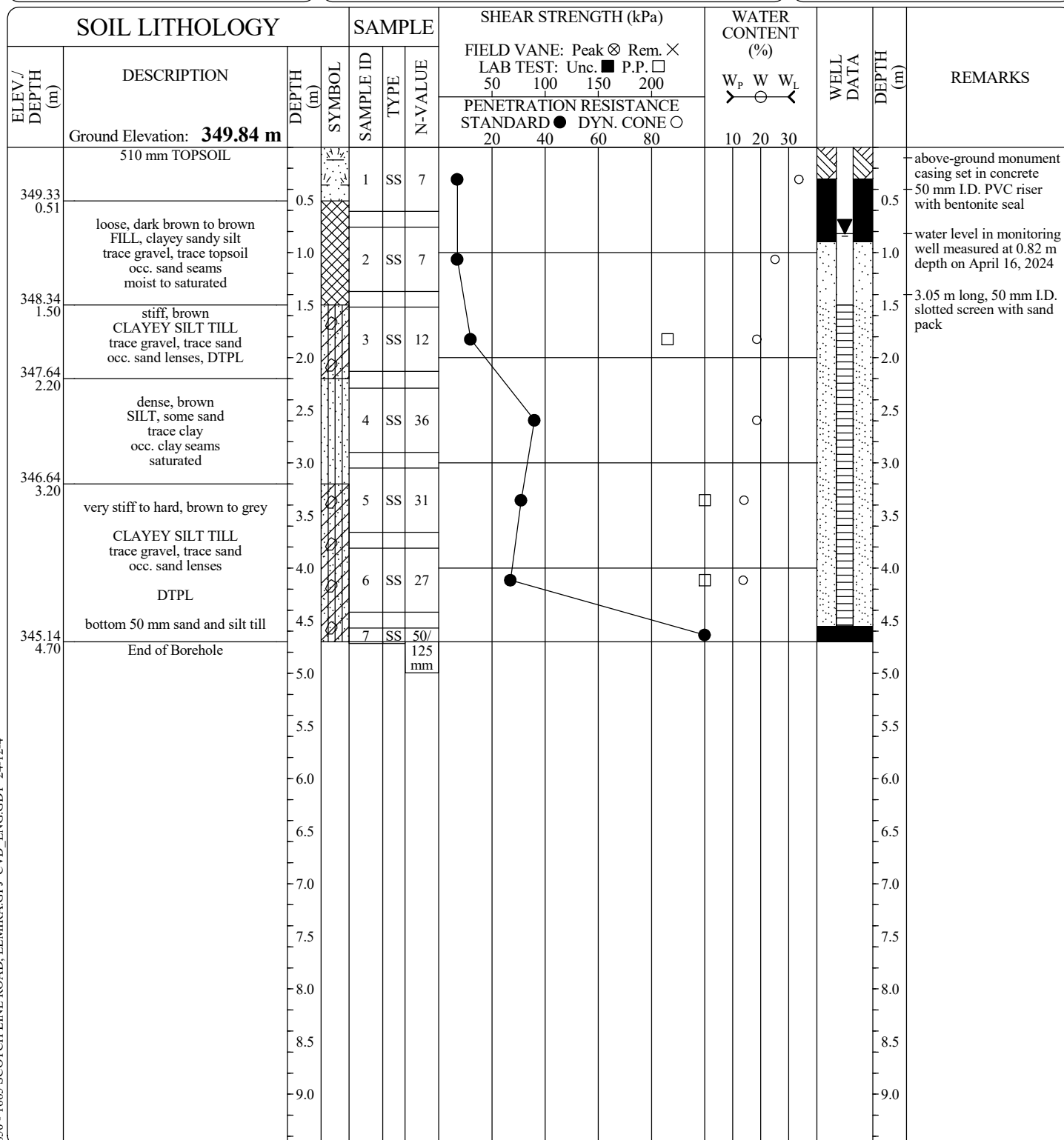
FILE No: 1650**BOREHOLE No. 4S**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 28 - 24 TO Mar 28 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↗ ○ ↖						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80										
346.94 4.50	Refer to Borehole No. 4D for soil descriptions and characteristics	0.5														above-ground monument casing set in concrete	
		1.0														50 mm I.D. PVC riser with bentonite seal	
		1.5														3.05 m long, 50 mm I.D. slotted screen with sand pack	
		2.0															
		2.5															
		3.0														water level in monitoring well measured at 2.63 m depth on April 16, 2024	
		3.5															
		4.0															
	4.5																
	End of Borehole	5.0															
		5.5															
		6.0															
		6.5															
		7.0															
		7.5															
		8.0															
		8.5															
		9.0															

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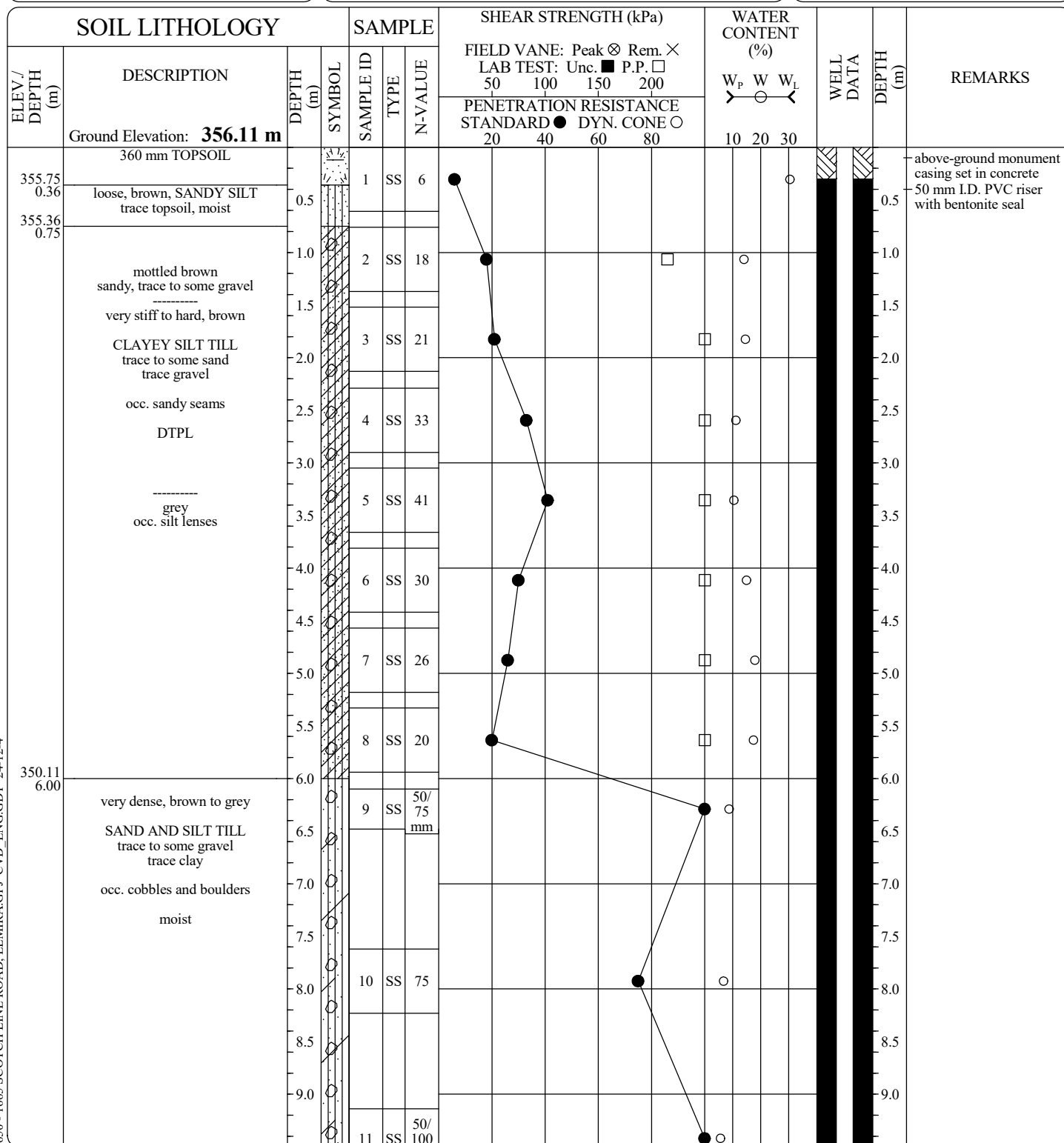
FILE No: 1650**BOREHOLE No. 5**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 28 - 24 TO Mar 28 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
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FILE No: 1650**BOREHOLE No. 6**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 28 - 24 TO Mar 28 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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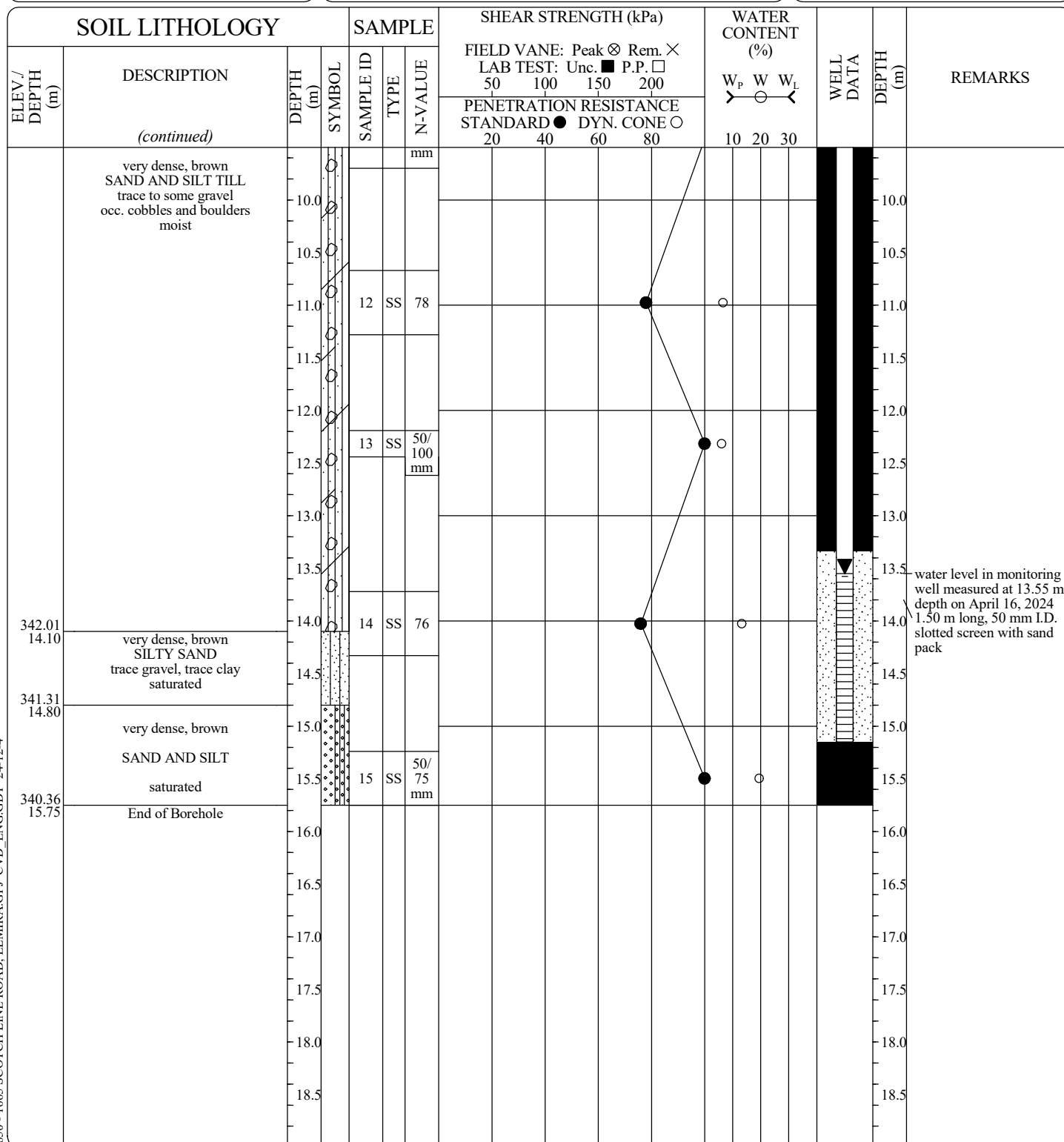
FILE No: 1650**BOREHOLE No. 7**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
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FILE No: 1650**BOREHOLE No. 8D**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**

