Project No.: 1161106060



Prepared for: City of Leduc

Prepared by: Stantec Consulting Ltd.

July 7, 2017



Revision: July 7, 2017 Project No.: **1161106060**

Sign-off Sheet

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Prepared by:

rancisco J. Morer

(signature)

Francisco Moreno, Ph.D., P.Eng.

Reviewed by:

(signature)

Mohamed Abdelrahman, M.Sc., P.Eng., PMP APEGA Permit No.: P0258



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1.0 Introduction

Stantec Consulting Ltd. (Stantec) is pleased to present this report to City of Leduc pertaining to the results of a desktop study for the proposed City of Leduc East Telford Lake Structure Plan (ASP). The desktop study was prepared in compliance with the document entitled "City of Leduc Request for Proposals for East Telford Lake Area Structure Plan" dated November 22, 2016.

The purpose of the geotechnical desktop study was to:

- Assess the subsurface soil and groundwater conditions; and,
- Identify potential geotechnical concerns associated with the proposed development.

Stantec's scope of work included the following tasks:

- Carry out an aerial image or airphoto review of the proposed development area;
- Review publically available surficial and bedrock geology mapping products for the area;
- Compile and review water well information from the Alberta Water Well Information Database; and
- Review of historical geotechnical reports for the area (including adjacent quarter sections), if made available to Stantec.
- Review of Stantec's own geotechnical report database for projects in the area.

Limitations associated with this report and its content are provided in the Statement of General Conditions provided in **Appendix A**.



2.0 Site and Project Description

The East Telford Lake project covers eight adjacent quarter sections of the legal land descriptions 31-49-24-W4M and 30-49-24-W4M located within the east side of the City of Leduc, both north and south of Telford Lake. The site is bounded by Rollyview Road to the south, by Range Road 245 to the east, by 65 Avenue to the north and William F. Lede Park and cultivated farmlands to the west. At the time of the desktop study the site was being used as cultivated farmland.

A site plan showing the location of the site and the overall study area is provided on **Figure 1 (Appendix B**). The proposed land usage is quite diverse and will likely include parks, business developments and commercial mixed use. Additionally, a series of storm water management facilities will likely be proposed across the site.



3.0 Field Exploration Program

3.1 Published Surficial Geology Maps

Based on the available literature, the surficial gegology in the area is predominantly described as glacial till deposit overlying bedrock. The glacial till generally contain unsorted clay, silt, pockets of sand and gravel, cobbles and boulders. Locally, it may contain blocks of bedrock, stratified sediments, or lenses of glaciolacustrine and/or glaciofluvial sediments. Throughout much of the study area the till is between 5 to 10 m thick, however, areas of relatively thin till might also occur.

The near-surface bedrock geology is the Horseshoe Canyon Formation of Late Cretaceous age. The Horseshoe Formation consists primarily of fine- to very fine grained, feldspathic sandstone interbedded with siltstone, bentonitic mudstone, carbonaceous mudstone and laterally continuous coal seams.

3.2 Previous Reports

A review of the following information (made available to use from the City of Leduc) was undertaken for the purpose of obtaining anticipated subsurface conditions in the vicinity of the site:

- J.R. Paine & Associates Ltd., May 17, 2016. Groundwater Table Investigation Proposed Leduc Cemetery Site, Portion of NE 30-49-24-W4M, Leduc, Alberta.
- Wedler Engineering LLP, August 24, 2010. Harvest Industrial Park Area Structure Plan, Apendix E, Geotechnical Assessment Report Proposed Industrial Subdivision Portions of NE1/4 and SE ¼ 36-39-25-W4M North Telford Lake, Leduc, Alberta.
- TetraTech EBA, August 22, 2011. Phase I Environmental Site Assessment at NW 30-049—24 W4M, Leduc, Alberta.

3.3 Historical Aerial Photograph Review

Historical aerial photographs and Google Earth images were reviewed for the site spanning from 1978 and 2005 and 2002 and 2016 respectively. Aerial photographs were obtained from the "Air Photo Distribution, Alberta Sustainable Resource Development" in Edmonton. The photographs were reviewed to identify the historical change and development in the subject property.

A detailed summary of the site conditions observed from the aerial photographs is presented in the table below. A copy of the aerial photos is also provided in **Appendix C**.



Table 3-1	Summray of Aeria	al Photograph Review
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Year	Scale	Observations
		The subject property in this aerial photograph was predominantly undeveloped agricultural land. Telford Lake and Telford Creek exist in the central portion of the subject site bisecting it.
		A major natural drainage channel can be observed at the NW corner of the site. Poorly defined surface drainage features, mostly oriented to the east, are also visible.
1978	1:25,000	A number of low-lying wet areas are also observed throughout.
		Woodland areas can be seen in some areas north and south of Telford Lake and along the Telford Lake shoreline area.
		A circular feature, possibly a pond, was visible on the southeastern part of the site.
		An indistinct feature, assumed to be a residential dwelling, was visible at the southwestern side of the site.
		The subject property remains as undeveloped agricultural land. Telford Lake and the woodland areas are still visible in this aerial photo.
1987	1:25,000	The circular feature on the southeastern part of the site was no longer present. An indistinct feature is now visible at this location.
		Also, significant activity, consisting of land clearing was visible on the northwest corner of the quarter section to the southeast.
		The pipeline ROW is visible dissecting the site.
		Other topographical features remain the same as above.
1993	1:20,000	The subject property remains as undeveloped agricultural land. Land on northwest corner of the quarter section to the southeast appears to have been reclaimed to its original conditions.
		Other topographical features remain the same as above.
2002	1:10,000	The subject property remains as undeveloped agricultural land. A small structure, assumed to be a residential dwelling, was visible south of Telford Creek.
		Other topographical features remain the same as above.
2005	1:25,000	There is no change in the subject site from the previous aerial photo of 2002. The site remains agricultural undeveloped land.
		Other topographical features remain the same as above.

3.4 Coal Mine Atlas Review

Based on a review of the Alberta Energy Regulator online Coal Mine Map Viewer, no coal mines were identified within the footprint of the site. Therefore, issue related to the presence of coal mines are not likely to be a concern.



4.0 Site Reconnaissance

A site visit was carried out by a Stantec geotechnical representative on April 10, 2017. The aim of the visit was to take photographs, identifying sources of geotechnical concern through visual inspection of the site and its borders. Pictures were taken to show the boundaries, roads, land topography and associated drainage patterns (Appendix D). This section presents the observations made of the site during the site visit.

The weather conditions were overcast, no wind and the temperature was 8°C. The ASP area is generally flat with slight rolling and low-lying wet areas observed throughout. Generally, the ASP area slopes to the east towards Saunders Lake, however, it is expected some local surface water to drain towards Telford Lake or Telford Creek bisecting the site.

A number of small ephemeral wetlands were identified throughout the site and are low-lying areas with similar level grading and shallow water table conditions. The short-lived nature of these wetlands indicates that they are highly dependent on climatic inputs and outputs, with precipitation, local runoff, and evapotranspiration dominating the water budgets.

The ASP area has been predominantly cleared and utilized for agricultural purposes. Areas not cultivated include woodland in the south-central portion of of the NW ¼ section of 31-49-24-W4M, the central part of section 30-49-24-W4M, the eastern-central part of the SW ¼ of section 30-49-24-W4M and the Telford Lake shoreline area.

There are currently several buildings on the site, which includes a mobile home and garage, and a couple of residential homes. In addition, there is one valve station located on the north side of the site within the NE ¼ section of 31-49-24-W4M.

5.0 Site Conditions

5.1 Surface Features

The majority of the site is currently utilized as cultivated farmland with several farmyards and low-lying areas throughout.

The site is relatively flat with an overall gentle slope towards Saunders Lake with local relief toward Telford Lake or Telford Creek.

Adjacent to the southwest side of the site is the William F. Lede Park. The surrounding areas primarily consist of cultivated farmland, with the exception of the lands to the northwest where industrial development has commenced.

5.2 Soil Conditions

Based on our review of the aforementioned geotechnical reports, available geotechnical boreholes records consists of sixteen (16) boreholes drilled offsite advanced to depths between 4.6 and 15.3 m, and six boreholes drilled onsite advanced to depths of 6.1 m (Appendix E).



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Based on these borehole records, the soil profile generally consisted of topsoil over clay till underlain by bedrock comprised of clayshale and sandstone. These findings are consistent with the results from surficial geology maps.

In general the clay till was described as silty, sandy, moist to very moist, stiff to very stiff, medium plastic, greyish brown to brown, with thin sand seams and pockets throughout. The clay shale bedrock was described as silty, sandy, moist, hard, high plastic and the sandstone as silty, clayey, dense, moist, grey lo light grey.

5.3 Groundwater Conditions

At the completion of drilling, groundwater was encountered at the majority of boreholes, however, no sloughing was recorded in any of them. A total of eleven (11) piezometers were installed during drilling.

Groundwater conditions were measured two weeks after completion of drilling. In general, the watertable is within 3 m below ground surface but with groundwater level readings as deep as 5.2 m below ground surface. The watertable elevations were also highly variable but seem to correlate with the lake water level and other major drainage features.

However, it should be noted that groundwater levels are expected to fluctuate seasonally and affected by site use, adjacent site use, and during or following significant precipitation events.



6.0 Geotechnical Considerations

Geotechnical concerns associated with this site relative to the proposed future development are considered typical with those associated with similar development in this area of Leduc.

6.1 Uncontrolled Fill

Detail review of the aerial photographs showed evidence of construction activities in the 1980's to the north of the southeast quarter section of Sec. 30-49-24-W4M, including some clearing of farmland and construction of structures. The structures were subsequently removed and the entire area reclaimed to its original conditions as shown in the 1993 aerial photo. The conditions and standards under which the fill was placed are unknown.

The Canadian Foundation Engineering Manual states the following regarding fill material: "An engineered fill placed under careful control may be an extremely dense material, more uniform, more rigid, and stronger than almost all natural deposits. When not placed under controlled conditions, it may be a heterogeneous mass of rubbish, debris, and loose soil of many types totally useless as a foundation material. It may, of course, also be some combination intermediate between these extremes".

The potential presence of fill with poor quality control (i.e. uncontrolled fill placement) presents a risk of settlement due to the compressibility of poorly compacted fills. Therefore, given the above noted information and previous statement, for grade supported structures that are sensitive to settlements such as slab-on-grades, etc., complete removal of the existing fill material (if encountered) is expected to be required and the grade reinstated with imported engineered fill as required depending on the final grading plan.

6.2 Historical Structural Elements

The presence of former structural elements associated with previous development was identified on site during the historical aerial photograph review. It is possible that other buried structures, or portions thereof, remain on site. Although a detailed geotechnical, or geophysical investigation may help identify additional relic structures or elements, it will be difficult to ascertain with certainty whether additional relic structures remain until such time as construction excavation proceeds. The designer and future construction contractor should be made aware of these potential unknowns.

6.3 Flowing Sands

The presence of interbedded sand pockets and increased sand content with depth in the till layer may lead to challenges during construction, especially if excavations extend below the groundwater level. Challenges such as sloughing, ground water seepage, piping or flowing sands may be encountered. Typically, these situations can be addressed by various dewatering methods. Confirming the groundwater elevation and developing a detailed soil stratigraphy for the site is recommended as part of a detailed geotechnical investigation to be completed during the detailed design stages.

6.4 Shallow Groundwater and Surface Water

Based on the reports obtained during the desktop study, the groundwater watertable could be as shallow as 3 m below ground surface. Having groundwater at a depth of 3.0 m or less will need to be



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considered during the detailed design stage, especially if below grade structures such as a basement or parkade are considered in the new development. Furthermore, a shallow groundwater level may lead to constructability issues when dealing with open excavations for utilities and foundations.

As recommended previously, a detailed geotechnical investigation should be performed to confirm the groundwater levels at the site and how these levels will need to be addressed in the design and construction of the development.

6.5 Thick Organic and Topsoil Deposits and Soft Soils

The presence of ponded water and areas indicative of poor surface drainage were encountered. It is possible that increased thickness of topsoil and organic containing materials and soft soils may be present in areas across the site.



7.0 Geotechnical Recommendations

7.1 Feasibility Assessment

Based on the soil and groundwater conditions encountered over the site, which consists of topsoil over a medium plastic, stiff to very stiff clay till overlying bedrock comprising of clayshale and sandstone, the proposed development is considered feasible at the subject site.

Standard construction practices for site grading, utility installation, building foundations, and roadway constructon are generally applicable for any future development. The following guidelines are presented as part of the feasibility assessment.

- There is sufficial topsoil material present throughout the site, which will be required to be removed during construction;
- Some wetting may be required during trench backfilling at utility installation due to the dry nature of the clay till soils at depth;
- Soft, wet soils with high groundwater conditions might be present at ponded areas or other areas indicative of poor drainage which will need to be taken into account for design and construction of utilities, residential foundations, and foundation drainage systems.