Machine: **CME-55 Track**
 Method: **Hollow Stem Augers**
 Size: **108 mm I.D.**
 Date: **Mar 27 - 24 TO Mar 27 - 24**

PROJECT MANAGER: **EYC**
**CHUNG & VANDER DOELEN
ENGINEERING LTD.**

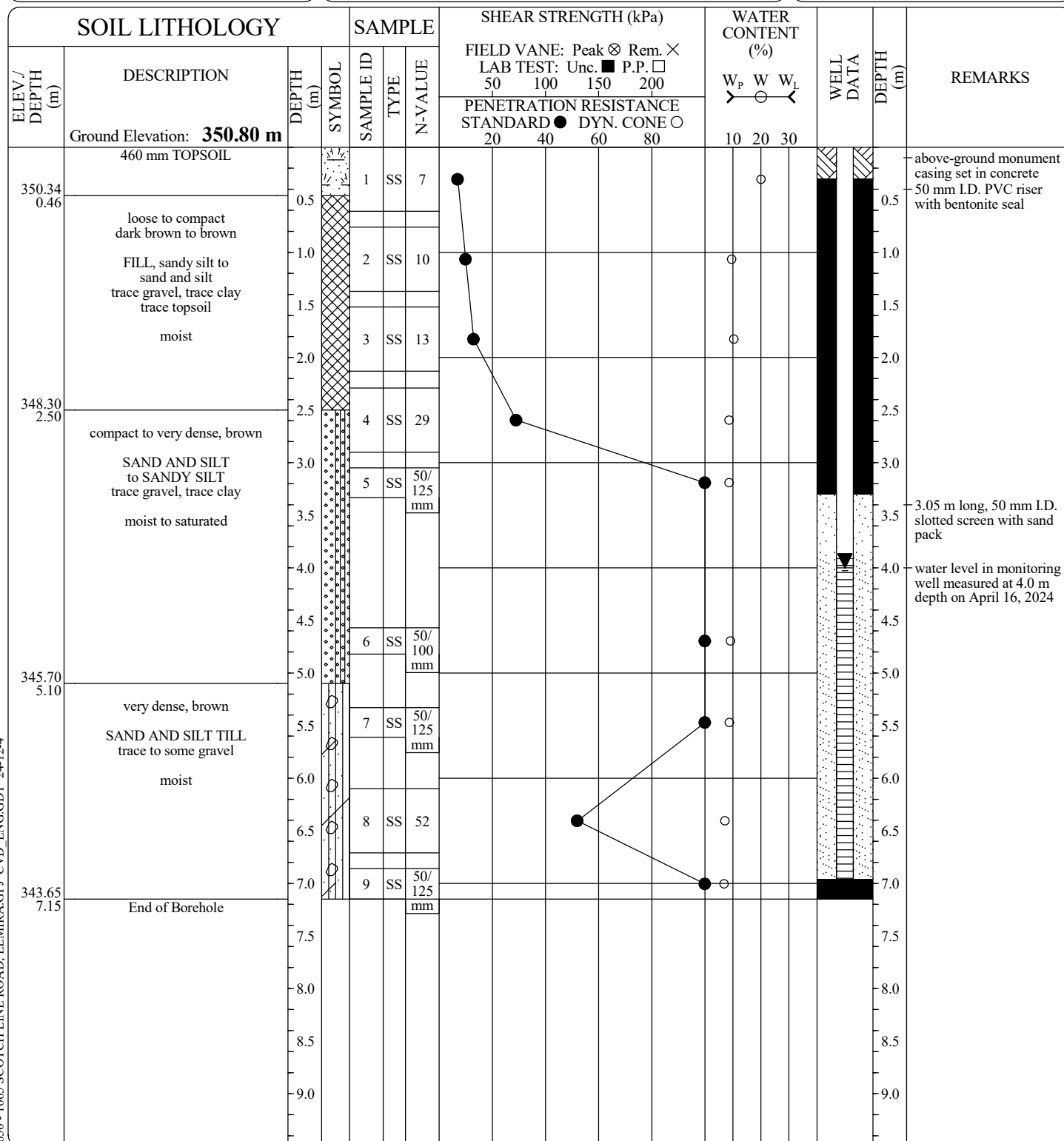
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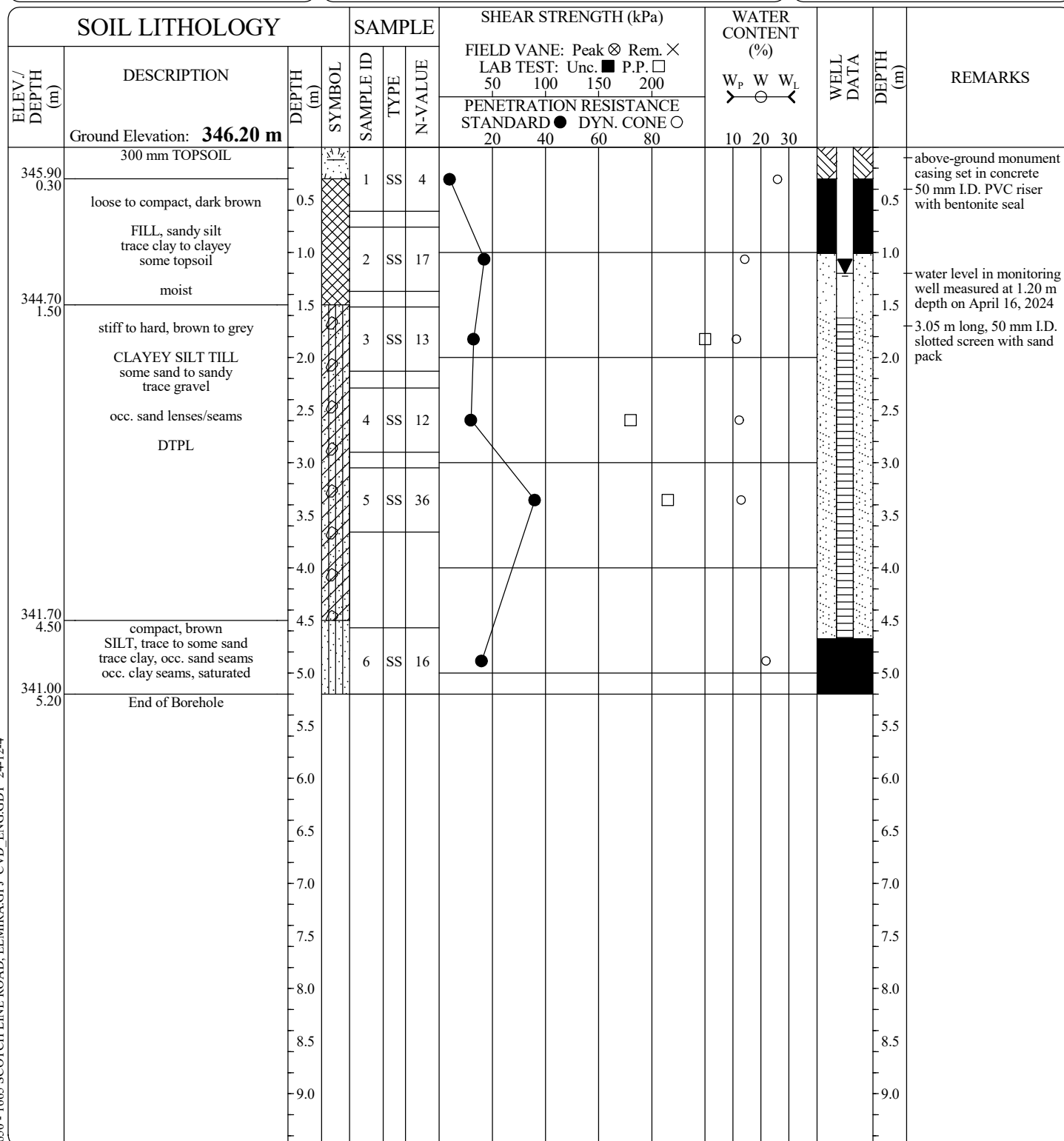
FILE No: 1650**BOREHOLE No. 8D**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Hollow Stem Augers**Size: **108 mm I.D.**Date: **Mar 27 - 24 TO Mar 27 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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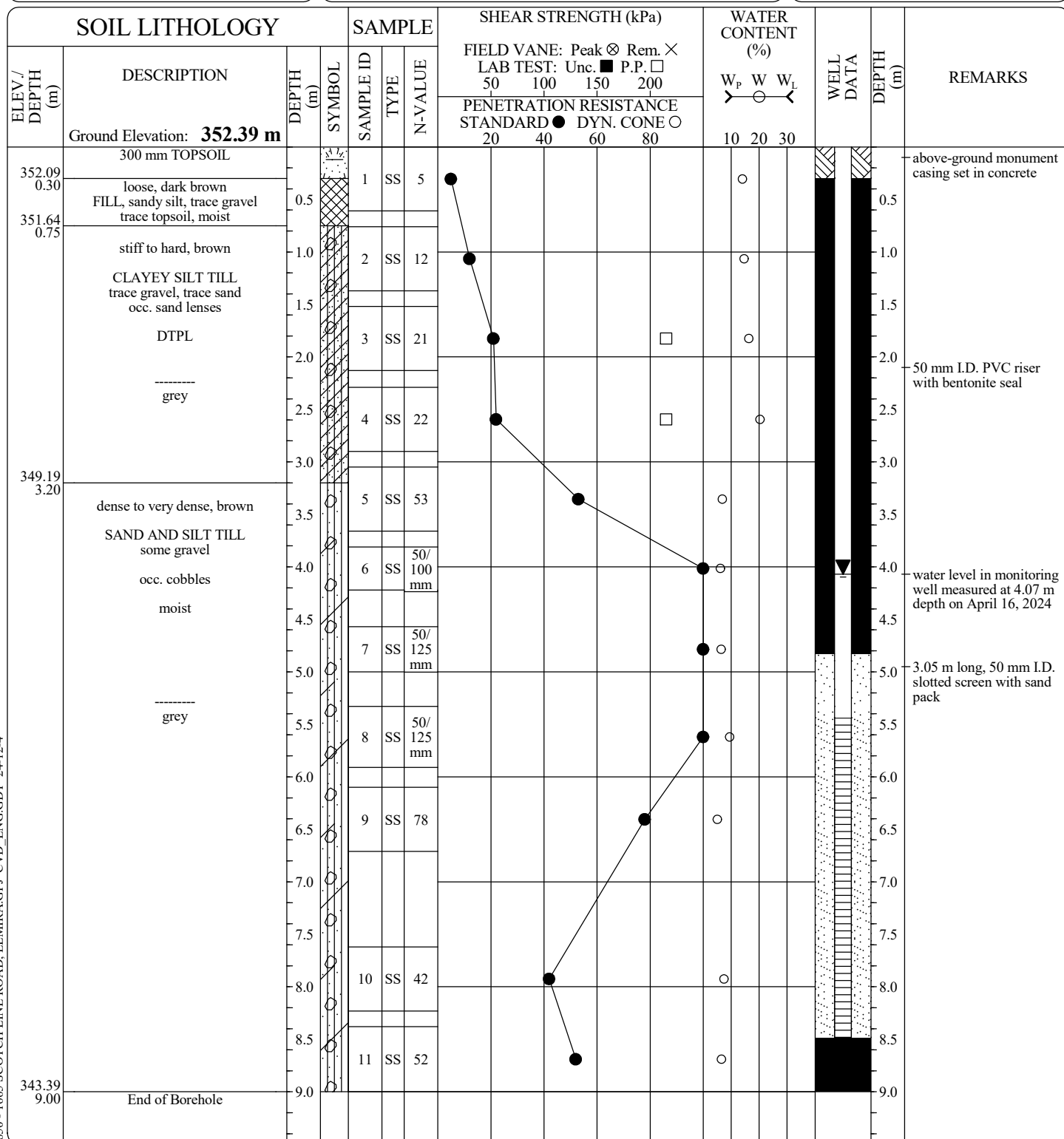
FILE No: 1650**BOREHOLE No. 8S**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 27 - 24 TO Mar 27 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↗ ○ ↖						
							PENETRATION RESISTANCE										
							STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30						
350.75 5.35	Refer to Borehole No. 8D for soil descriptions and characteristics	0.5														above-ground monument casing set in concrete 50 mm I.D. PVC riser with bentonite seal	
		1.0															
		1.5															
		2.0															3.05 m long, 50 mm I.D. slotted screen with sand pack
		2.5															
		3.0															
		3.5															
		4.0															
		4.5															
	5.0														water level in monitoring well measured at 5.15 m depth on April 16, 2024		
	5.5																
	6.0																
	6.5																
	7.0																
	7.5																
	8.0																
	8.5																
	9.0																
End of Borehole		5.5															