Based on the preliminary nature of this study, further investigations will be required for future design stages in order to confirm the details presented herein and provide additional appropriate geotechnical design criteria as required.

7.2 Site Preparation

Site preparation for foundations, slabs-on-grade, roadway subgrades, and areas considered for the placement of engineered fill should be prepared by clearing and stripping all vegetation, topsoil, organic-rich soils, soft or loose native soil, and other deleterious materials that may be encountered at time of site preparation. The thickness of surficial organic topsoil deposits varies within the site; therefore, quantity estimates should recognize the inherent variability associated with these deposits.

If soft, disturbed, deleterious or otherwise unsuitable soils or fill materials are encountered during earthworks, these materials should be sub-excavated and replaced with suitable, engineered fill (of a similar nature to the native subgrade soils) to promote subgrade uniformity. Suitable clean fill can be reused as engineered fill.

The near-surface soils encountered are expected to be susceptible to disturbance and to have poor trafficability, particularly during periods of adverse (wet or freezing) weather conditions. Loose and disturbed material should be removed and the bearing surface should not be allowed to become wet or frozen prior to concrete placement. Care should be taken to avoid disturbance during construction as the disturbance will reduce the bearing resistance of soils and would require removal and replacement of the disturbed material.



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The exposed subgrade soil should be reviewed by a qualified geotechnical engineer prior to placement of fill, foundation forms or concrete. The subgrade should be proof-rolled using a fully-loaded truck or water truck to identify weak or soft areas. Any soft/weak areas should be over-excavated, backfilled using engineered fill and compacted as per specification outlined in **Section 7.3**.

Where construction is carried out during winter conditions, the subgrade should be protected from freezing. In addition, the subgrade should be protected from wetting or drying, both before and after the placement of the granular base material and concrete. Subgrade surfaces that are allowed to dry or become wet must be scarified, moisture conditioned and re-compacted, as specified above.

7.3 Backfill selection and Compaction Requirements

Engineered fill should consist of clean mineral soil free from organics or other deleterious materials. The native clay till is considered suitable for re-use as Engineered Fill with proper moisture conditioning.

In general, drying or wetting of the site soils will be required during periods of heavy rain, hot weather, or in the event that excavated material is allowed to dry excessively prior to re-use. Alternatively, mixing of dry and wet soils to reach the OWC may be considered provided that qualified geotechnical personnel approve the mixed soil prior to use.

All fill materials should be placed in lifts having a thickness such that the compaction equipment can achieve the required density, but not exceed 150 mm. All imported fill materials should be tested and approved by a geotechnical engineer prior to delivery to the site.

7.4 Utility Trench Excavation and Backfill

Bedding materials for utilities should be specified and placed in accordance with the pipe design requirements and meet applicable City of Leduc Design and Construction Specifications. Utility trench backfill should consist of compacted engineered fill, similar to, or the same as the excavated soils. Different abutting materials within the frost zone will require a frost taper in order to minimize differential frost heaving.

It is suggested that the bedding material be placed around the service pipes with a minimum of 300 mm cover on all sides of the pipe.

Temporary surcharge loads such as excavated soils and stockpiles of materials should be kept back from the excavation crest by a minimum distance equal to the excavation depth.

Soft, wet soils with high groundwater conditions might be present at ponded areas or other areas indicative of poor drainage which will need to be taken into account for design and construction of utilities. Some drying of trench backfill materials or blending with drier soils to obtain proper compaction due to the wet nature of these subsurface soil conditions.

7.5 Site Grading and Drainage

As noted previously, the groundwater watertable could be as shallow as 3 m below ground surface with groundwater levels expected to be higher than the recorded levels due to seasonal fluctuations or at ponded areas and other areas indicative of poor drainage. The final grades across the site are not available. It is likely that for each business/commercial building and/or regional permanent drainage



systems will be required to avoid seepage into underground structures that are constructed deeper than the groundwater level.

For preliminary design, individual drainage systems should be installed surrounding and below the underground structures such as residential basements or parkades. Final layout and design of the drainage system will need to be addressed during the detailed design phases of the project.

It is anticipated that some site grading will be required in the development areas in order to level the site and to achieve subgrade design elevations. Positive drainage away from areas to be occupied by any buildings, exterior slabs, roadways and parking areas should be designed in order to reduce accumulation of surface runoff to prevent ponding and possible softening of the subgrade. Excess water should be drained or pumped from the site as quickly as possible, both during and after construction.

The final grade should provide surface drainage away from all structures. Landscaped areas should be graded to slope water away from any buildings. A minimum gradient of 2% should be used wherever possible. Roof and other drain extensions should discharge well clear of any buildings or equipment.

7.6 Foundations

Over the majority of the site, the native clay till materials encountered over the site are found to be suitable for housing development. Shallow foundations are considered to be suitable and the preferred foundation type for business/commercial developments given the anticipated relatively lightly-loaded foundations.

Shallow foundations placed on suitably-compacted engineered fill or undisturbed clay till are considered suitable for structures or buildings without significant uplift loading. For preliminary planning purposes, a factored geotechnical bearing resistance at Ultimate Limit States (ULS) of 100 kPa is recommended for the native clay tills as well as for properly constructed engineered fill. The bearing pressure at Serviceability Limit States (SLS) is dependent on footing width, shape, embedment depth, subgrade material and allowable settlement. For preliminary planning purposes, the Serviceability Limit States (SLS) bearing pressure can be assumed to be in the order of 75 kPa (assuming an allowable settlement of 25 mm and foundation width of up to 1 m).

For areas where a significant thickness of engineered fill is proposed, both deep (pile) foundations (castin-place concrete piles) and footings are feasible for the foundation systems.

Based on the soil and groundwater conditions presented in the reports reviewed as well as our own experience with similar soil materials, the cast-in-place piles may be designed on the following preliminary allowable skin friction values:



Material and Depth	Fractored Shaft Resistance (kPa)	Factored Toe Resistance (kPa)
Frost Zone/Fill ¹ (0 to 2.5 m)	0	-
Clay Till	20	250
Bedrock	30	350

(CIP) Preliminary Parameters

Notes:

(1) Shaft resistance should be neglected in all fill soils and within the frost zone

The minimum embedment depth of cast-in-place concrete piles should be sufficient to resist the imposed loads and uplift forces due to frost heave, but not be less than 7.0 m. The minimum depth will also depend on the construction details of the pile and future fill placement.

It should be noted that based on the preliminary nature of this study (limited number of borehole and testing information), further site-specific soil investigation is required in order to confirm preliminary foundation design parameters provided in this report.

Other deep foundation systems may be freasible and could be utilized based on application such as driven steel piles, helical piles, cast-in-place concrete belled piles, etc.

7.7 Storm water management facilities (SWMF)

It is considered that any SWMF are to be placed within the surficial clay till, as such for preliminary design purposes the maximum side slopes between the high water levels (HWL) and a point 1 m below the normal water levels (NWL) must be 7H:1V including overflow areas. These side slopes should be landscaped upon construction of the SWMF to reduce erosion. A side slope of 4H:1V or flatter is recommended after the 7H:1V side slope.

The side slope in the vicinity of the NWL (horizontally, 2.1 m inside an 2.1 m outside of the NWL) must be protected from wave and ice erosion using a minimum 250 mm deep layer of well graded washed rock, with a minimum particle size of 75 mm, placed on a woven polypropylene geotextile fabric. The slope above this zone should be landscaped as soon as practical after grading to reduce erosion.

As noted previously, the groundwater watertable could be as shallow as 3 m below ground surface with groundwater levels expected to be higher than the recorded levels at ponded areas and other areas indicative of poor drainage. The final grades for the SWMFs are not available, however, having the pond extended below the groundwater table may present difficulties during construction of a clay liner. This issue may be aggravated if sand pockets or seams are found during construction.

In addition, as previously mentioned in **Section 6.1**, the potential existence of uncontrolled fill was identified which will need to be taken into account for design and construction of SWMF.



7.8 Frost considerations

7.8.1 Frost Susceptibility and Penetration Depth

Guidelines developed by Casagrande (1932) are commonly used to qualitatively assess the frost susceptibility of soils. These guidelines are based on plasticity index and the percentage of the soil finer than 0.02 mm (by weight) and have been adapted by the Canadian Foundation Engineering Manual (CFEM 2006) and the United States Army Corps of Engineers (US ACE 1984). According to these guidelines, soils are classified into four group of F1 through F4 in order of increasing frost susceptibility. According to these guidelines, the clay till at the site is classified as frost susceptible soil (F3).

CFEM (2006) provides a procedure to estimate the seasonal frost penetration depth in the surficial soil units. A mean freezing index of 1,500°C days was used for the site area. Accordingly, a design seasonal frost penetration depth is estimated to be approximately 2.5 m for the clay till. It is noted that the seasonal frost penetration depth is expected to decrease if significant snow cover, peat and/or vegetation are present at the surface. Alternatively, greater frost penetration will occur if granular fill materials are utilized.

Appropriate insulation type should be chosen based on the design loading, deformation tolerance and exposure to chemicals. Considering viscoelastic behavior the insulation products, the compressive strength of the product should be at least three times the design bearing pressure (a factor of safety of 3 against long-term creep).

7.8.2 Foundation Protection

To provide protection for shallow foundations from frost heave, these foundations should be placed at minimum depths of 2.5 m and 1.5 m below ground surface, for unheated and heated buildings, respectively. For foundations placed shallower than these depths, insulation should be considered.

7.8.3 Utility Lines

For un-insulated utility lines including water and sewer pipelines, the minimum burial depth should not be less than the seasonal frost penetration depth. For installation of un-insulated utility lines including water and sewer pipelines with soil cover less than the design seasonal frost penetration depth, insulation must be considered.

7.9 Seismic Site Class

The 2010 NBCC seismic design procedures are used for site seismic classification. These procedures are based on ground motion parameters (e.g. peak ground acceleration (PGA) and spectral acceleration, Sa values) having a 2% probability of Exceedance in 50 years; i.e., the 2,475 year return period earthquake event. Based on the subsurface conditions, it is appropriate to classify the ground conditions at the subject site as a Class D Site, in accordance with the 2010 NBCC (Table 4.1.8.4.A).



8.0 Closure

This report has been prepared for the sole benefit of City of Leduc, and may not be used by any third party without the express written consent of Stantec Consulting Ltd. Any use, which a third party makes of this report, is the responsibility of such third party. Use of this report is subject to the Statement of General Conditions provided in the Appendices.

It is the responsibility of City of Leduc, who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Stantec should any of these not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report
- Basis of the report
- Standard of care
- Interpretation of site conditions
- Varying or unexpected site conditions
- Planning, design or construction

We trust the above information meets with your present requirements. Should you have any questions or require further information, please contact us.



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Appendix A Statement of General Conditions

STATEMENT OF GENERAL CONDITIONS

<u>USE OF THIS REPORT</u>: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and the Client. Any use which a third party makes of this report is the responsibility of such third party.

<u>BASIS OF THE REPORT</u>: The information, opinions, and/or recommendations made in this report are in accordance with Stantec Consulting Ltd.'s present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec Consulting Ltd. is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

<u>STANDARD OF CARE</u>: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

<u>INTERPRETATION OF SITE CONDITIONS</u>: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec Consulting Ltd. at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

<u>VARYING OR UNEXPECTED CONDITIONS</u>: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec Consulting Ltd. must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec Consulting Ltd. will not be responsible to any party for damages incurred as a result of failing to notify Stantec Consulting Ltd. that differing site or sub- surface conditions are present upon becoming aware of such conditions.

<u>PLANNING, DESIGN, OR CONSTRUCTION</u>: Development or design plans and specifications should be reviewed by Stantec Consulting Ltd., sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec Consulting Ltd. cannot be responsible for site work carried out without being present.