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FILE No: 1650**BOREHOLE No. 9**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 10**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 11**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 27 - 24 TO Mar 27 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 12**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □				WATER CONTENT (%)					
							50 100 150 200				W _p W W _L					
							PENETRATION RESISTANCE				↗ ○ ↖					
							STANDARD ● DYN. CONE ○				20 40 60 80					
Ground Elevation: 346.47 m										10 20 30						
346.14 0.33 345.27 1.20 341.27 5.20	330 mm TOPSOIL			1	SS	5	●						○		above-ground monument casing set in concrete 50 mm I.D. PVC riser with bentonite seal water level in monitoring well measured at 0.67 m depth on April 16, 2024 3.05 m long, 50 mm I.D. slotted screen with sand pack	
	loose to compact dark brown to mottled brown FILL, sandy silt trace to some gravel trace clay, trace topsoil moist	0.5														
		1.0		2	SS	10	●						○			
	stiff to very stiff, brown	1.5														
	CLAYEY SILT TILL some sand to sandy trace gravel	2.0			3	SS	14	●					○			
	DTPL	2.5														
		3.0			4	SS	16	●			□		○			
	----- grey	3.5									□		○			
		4.0														
		4.5														
	freq. sandy silt seams	5.0											○			
	End of Borehole															
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 13**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↗ ○ ↖				
Ground Elevation: 345.99 m							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30				
345.69 0.30 345.49 0.50	300 mm TOPSOIL			1	SS	9	●						○		
	loose, brown, FILL sandy silt, trace topsoil, moist	0.5													
	loose to compact, brown														
	SANDY SILT to some sand trace gravel, trace clay	1.0		2	SS	10	●						○		
	occ. silt seams occ. clay lenses/seams	1.5													
	wet to saturated	2.0		3	SS	9	●						○		
343.59 2.40	loose, brown SAND AND GRAVEL trace silt, saturated	2.5		4	SS	9	●						○		
343.04 2.95	very stiff, grey CLAYEY SANDY SILT TILL trace gravel, occ. silt seams DTPL	3.0													
342.34 3.65	End of Borehole	3.5		5	SS	19	●					□	○		
		4.0													
		4.5													
		5.0													
		5.5													
		6.0													
		6.5													
		7.0													
		7.5													
		8.0													
		8.5													
		9.0													

water level at 0.9 m depth
upon withdrawal of
drilling augersborehole open to 3.65 m
depth upon withdrawal of
drilling augersPROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 14**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □				W _P W W _L					
							PENETRATION RESISTANCE				↗ ○ ↖					
							STANDARD ● DYN. CONE ○				10 20 30					
Ground Elevation: 350.16 m																
	360 mm TOPSOIL															
349.80 0.36	loose, dark brown, FILL sandy silt, trace gravel, trace clay occ. sand lenses, moist	0.5		1	SS	6	●							○		
349.41 0.75																
		loose, brown	1.0		2	SS	7	●						○		
		Fine SAND some silt	1.5													
		moist	2.0		3	SS	8	●						○		
		2.5														
		3.0		4	SS	5	●						○			
		3.5														
346.51 3.65	End of Borehole	3.5		5	SS	9	●							○		
		4.0														borehole open and dry to 3.65 m depth upon withdrawal of drilling augers
		4.5														
		5.0														
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

borehole open and dry to
3.65 m depth upon
withdrawal of drilling
augersPROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 15**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				WATER CONTENT (%) W _p W W _L ↗ ○ ↖ 10 20 30					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80									
	Ground Elevation: 352.24 m															
	510 mm TOPSOIL															
351.73 0.51		0.5		1	SS	6	●									
	loose, brown FILL, clayey sandy silt trace gravel, trace clay moist to wet	1.0		2	SS	7	●									
351.04 1.20		1.5		3	SS	16						□				
	firm to very stiff, brown CLAYEY SILT TILL trace gravel, trace sand occ. silt lenses DTPL	2.0		4	SS	50	●					□	○			
350.04 2.20		2.5		5	SS	50/ 125 mm										
	very dense, brown SAND AND SILT TILL some gravel moist	3.0											○			
348.74 3.50	End of Borehole	3.5											●	○		
		4.0														borehole open and dry to 3.5 m depth upon withdrawal of drilling augers
		4.5														
		5.0														
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

borehole open and dry to
3.5 m depth upon
withdrawal of drilling
augersPROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 16**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↗ ○ ↖						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80										
Ground Elevation: 353.36 m																	
	410 mm TOPSOIL																
352.95 0.41	loose, dark brown, FILL sandy silt, trace gravel trace clay, moist	0.5		1	SS	6	●									water level at 0.3 m depth upon withdrawal of drilling augers	
352.61 0.75																	
	loose, brown SANDY SILT trace clay saturated	1.0		2	SS	7	●										
351.91 1.45	stiff, brown CLAYEY SILT trace gravel, trace sand occ. sand lenses DTPL to APL	1.5															
		2.0		3	SS	8	●										
		2.5															
		3.0		4	SS	11	●										
350.41 2.95	compact, brown SANDY SILT occ. clay seams, saturated	3.5		5	SS	21	●										
349.71 3.65	End of Borehole															borehole open to 3.65 m depth upon withdrawal of drilling augers	
		4.0															
		4.5															
		5.0															
		5.5															
		6.0															
		6.5															
		7.0															
		7.5															
		8.0															
		8.5															
		9.0															

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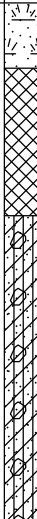
FILE No: 1650**BOREHOLE No. 17**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↔ ○ ↔					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80									
Ground Elevation: 350.61 m												10 20 30				
350.15 0.46	460 mm TOPSOIL	0.5		1	SS	6	●									
	loose to compact, dark brown FILL, silty sand to sand and silt trace gravel occ. brick fragments moist	1.0		2	SS	13	●							○		
349.11 1.50		compact to dense FILL, sand and gravel some silt to silty trace topsoil occ. cobbles wet to saturated	1.5		3	SS	24	●						○		borehole cave-in and water level at 1.5 m depth upon withdrawal of drilling augers
	2.0															
	2.5			4	SS	32	●							○		
347.66 2.95	hard, brown to grey CLAYEY SILT TILL some sand, trace gravel, DTPL	3.0														
346.96 3.65		3.5		5	SS	37	●						□	○		
	End of Borehole	4.0														
		4.5														
		5.0														
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

borehole cave-in and water level at 1.5 m depth upon withdrawal of drilling augers

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FILE No: 1650**BOREHOLE No. 18**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 27 - 24 TO Mar 27 - 24**