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Appendix B Site Plan





East Telford Lake Area Structure Plan Context

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Appendix C Aerial Photos























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Appendix D Photographs





View of East Telford Lake Area showing lower wet area



View of East Telford Lake Area showing undulating topography





View showing existing valve station



View of East Telford Lake Area showing flat topography





View of East Telford Lake Area showing existing surface drainage channel



View of East Telford Lake Area showing lower wet area





View of Telford Creek at intersection with Range Road 245



View showing existing residential housing, garage, and other small structures



 Revision:
 July 7, 2017

 Project No.:
 1161106060







IFN	T: Sel	ect Enc	ineering Consultants Lt	d f		IL ETHOR	2.5	olid Ste	PROJECT NO: 416)-434	FLEVA	TION: 727.09 m	p-01
WNE	R: Ci	ty of Lee	duc		OCATIC	N: As	per	site pla	n .		LLLIN	1014. 121.001	
AMPL	ETY	PE	SHELBY TUBE	CORE SAM	PLE		SAI	IPLE	GRAB SAMPLE	III NO F	ECOVERY		
ACKE	FILL T	YPE	BENTONITE	PEA GRAVE	EL	sLC	UGH	1	GROUT		L CUTTINGS	SAND	
Water Level	SOIL SYMBOL	usc	DESC	301L Cription	1		SAMPLE TYPE	SPT (N)	POCKETPEN. (IKPd) 100 200 300 400 PLASTIC M.C. UDU 10 40 50	D	OTHER DATA	SLOTTED	
	333	OR	ORGANICS : topsoil, mo	ist, brown/black.	2	00 mm		8		1		1	1
22		α	CLAY TILL : sity, sandy, palstic, greyish brown to li stones to 50mm in diame Below 1.2m, very stiff, tra peobles.	, moist, stiff, mediu arown, precipiliates, ler. ce coal, oxides and	m , oxides, al								
			Below 2.7m, very sandy, auger. SANDSTONE BEDROCK medium plastic, ground o	dense, brown, grou (: silty, clayey, der n auger, grey.	und on nse,	3.4 m							
		SS-BR	Below 4.6m, minor amour Vencountered. CLAY SHALE BEDROCH	nts of ingressing wa	ater iist,	4.6 m			123				
		CS-BR	hard, high plastic, grey.						165				
			END OF TESTHOLE @ 6 no slough on completion standpipe installed to 6.1 6 day waterlevel reading 11 day waterlevel reading 16 day waterlevel reading	1.1 m. 0.3 m of wai of testhole. Slotted m. 3.27 m logs. g: 2.24 m logs. g: 2.22 m logs.	ter and								
1	-			Inter ter	17504			LOC	GED BY: CW		COMPLETION	DEPTH: 6.10 m	-
		J.R	CONSULTING & TESTING EN	GINEERS	Edmon	ton, AB	158	ET REV	EWED BY: R Evans		COMPLETION	DATE: 04/13/16	i



ROJE	ECI: (Geo. Im	v. Prop. Leduc Cemeter	y, Preliminary A	ssessm	ent		PROJECT NO: 416	0-454	BOREH	OLE NO: 201	16-02
CLIEN	T: Se	ect Eng	ineering Consultants Lt	d	DRILL	METHOD	Solid S	tem Auger		ELEVAT	TION: 727.59	m
OWNE	R: Ci	y of Lee	duc		LOCAT	TION: As p	er site p	an				
SAMP	LE TY	PE		CORE SAM	MPLE	SPT	SAMPLE	GRAB SAMPLE	III NO RE	COVERY		
BACK	FILL T	YPE	BENTONITE	PEA GRAV	VEL	SLO	JGH	GROUT		CUTTINGS	SAND	
Depth (m) Water Level	SOIL SYMBOL	nsc	DESC	Soil Ription			SPT (N)	POCKETPEN. (8Pel 400 100 200 300 400 PLASTIC M.C. LIQU 20 40 50 50	D D	OTHER DATA	SLOTTED	PIEZOMETER
0		OR	ORGANICS : topsoil, mo	ist, brown/black.		200 mm			1			
-1 -2 		a	CLAY TILL : sity, sandy palstic, greyish known to stones to 40mm in diame Below 0.9m, moist to very Below 1.8m, very sandy, known.	, moist, very stiff, brown, some prec ter. y moist, stiff. sand pockets thro moist to very moi	medium ipitates, bughout, st, stiff.	200 1111						7
4		CS-BR	CLAY SHALE BEDROCH medium to high plastic, d blueish grey. At 4.9m, coal inclusions a ingressing water.	C: silty, sandy, m ense, ground on a and high amounts	oist, auger,	3.7 m						
-6			Below 5.2m, soft, kentori	tic with kentonite	pieces.							
7			END OF TESTHOLE @ 6 no slough on completion standpipe installed to 6.1 6 day waterlevel reading 11 day waterlevel reading 16 day waterlevel reading	8.1 m. 0.9 m of w of testhole. Slotte m. 3.36 m løgs. g: 2.4 m løgs. g: 2.39 m løgs.	ater and							1
7.9												
1	-	LP	Paine & Assoc	lates I tel	1750	05 - 106 Aver	ue LC	GGED BY: CW	C	OMPLETION	DEPTH: 6.10	m
1 -			CONSULTING & TESTING EN	GINEERS	Edm	onton, AB T	58 1E7 RE	EVIEWED BY: R Evans	C	OMPLETION	DATE: 04/13/1	16







KUJ	ECI: (Geo. In	v. Prop. Leduc Cemeter	y, Preliminary Assessr	nent			PROJECT NO: 416)-454	BOREH	OLE NO: 2016-	04
LIEN	II: Sel	lect Eng	gineering Consultants Lt	d DRILL	METHOD): Solid	Ste	m Auger		ELEVA	TION: 727.42 m	9
AND		PE				SAMP	e pia		III.NO	RECOVERY		
ACK	FILLT	YPE	BENTONITE	PEA GRAVEL		UGH	E	GROUT			SAND	
	2				Шосо	ш.						
Water Level	OIL SYMBC	nsc	DESC	SOIL CRIPTION		AMPLE TYP	SPT (N)	▲ POCKETPEN. (kPa) ▲ 100 200 300 400 PLASTIC M.C. LIDU	D	OTHER DATA	SLOTTED	
	3333	OR	ORGANICS : topsoil, mo	ist. brown/black.	150 mm	3		20 40 50 80	-		d	
		SM	SAND : sity, moist to ver some day and oxides.	y moist, loose, brown,	130 1001			74				
1.78			CLAY TILL : sity, sandy, trace oxides and precipita	, very moist, firm, krown, ntes.	1.1 m.							72.64
			Below 1.8m, moist, very s sand seams throughout, 1 pebbles, stories to 50mm	stiff, greyish krown, thin trace coal, oxides and in diameter.				3 4 .				-
		a	Below 3.7m, krownish gre	ey.								
and the second se			Below 4.3m, moist to very	y moist, stiff, grey.								
			At 5.9m, 100mm west sar ingressing water. END OF TESTHOLE @ 6 no slough on completion standpipe installed to 6.1 6 day waterlevel reading: 11 day waterlevel reading 16 day waterlevel reading	nd pocket with some 0.1 m. 0.3 m of water and of testhole. Slotted m. 2.68 m logs. g: 1.73 m logs. g: 1.78 m logs.								1000
			Belos 8 Assoc	John I.4. 177	05 - 106 Ave		LOC	GED BY: CW		COMPLETION	N DEPTH: 6.10 m	3
		J.N	CONSULTING & TESTING EN	GINEERS Pho	nonton, AB 1 one: (780) 48	58 1E7 9-0700	RE	IEWED BY: R Evans		COMPLETION	N DATE: 04/13/16	



PROJE	CT:	Geo. In	v. Prop. Leduc Cemeter	y, Preliminary Ass	essment			PROJECT NO: 4160)-454	BOREH	IOLE NO: 2	016-0)5
CLIEN	T: Se	lect Eng	gineering Consultants Lt	d D	RILL METHO	D: S	olid Ste	m Auger		ELEVA	fion: 732.(35 m	
OWNE	R: Ci	ty of Le	duc	L	DCATION: As	per	site pla	n					
SAMPI	ET	/PE	SHELBY TUBE	CORE SAMP		T SA	MPLE	GRAB SAMPLE		RECOVERY			
BACKE		IYPE	BENTONITE	PEA GRAVE		OUGł	-	GROUT		LL CUTTING5	SAND		
Depth (m)	SOIL SYMBOL	nsc	S DESC	SOIL RIPTION		SAMPLE TYPE	SPT (N)	POCKETPEN. (kPd) A 100 200 300 400 PLASTIC M.C. LIQUI 20 40 60 80	D	other Data		SLOTTED PIEZOMETER	Elevation (m)
0	333	OR	ORGANICS : topsoil, mo	ist, brown/black.	200	+							-
		a	CLAY SHALE BEDROCK medium to high plastic, ker	 c) in our model. moist, stiff to very s race coal, oxides an in diameter. moist and seams moist and seams silty, sandy, mois swn. sh grey. 	d ^z .7 m								732- 731- 730-
		CS-BR	Below 4.3, ground on aug END OF TESTHOLE @ 6 slough on completion of to installed to 6.1 m. 6 day waterlevel reading: 11 day waterlevel reading: 16 day waterlevel reading	er. .1 m. No water and esthole. Slotted star 4.71 m kgs. ; 3.74 m kgs. ; 3.75 m kgs.	ino napipe								728- 727- 726-
7.9		J.R	Paine & Assoc	iates Ltd.	17505 - 105 Av	enue	LOG	GED BY: CW		COMPLETION	DEPTH: 6.1	0 m	725-
	Ľp,)	CONSULTING & TESTING EN	GINEERS	Edmonton, AB Phone: (780) 44 Exer (780) 460	158 89-07	ie REV	/IEWED BY: R Evans		COMPLETION	DATE: 04/1	3/16	4 . 4 4
	/		BEDTECHNICAL · ENVIRONMENTAL	- MATERIALS -	Fax: (780) 4891	0000	Fig.	NO: D				rage -	1 01 1



	DESC ORGANICS : topsoil, m CLAY TILL : sity, sand known, trace coal, oxider 40mm in diameter.	The second secon	200 mm	Wer site p SAMPLE UGH	Con Puger an GRAB SAMPLE GRAB SAMPLE GROUT POCKETPEN, (kPa) 4 100 200 300 400 PLASTIC M.C. LIOUI 20 40 60 80 10 50 80		
	BEINTONITE BENTONITE DES(ORGANICS : topsoil, m CLAY TILL : silty, sandy brown, trace coal, oxides 40mm in diameter. Below 2.4m, moist to ver seams throughout.	CORE SAMPLE CORE SAMPLE PEA GRAVEL SOIL CRIPTION oist, known/black. y, moist, very stiff, grey s and pekkles, stones t	200 mm ish to	SAMPLE UGH HILL ALL ALL ALL ALL ALL ALL ALL ALL ALL	GRAB SAMPLE	OTHER DATA	SAND STORED
	BENTONITE DES(ORGANICS : topsoil, m CLAY TILL : sity, sandy brown, trace coal, oxides 40mm in diameter. Below 2.4m, moist to ver seams throughout.	PEA GRAVEL SOIL CRIPTION oist, brown/black. y, moist, very stiff, greyi s and pebbles, stones t	200 mm ish to	SPT (N)	GROUT APOCKETPEN (BPI) 100 200 300 400 PLAETIC M.C. UQUI 20 40 80 80 12 40 80 80 12 40 80 80 12 40 80 80 12 40 80 80 12 40 80 80 12 40 80 80 12 40 80 80 12 40 80 12 40 80 12 40		Send Store Text
	DES(ORGANICS : topsoil, m CLAY TILL : sily, sand) brown, hoce coal, oxide: 40mm in diameter.	SOIL CRIPTION oist, known/black. y, moist, very stiff, greyt s and pelobles, stones t	200 mm ish io	SAMPLE TYPE SPT (N)	POCKETPEN (BP4) A 100 200 300 400 PLASTIC M.C. LIDUI 20 40 50 80	OTHER DATA	SLOTTED SLOTTED
	ORGANICS : topsoil, m CLAY TILL : sity, sand known, trace coal, oxides 40mm in diameter. Below 2.4m, moist to ver seams throughout.	oist, korown/black. y, moist, very stiff, greyi s and pekkles, stones t ny moist, stiff, thin sand	200 mm ish to				
α	CLAY TILL : sity, sandy known, trace coal, oxides 40mm in diameter. Below 2.4m, moist to ver seams throughout.	r, moist, very stiff, grey s and pekkles, stones t ny moist, stiff, thin sand	ish to				
	Below 3.7m, very moist,	fimn, grey.			**		
CS-BR	CLAY SHALE BEDROC hard, high plastic, grey. END OF TESTHOLE @ slough on completion of installed to 6.1 m. 6 day waterlevel reading 11 day waterlevel reading 16 day waterlevel reading	K : silty, sandy, moist, 6.1 m. No water and n testhole. Slotted stand ; 4.27 m logs. g; 2.2 m logs. g; 2.22 m logs.	5.5 m 10 kpipe				