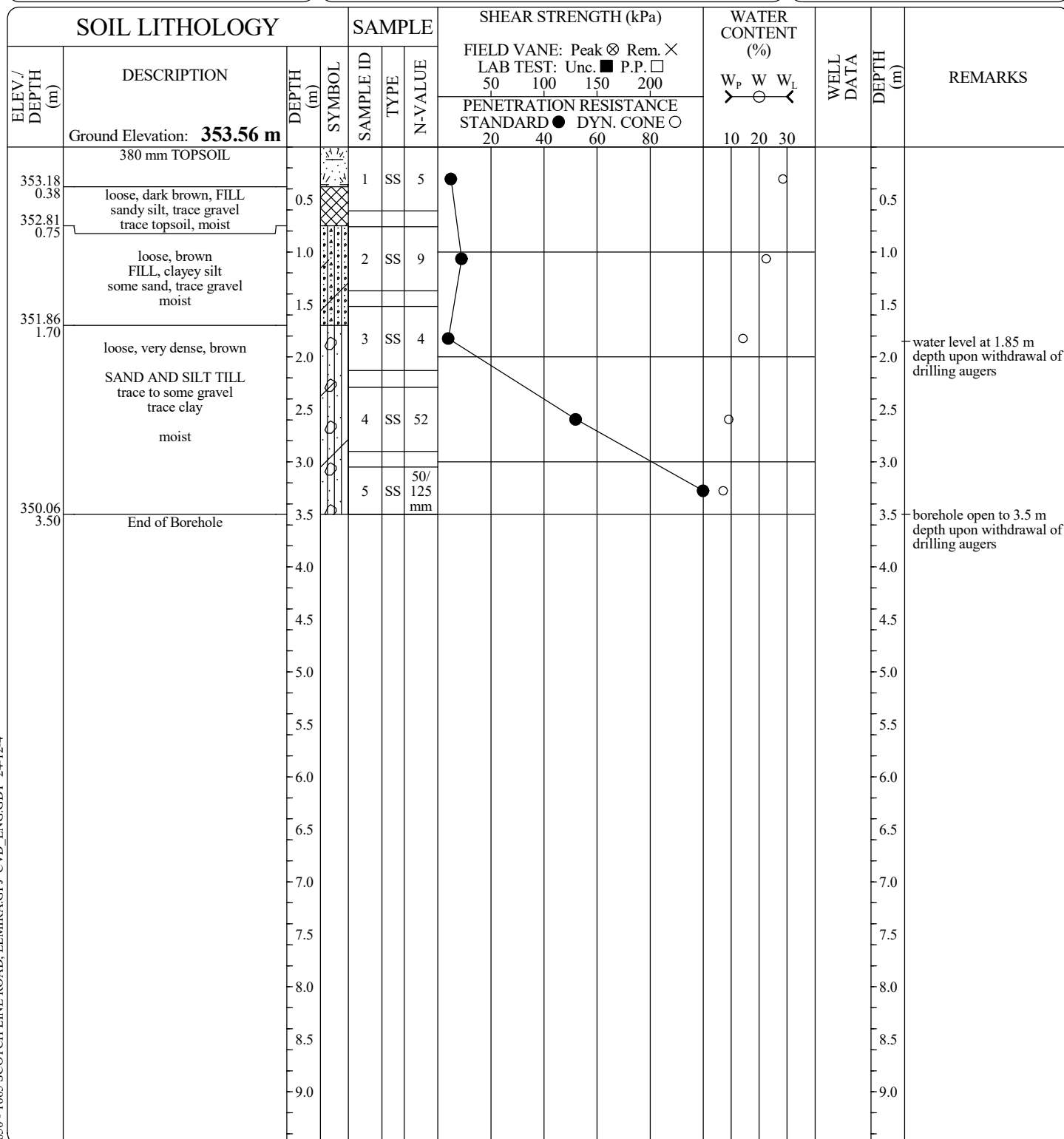
SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS		
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↗ ○ ↖						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30						
355.08 0.46	460 mm TOPSOIL	0.5 1.0 1.5 2.0 2.5 3.0 3.5		1	SS	5	●									water level at 0.9 m depth upon withdrawal of drilling augers	
	loose, mottled brown to brown																
	FILL, clayey sandy silt trace topsoil			2	SS	5	●										
	moist																
	stiff to hard, brown			3	SS	9	●										
354.04 1.50	CLAYEY SILT TILL trace to some sand trace gravel															borehole open to 3.65 m depth upon withdrawal of drilling augers	
	DTPL	4	SS	50/ 100 mm						■							
		5	SS	42							□						
351.89 3.65	End of Borehole																

water level at 0.9 m depth
upon withdrawal of
drilling augersborehole open to 3.65 m
depth upon withdrawal of
drilling augersPROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 19**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □				PENETRATION RESISTANCE STANDARD ● DYN. CONE ○					
Ground Elevation: 354.83 m							50	100	150	200	10	20	30			
354.45 0.38	380 mm TOPSOIL			1	SS	6	●						○			
354.08 0.75	loose, dark brown, FILL, sandy silt, trace gravel trace topsoil, moist	0.5														
	sandy	1.0		2	SS	10	●						○			
	stiff to hard, brown	1.5														
	CLAYEY SILT TILL trace to some gravel trace to some sand	2.0		3	SS	15	●						○			
	occ. silt lenses	2.5														
	DTPL	2.5		4	SS	38						□	○			
		3.0														
351.53 3.30	very dense, brown SAND AND SILT TILL some gravel, moist	3.5		5	SS	53							○			
351.18 3.65	End of Borehole															borehole open and dry to 3.65 m depth upon withdrawal of drilling augers
		4.0														
		4.5														
		5.0														
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

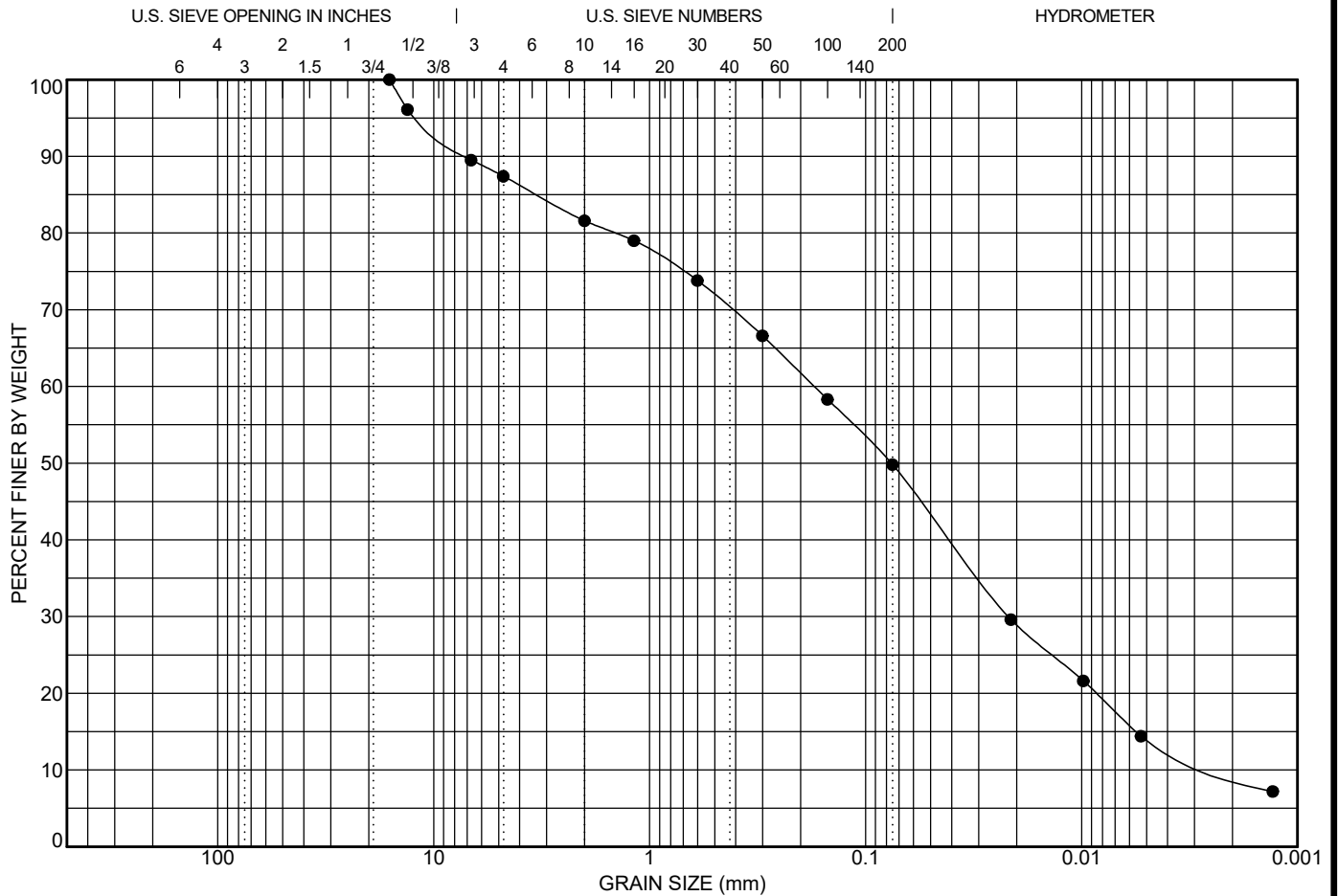
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FILE No: 1650**BOREHOLE No. 20**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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FILE No: 1650**BOREHOLE No. 21**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↗ ○ ↖						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30						
Ground Elevation: 352.01 m																	
351.63 0.38	380 mm TOPSOIL			1	SS	3	●										
	very loose to compact dark brown to brown FILL, sandy silt to sand and silt trace to some gravel trace clay, trace topsoil moist	0.5															
		1.0		2	SS	5	●										
1.5																	
		2.0		3	SS	16	●										
349.71 2.30	dense to very dense, brown SAND AND SILT TILL trace to some gravel moist	2.5															
		3.0		4	SS	34	●										
		3.5															
		3.5		5	SS	57	●										
348.36 3.65	End of Borehole	4.0														borehole open and dry to 3.65 m depth upon withdrawal of drilling augers	
		4.5															
		5.0															
		5.5															
		6.0															
		6.5															
		7.0															
		7.5															
		8.0															
		8.5															
		9.0															

borehole open and dry to
3.65 m depth upon
withdrawal of drilling
augersPROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.22	76.99	16	0.173	0.022	0.002	12.6	37.6	49.8	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 1 - SA 3; 1.50 to 2.10 m depth
Sample No.: 1-3
Date Sampled: Apr. 01 - 2024
Sampled By: RS
Lab No.: 442
Date Tested: May. 10 - 2024
Type of Material: Sand and Silt Till, some gravel, trace clay

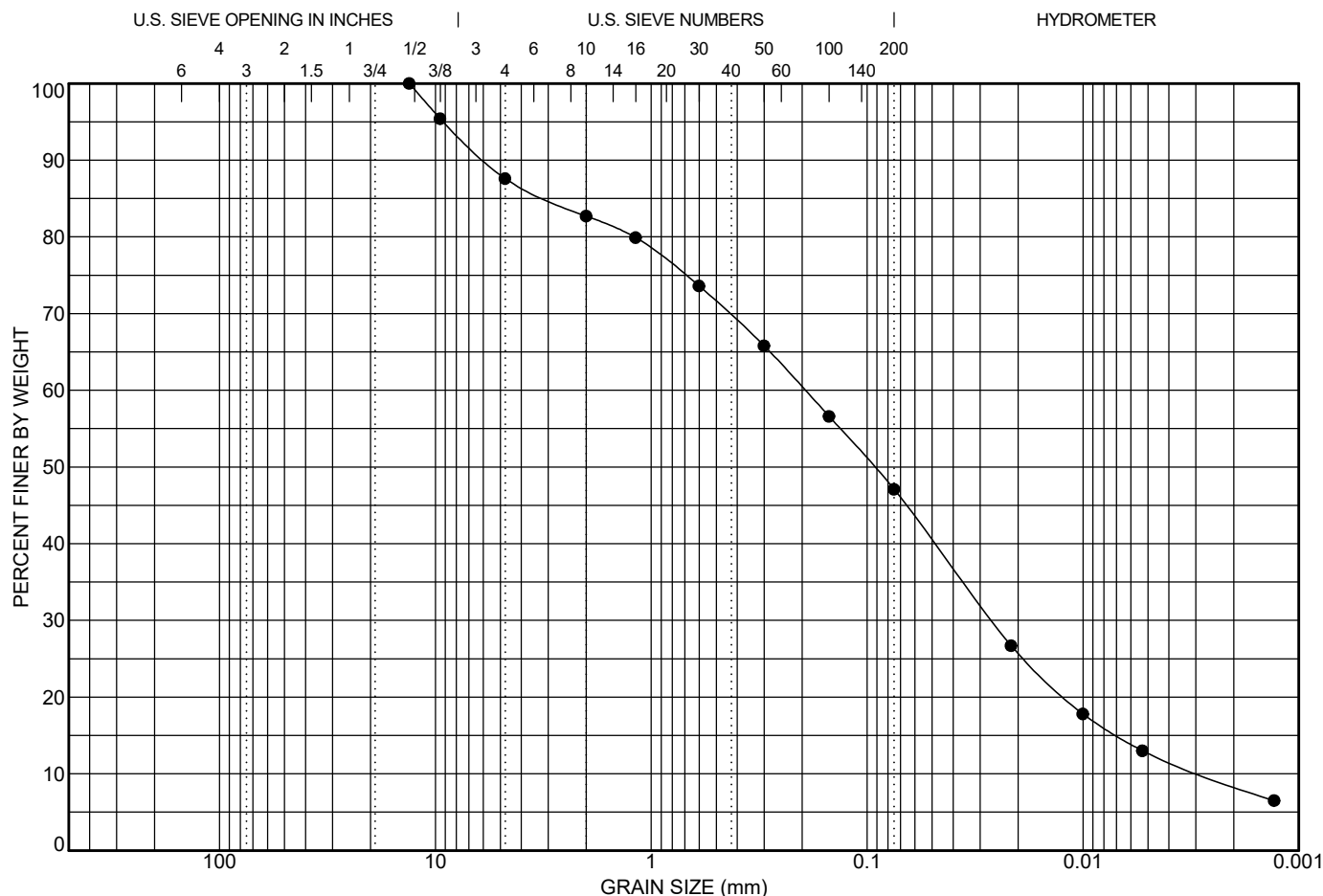
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.29	69.95	13.2	0.194	0.026	0.003	12.4	40.5	47.1	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 2 - SA 5; 3.05 to 3.50 m depth
Sample No.: 2-5
Date Sampled: Apr. 01 - 2024
Sampled By: RS
Lab No.: 443
Date Tested: May. 10 - 2024
Type of Material: Sand and Silt Till, some gravel, trace clay

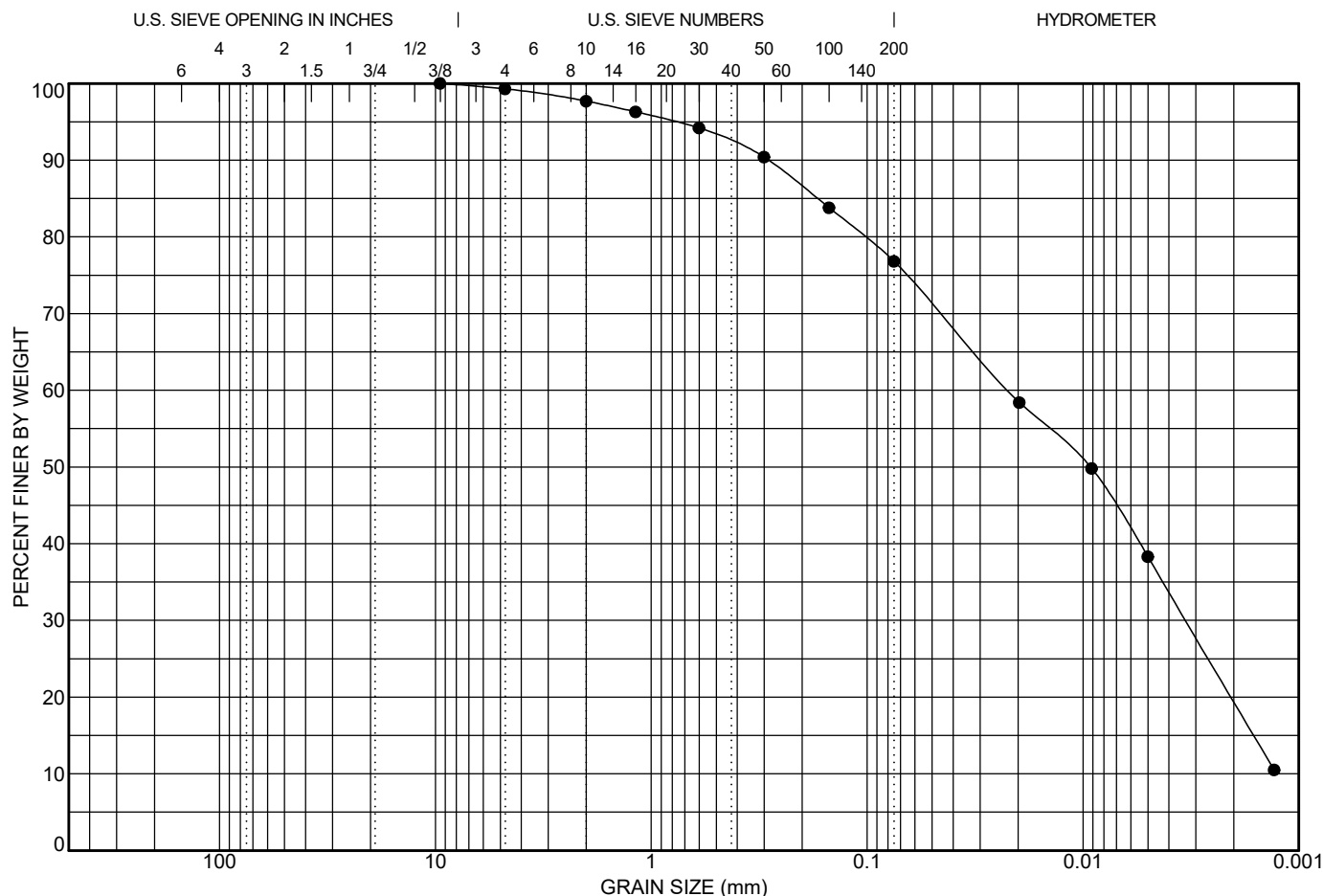
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 25



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					9.5	0.022	0.003		0.7	22.5		76.8

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 3 - SA 4; 2.30 to 2.90 m depth
Sample No.: 3-4
Date Sampled: Mar. 26 - 2024
Sampled By: RS
Lab No.: 444
Date Tested: May. 10 - 2024
Type of Material: Clayey Sandy Silt Till

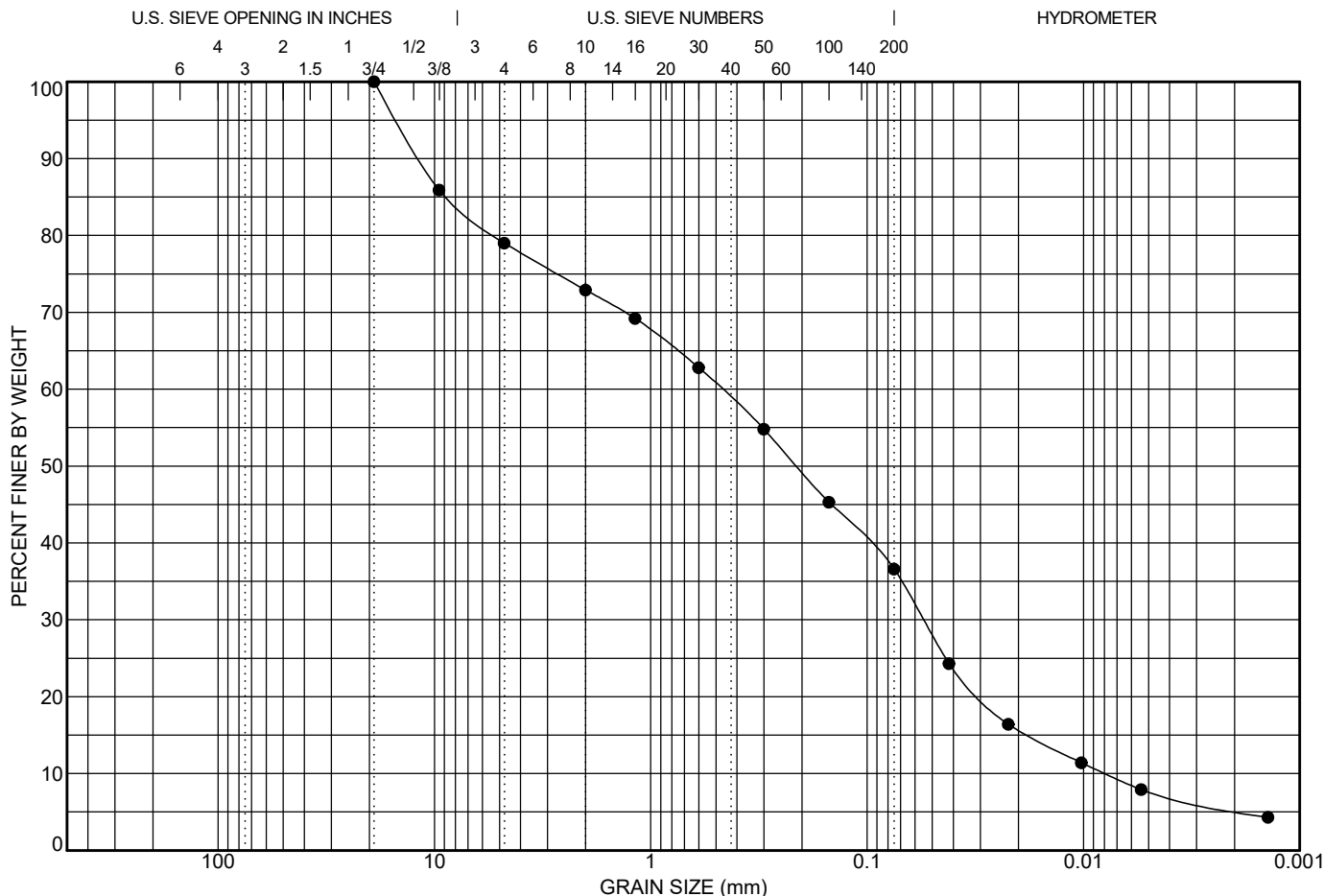
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 26