Gente	ch Developments l	Ltd.				Propos	ed Industrial Su	bdivision				B	OREHOLE NO	: BH-01		
SPT D)rilling					North T	elford Lake, Le	duc, Albe	rta			PF	ROJECT NO:	GP1334		
150m	m Solid Stern Auge	ar 🛛				See bo	rehole location	plan.				EL	EVATION:			
SAMP	LE TYPE	SHELBY TU	JBE		NO RECO	WERY			DISTURB	D	E	A-4	CASING	CONT	INUOUS	i
BACK	FILL TYPE	BENTONIT	E		PEA GRA	VEL	SLOUGH		GROUT		E		RILL CUTTINGS	SAND		
Depth (m)	ESTANDARD PE 20 40 0 PLASTIC MC 20 40 0		USCS	SOIL SYMBOL		D	SOIL ESCRIPTI	ON		SAMPLE TYPE	SAMPLENO	(N)	OTHER TO COMME	ESTS NTS	INSTRUMENTATION DATA	Depth (m)
			0PS0		TOPSOIL SILT, some Some cli CLAY, trac grey flecks SILT, some ight grey, 1 SILT, some SAND, silty SILT, claye - sandy, ti REFUSAL	e sand, tra ay and sar e sand an moist. ENCOUN y, trace fin race clay.	ice clay and grave nd, trace gravel, k id gravel, stiff, dar d clay, hard / very (TERED. e gravel, very der and, hard, light kr	el, light kro locky, moù k krownish dense, lov ise, light kr	wn, frozen. st. st. v plastic, rown, moist.		1 1 1 1 5 5 0. 5 5 0. 5 5 0. 5 5 0. 5 5 0. 5 5 0.	15 M 12 M 13 M 13 M 13 M 13 M 13 M 13 M 13 M 14 M 14 M 14 M 14 M 14 M 14 M 14 M 14	MC = 18% MC = 19% MC = 15% MC = 15% MC = 16% MC = 14% MC = 14% MC = 14% MC = 18% MC = 16%			
16					Screen fro Solid from Cuttings fro Bentonite f Groundwat surface. End of bor	n 14.2 to 11.2 m to om 14.2 m fom 0.3 m fom 0.3 m er level or ehole at 1	areat. Sturface. I to 3 m. I to sturface. In February 22, 20 4.2 m.	09 = 5.2 m	below .							-
3								LOGGED	BY: DG				COMPLETION	DEPTH: 1	4.2 m	
								REVIEW	ED BY: RM				COMPLETION	DATE: 16/	2/09	
2															Page	1 of 1



Gente	ch Development	s Ltd.				Propose	d Industrial S	Subdivision	1			B	OREHOLE NO:	BH-02		
SPT)rilling					North Te	elford Lake, L	educ, Alb.	erta			P	Roject No: (GP1334		
150m	m Solid Stem Au	ger				See bore	ehole location	n plan.				E	LEVATION:			
SAMP	LE TYPE	SHELBY TU	IBE			VERY			DISTURB	ED	[A-	CASING	CONTI	NUOUS	i
BACK	FILL TYPE	BENTONIT	E		PEA GRA	VEL	SLOUGH		GROUT				RILL CUTTINGS	SAND		
Depth (m)	20 40 PLASTIC MC 20 40	0 PEN (N)	nscs	SOIL SYMBOL		DE	SOIL ESCRIPT	ION		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TE COMMEN	ests Ats	INSTRUMENTATION DATA	Depth (m)
2	•				- some cla plastic, med - stiff. - light brow - trace cla	e sand, trac ay, trace sa slium brown wn specks. y, sand an	nd and gravel n, moist.	, very stiff, n low plastic,	ight krown,	X		20	MC = 16% MC = 18%			- -
-	•			moist. some sa sandy.	nd, hard, k	ow to non-plas	tic, grey, mo	oist.	X		65	MC = 19%			-	
-6	•	30		SAND & SI	LT, very de	ense, light grey	r, moist.		×	ć	50/).09	MC = 16%			-6	
- - 	SAN SILT					y, light plas	stic, hard, light	grey, moist		×	å	50/ I 0.08	MC = 16%		-	- - 8
10	•				- WATER	ENCOUNT	TERED.			×	-	50/ I 150	MC = 20%			-
12		39	•		Backfilled t	o surface w	vith cuttings. .7 m.			×	ė	50/ I).10	MC = 19%		-	
aver 14															-	-
																- 16
-18																-18
20	•••••							LOGGE	D BY: DG				COMPLETION	DEPTH: 12	7 m	
E C								REVIEW	ED BY: RM				COMPLETION	DATE: 16/2	2/09 Page	1
								1					1		r age	1 01 1



Gente	ch Developments	s Ltd.			P	roposed	Industrial S	bubdivision	n			E	BOREHOLE NO	: BH-03		
SPT D	rilling				N	lorth Tel	ford Lake, L	educ, Alb	erta			F	PROJECT NO:	GP1334		
150m	m Solid Stem Aug	jer			S	èee borel	hole location	n plan.				E	ELEVATION:			
SAMP	LE TYPE	SHELBY TU	BE		NO RECOVE	ERY			DISTURB	D		_/	A-CASING	CONT	NUOU	5
BACK	FILL TYPE	BENTONIT	Ε		PEA GRAVE	EL.	SLOUGH		GROUT			\mathbb{Z}	RILL CUTTINGS	SAND		
Depth (m)	ESTANDARD 20 40 PLASTIC MC 20 40	PEN (N)	nscs	SOIL SYMBOL		DE	SOIL SCRIPT	ION		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TI COMME	ESTS NTS	INSTRUMENTATION DATA	Depth (m)
					TOPSOIL SILT, some si some clay, brown with gre trace clay, trace clay, some clay, some clay, SILT, some si light grey, moi WATER EN WATER EN	and, trace trace sar ey specks no gravel medium ; and and o ist.	e clay and gravel, s, moist. , blocky, low p plastic. day, hard / ve ERED.	vel, light br	own, frozen.			37 63 63 50/ 0.10 50/ -0.04	MC = 21% MC = 17% MC = 13% MC = 18% MC = 17% MC = 23%		NI III	
18																- -
3								LOGGE	D BY: DG				COMPLETION	DEPTH: 12	2.7 m	
								REVIEV	ED BY: RM				COMPLETION	DATE: 16/	2/09	
2															Page	1 of 1