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.81	59.52	19	0.471	0.055	0.008	21.0	42.4		36.6

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 4 - SA 5; 3.05 to 3.65 m depth
Sample No.: 4-5
Date Sampled: Mar. 28 - 2024
Sampled By: RS
Lab No.: 445
Date Tested: May. 10 - 2024
Type of Material: Gravelly Silty Sand Till, trace clay

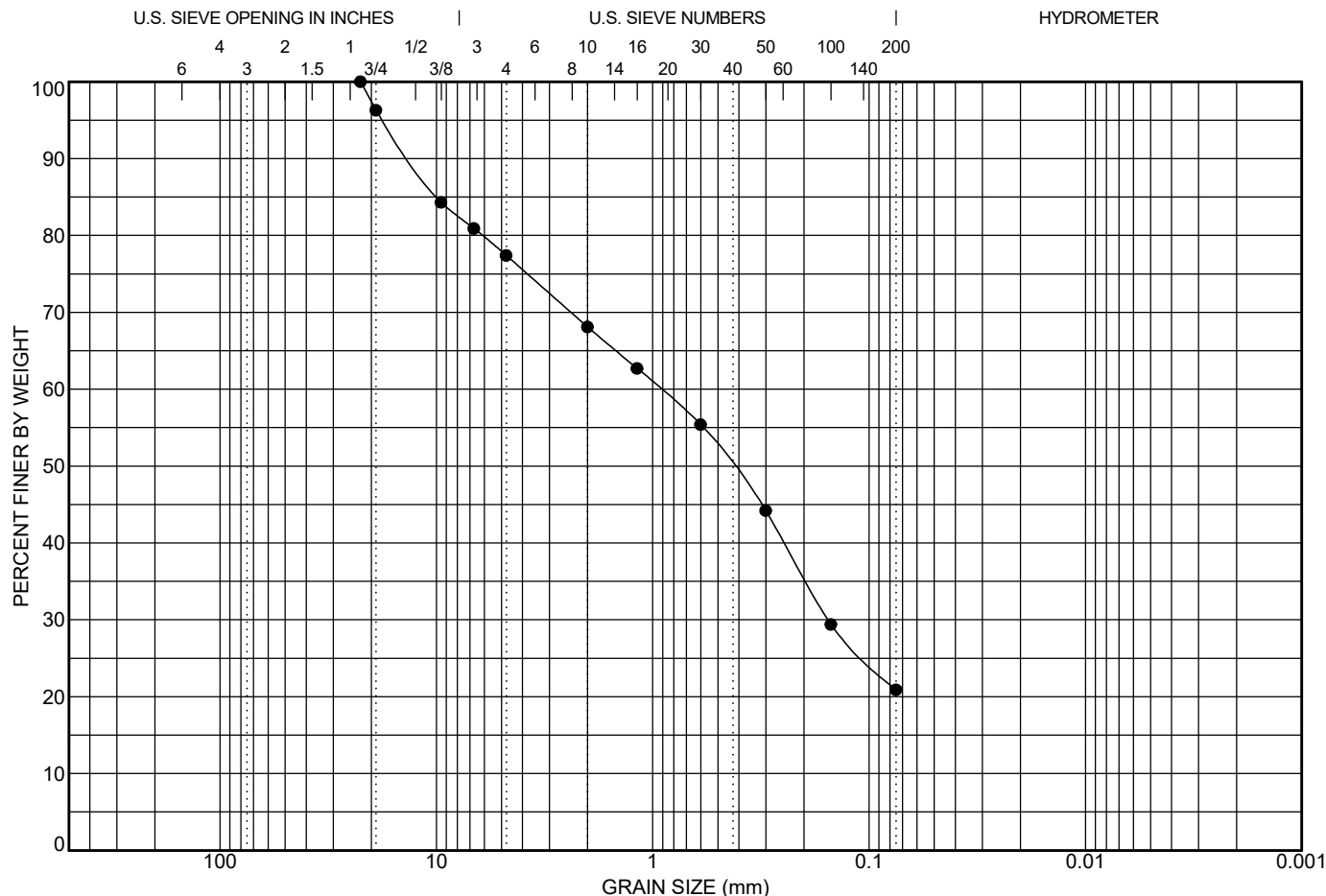
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 27



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					22.4	0.919	0.154		22.6	56.5	20.9	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 4 - SA 10; 9.30 to 9.40 m depth
Sample No.: 4-10
Date Sampled: Mar. 28 - 2024
Sampled By: RS
Lab No.: 446
Date Tested: May. 10 - 2024
Type of Material: Gravelly Silty Sand

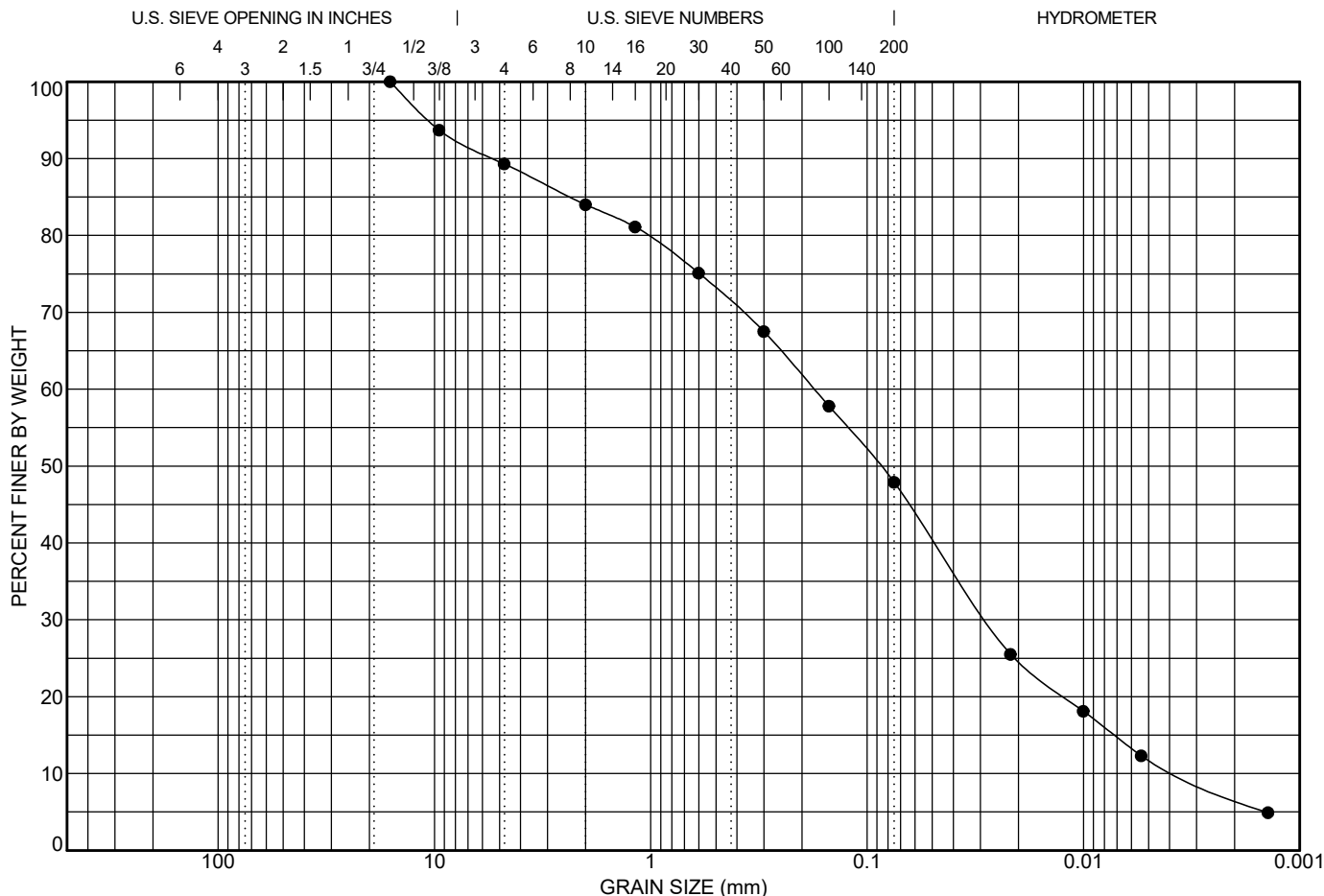
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 28



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.24	49.45	16	0.176	0.028	0.004	10.7	41.4	47.9	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 5 - SA 7; 4.60 to 5.10 m depth
Sample No.: 5-7
Date Sampled: Mar. 28 - 2024
Sampled By: RS
Lab No.: 447
Date Tested: May. 10 - 2024
Type of Material: Sand and Silt Till, some gravel, trace clay

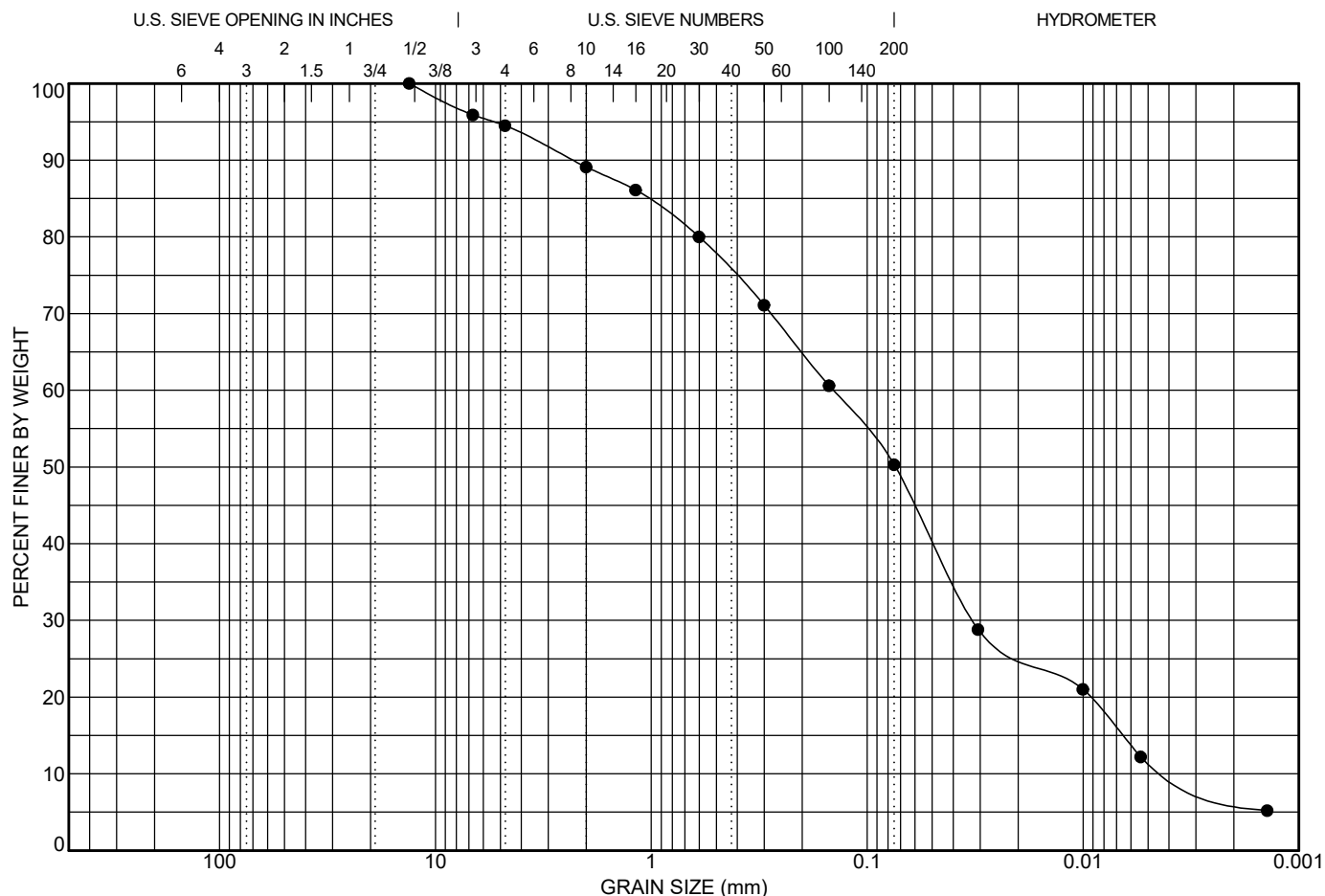
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 29



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			2.03	40.78	13.2	0.144	0.032	0.004	5.5	44.2	50.3	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 6 - SA 4; 2.30 to 2.90 m depth
Sample No.: 6-4
Date Sampled: Mar. 28 - 2024
Sampled By: RS
Lab No.: 448
Date Tested: May. 10 - 2024
Type of Material: Sand and Silt Till, trace gravel, trace clay

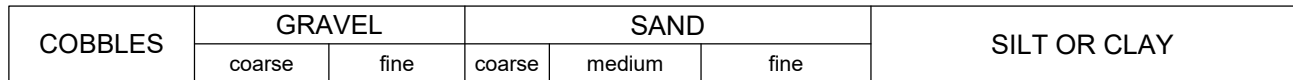
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 30



Date:	May. 10 - 2024	Sieve Size (mm)	Percent Passing	No Specifications
Client:	1000525725 Ontario Inc.			
Contractor:				
Source:				
Sampled From:	BH 7 - SA 4; 2.30 to 2.90 m depth			
Sample No.:	7-4			
Date Sampled:	Mar. 26 - 2024			
Sampled By:	RS			
Lab No.:	449			
Date Tested:	May. 10 - 2024			
Type of Material:	Silt, some sand, trace clay			

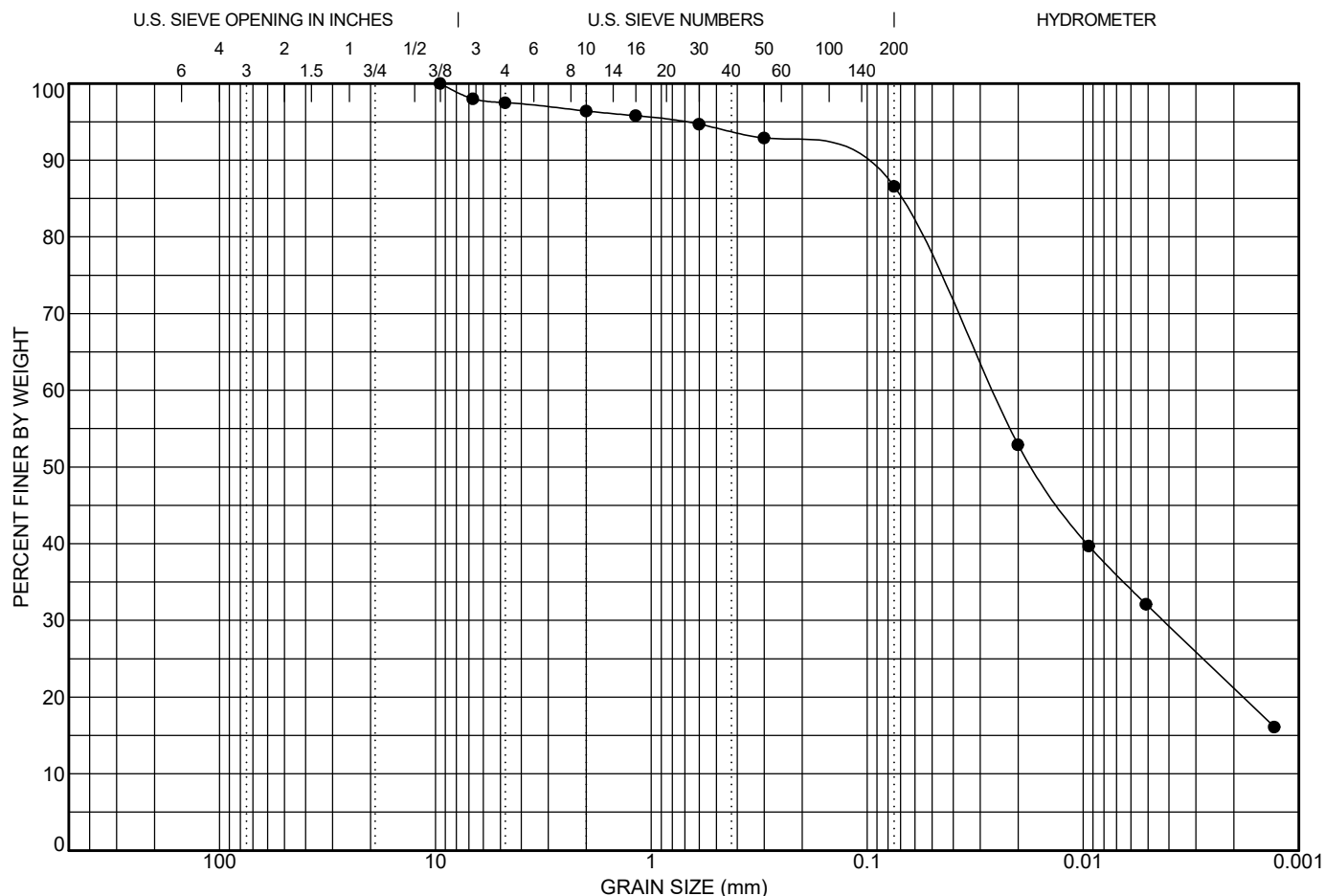


Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

File No.: 1650

Enclosure No.: 31



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					9.5	0.026	0.004		2.5	10.9	86.6	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 8 - SA 5; 3.05 to 3.65 m depth
Sample No.: 8-5
Date Sampled: Mar. 27 - 2024
Sampled By: RS
Lab No.: 450
Date Tested: May. 10 - 2024
Type of Material: Clayey Silt Till, some sand, trace gravel

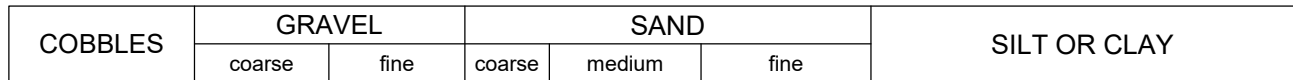
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 32

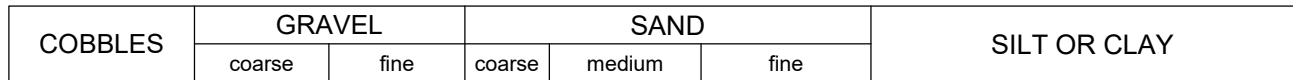


Date:	May. 10 - 2024	Sieve Size (mm)	Percent Passing	No Specifications
Client:	1000525725 Ontario Inc.			
Contractor:				
Source:				
Sampled From:	BH 8 - SA 14; 14.10 to 14.30 m depth			
Sample No.:	8-14			
Date Sampled:	Mar. 27 - 2024			
Sampled By:	RS			
Lab No.:	451			
Date Tested:	May. 10 - 2024			
Type of Material:	Silty Sand, trace gravel, trace clay			



GRAIN SIZE DISTRIBUTION

Enclosure No.: 33



Date:	May. 10 - 2024	Sieve Size (mm)	Percent Passing	No Specifications
Client:	1000525725 Ontario Inc.			
Contractor:				
Source:				
Sampled From:	BH 8 - SA 15; 15.25 to 15.70 m depth			
Sample No.:	8-15			
Date Sampled:	Mar. 27 - 2024			
Sampled By:	RS			
Lab No.:	452			
Date Tested:	May. 10 - 2024			
Type of Material:	Silt and Sand			



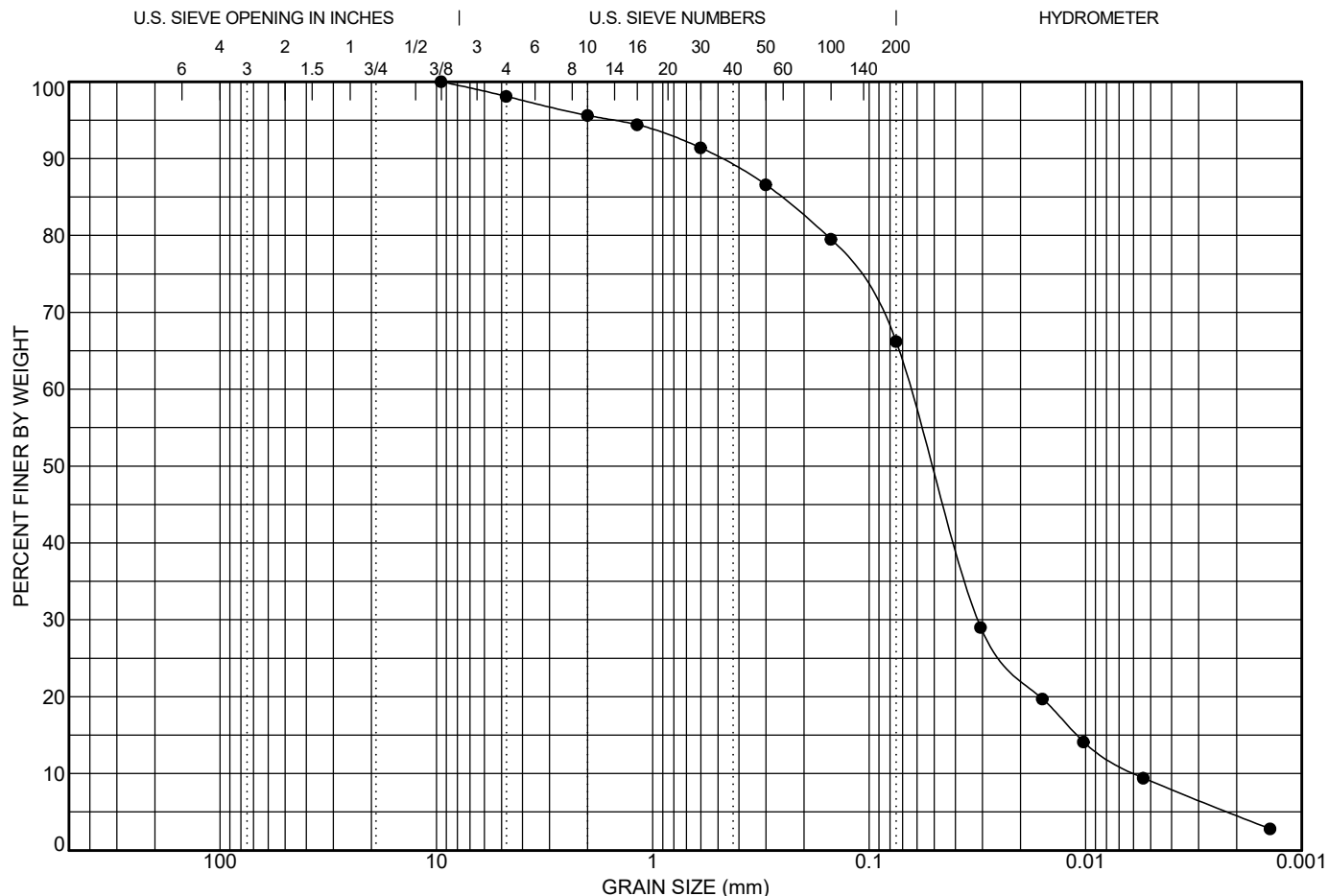
GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

File No.: 1650

Enclosure No.: 34



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			2.58	11.02	9.5	0.065	0.031	0.006	1.9	31.9	66.2	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 9 - SA 6; 4.55 to 4.80 m depth
Sample No.: 9-6
Date Sampled: Mar. 26 - 2024
Sampled By: RS
Lab No.: 453
Date Tested: May. 10 - 2024
Type of Material: Sandy Silt, trace gravel, trace clay

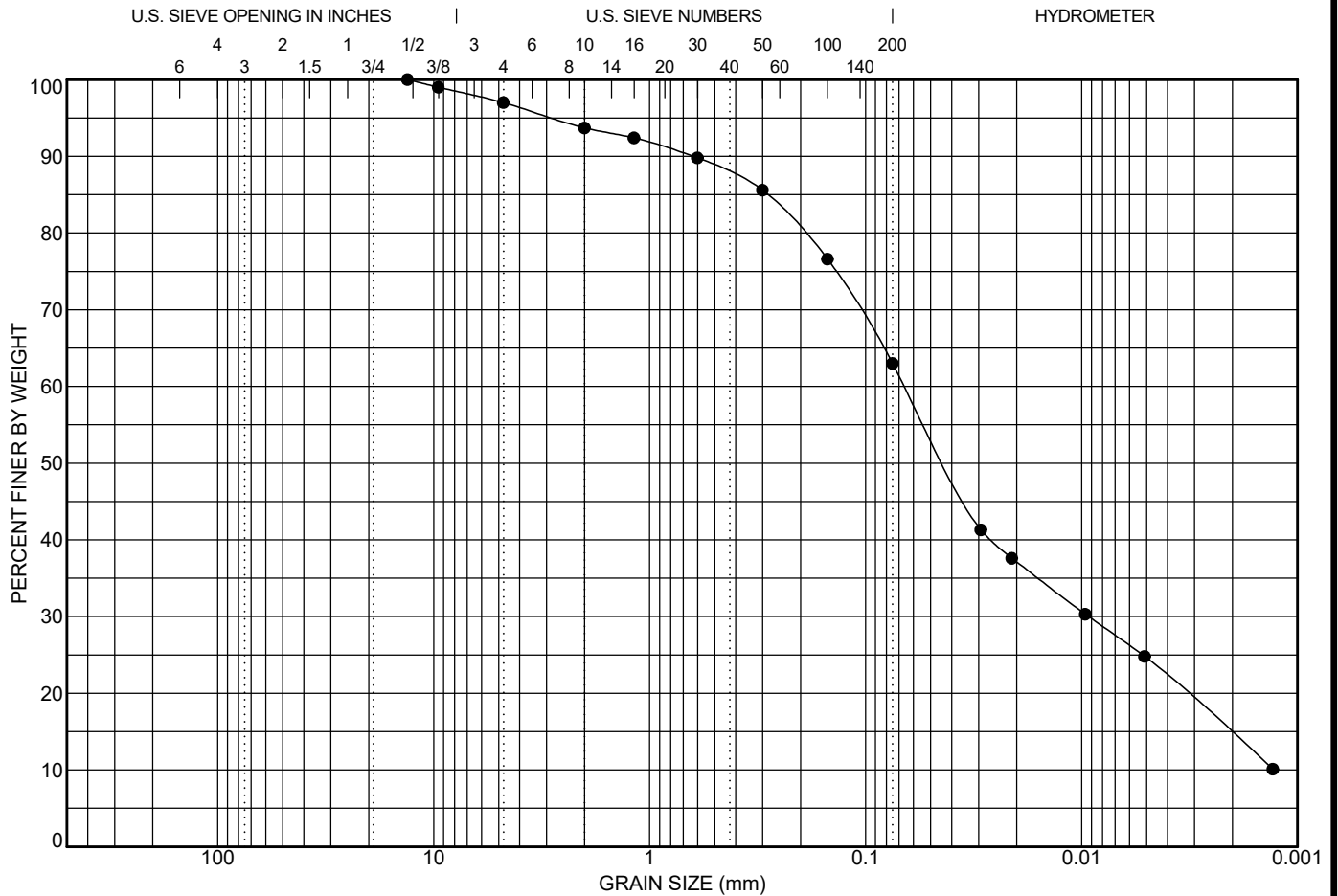
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 35



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					13.2	0.066	0.009		3.0	34.0		63.0

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 10 - SA 4; 2.30 to 2.90 m depth
Sample No.: 10-4
Date Sampled: Apr. 01 - 2024
Sampled By: RS
Lab No.: 454
Date Tested: May. 10 - 2024
Type of Material: Clayey Sandy Silt Till, trace gravel

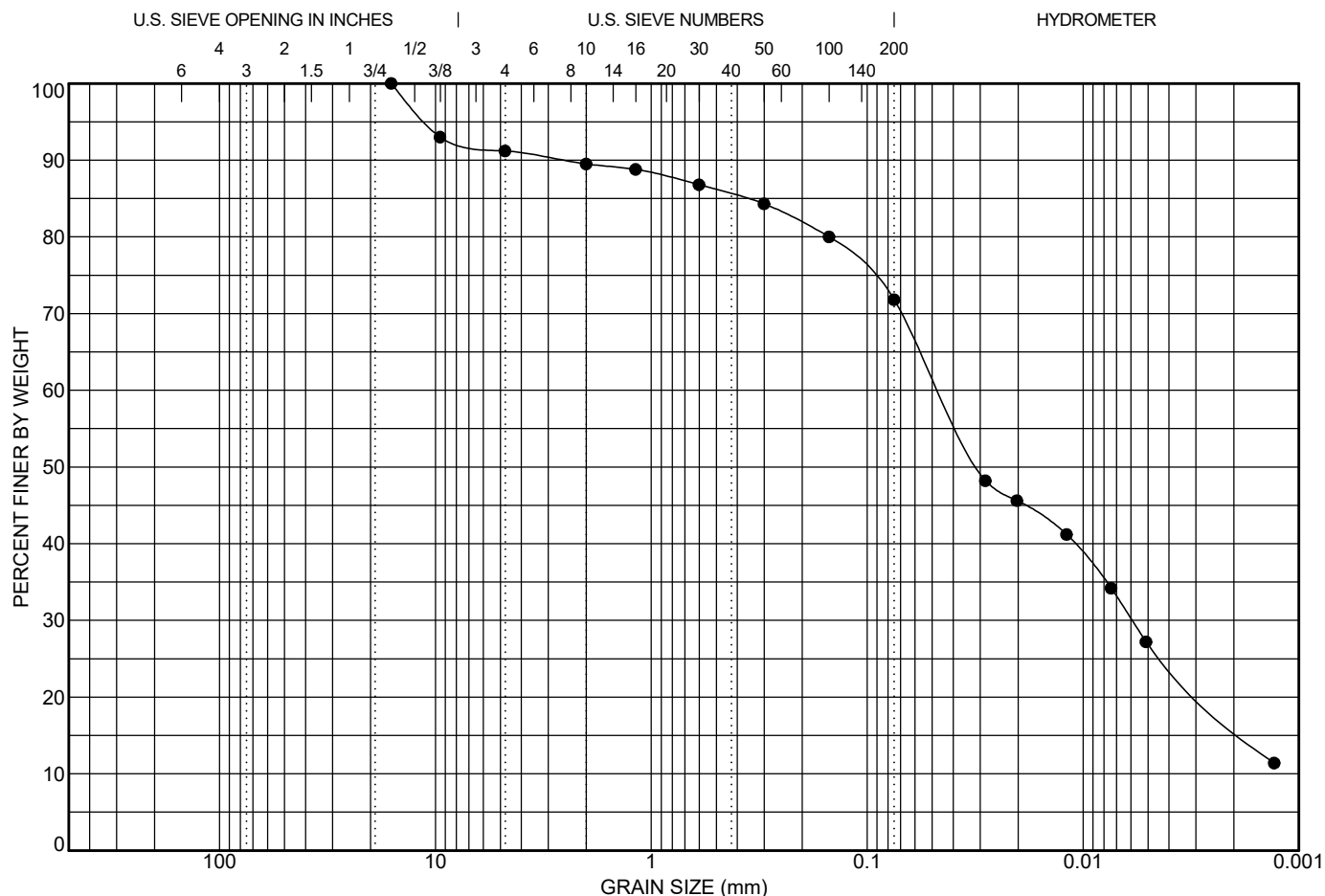
Sieve Size (mm)	Percent Passing	No Specifications



**CHUNG & VANDER DOELEN
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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 36



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					16	0.046	0.006		8.8	19.4	71.8	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 12 - SA 3; 1.50 to 2.10 m depth
Sample No.: 12-3
Date Sampled: Apr. 01 - 2024
Sampled By: RS
Lab No.: 455
Date Tested: May. 10 - 2024
Type of Material: Clayey Silt Till, some sand, trace gravel

Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

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