Gente	ch Development	s Ltd.				Proposed	d Industrial S	ubdivision	1			E	BOREHOLE NO	: BH-04		
SPT)rilling					North Te	lford Lake, Le	educ, Albe	erta			F	PROJECT NO:	GP1334		
150m	m Solid Stem Au	ger				See bore	hole location	plan.				E	ELEVATION:			
SAMP	LE TYPE	SHELBY TU	BE	[NO RECO	VERY				ED		A	-CASING	CONT	NUOUS	i
BACK	FILL TYPE	BENTONIT	E	[PEA GRA	VEL	SLOUGH		GROUT			Z	RILL CUTTINGS	SAND		
Depth (m)	STANDARD 20 40 PLASTIC MC 20 40	PEN (N)	nscs	SOIL SYMBOL		DE	SOIL SCRIPTI	ION		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TI COMME	ESTS NTS	INSTRUMENTATION DATA	Depth (m)
2	•				\TOPSOIL SILT, some ,moist. light brox trace sar trace sar blocky, li	sand, trac vn. 1d, no grav aht grey wi	e gravel, stiff, k el th rust mottle.	ow plastic, i	brown	X		25	MC = 19% MC = 17%			-2
- 4 -	•			SILT, trace moist.	sand, trace	e clay, low plas	tic, hard, lig	ht grey,			50/ 0.11	MC = 13%			- 4 -	
- - -6 -	• • • • • • • • • • • • • • • • • • •									X		90	MC = 16%			-6
- - -8 -	• • • • • • • • • • • • • • • • • • •					iy, trace sai nd. trace cl	nd. av.			X		50/ 0.10	MC = 16%			- - -8
10	•	39	•				-			X		50/ 0.10	MC = 15%			
	•	***	•		- some cla	iy, trace sai	nd.	ation of deal		М		50/ 0.11	MC = 19%			-12
- 14	4 Grou Moni					Well Installe n 12.7 to 9. 9.7 m to sur m 12.7 to 0 om 0.3 m t er level on 1	ed. 7 m. rface.).3 m. Io surface. February 22, 2	009 = 2.5 n	n below							-14
16			End of bore	hole at 12.	7 m.									- 16 		
3															[-
3								LOGGE	D BY: DG	-			COMPLETION	DEPTH: 12	2.7 m	
								REVIEW	ED BY: RM				COMPLETION	DATE: 16/	2/09	
2								1					1		Page	1 of 1



Gente	ch Developmer	ıts Ltd.				Propos	sed Indust	trial Sub	division				B	OREHOLE NO	BH-05		
SPT)rilling					North 7	Telford La	ke, Led	uc, Albert	a			P	ROJECT NO: (GP1334		
150m	m Solid Stern A	uger				See bo	orehole loo	cation pl	an.				E	LEVATION:			
SAME	LE TYPE	SHELBY TU	JBE	_	NO RECO	WERY		r		DISTURB	ED			-CASING	CONT	NUOU	5
BACK	FILL TYPE	BENTONIT	E		PEA GRA	VEL	SLO	DUGH		GROUT				RILL CUTTINGS	SAND	-	
Depth (m)	STANDAF 20 40 PLASTIC 20 40	D PEN (N)	nscs	SOIL SYMBOL		۵	SC DESCR)IL IPTIC	N		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TE COMMEN	ests VTS	INSTRUMENTATION DATA	Depth (m)
			-		 - Isome cla moist. - trace sa - trace sa - dayey, r - trace sa - sandy, t - sandy, t - WATER - some cla 	y, trace g ay, some nd. medium p e day, tra c day, tra c day, trace	yravel, froze sand, trace plastic, in-si ce to some	en, light k e gravel, i tu, increa e sand, lo	rown. very stiff, li ising moist w plastic, ł	ght krown, ure with hard, light			32 17 11 50/ 0.09 71 50/ 0.08	Frozen. MC = 12% MC = 17% MC = 17% MC = 15% MC = 16% MC = 17%			
				Groundwat End of bore	er @ 6.7 ehole at 1	m at comp 15.7 m.	letion of	drilling.		X	1	50/ 0.10	MC = 18%			- - - - - - - - - - - - - - - - - - -	
5									LOGGED	BY: DG				COMPLETION	DEPTH: 1	5.7 m	I
2								H	REVIEWE	DBY: RM				COMPLETION	DATE: 17/	2/09	
5								F								Page	1 of 1



Gente	ch Developmer	nts Ltd.			Propos	sed Industrial S	bubdivision	n			В	OREHOLE NO	BH-06		
SPT D)rilling				North 7	Telford Lake, L	educ, Alb	erta			P	ROJECT NO: (GP1334		
150m	m Solid Stern A	uger			See bo	vehole location	n plan.				E	Levation:			
SAMP	LE TYPE	SHELBY TU	BE	NO REC	OVERY			DISTURBE	D		A-	CASING	CONT	INUOUS	5
BACK	FILL TYPE	BENTONITE		PEA GR	AVEL	SLOUGH		GROUT			Zp	RILL CUTTINGS	SAND		
Depth (m)	20 40 PLASTIC 1 20 40	80 PEN (N)	USCS SOIL SVMPOL	01-01-01-01-01-01-01-01-01-01-01-01-01-0	C	SOIL ESCRIPT	ION		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TE COMME	ests VTS	INSTRUMENTATION DATA	Depth (m)
- - - - - - - - - - - - - - - - - - -	•		- <u></u>	 TOPSOIL SILT, sar very st some : sandy. 	dy, trace g iff, moist. sand to sar	pravel, stiff, crumi nety, trace clay, h	bly, frozen. ard, light br	own.			18 ¹ 54 ¹ 50/ 0.10	MC = 16% MC = 20% MC = 16%			
-6	•	K		some	day, traces	sand, low plastic	stic, hard, n	noist.	X		59	MC = 16%			-6
	•	22	- WATE	R ENCOU	NTERED, trace s	and.		~	(50/ 0.08	MC = 15%				
- 				– some (lay.				M		50/	MC = 17%			
12 				Monitorin Screen fr Solid fron Cuttings I Bentonite Groundw surface, End of loc	g Well Inst om 12.7 to 19.7 mto: 19.7 mto: from 0.3 n from 0.3 n ater level o rehole at 1	alled. 9.9.7 m. surface. o 0.3 m. n to surface. n February 22, 2	1009 = 4.1 r	n kelow			50/	MC = 16%			-12
- 18								D BY: DG				COMPLETION COMPLETION	DEPTH: 12 DATE: 17/	2.7 m	-18
ŝ								as st. rud				COMPLETION	2002.00	Page	1 of 1



Gente	ch Developments	: Ltd.			Propose	d Industrial Su	bdivision			B	OREHOLE NO	BH-07	
SPT D)rilling				North Te	elford Lake, Lex	luc, Alberta			P	Roject No: (GP1334	
150m	m Solid Stern Aug	jer			See bon	ehole location p	olan.			E	LEVATION:		
SAMP	LE TYPE	SHELBY TU	BE		NO RECOVERY		DIST	TURBED		A-	CASING	CONTI	NUOUS
BACK	FILL TYPE	BENTONITE	E		PEA GRAVEL	SLOUGH	GRO	DUT		Z¤	RILL CUTTINGS	SAND	
Depth (m)		PEN (N)	uscs	SOIL SYMBOL	D	SOIL ESCRIPTIO	N	SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TE COMMEN	ests VTS	INSTRUMENTATION DATA Depth (m)
-				Ĩ	TOPSOIL SILT, some sand and	l clay, frozen, ligh	t brown.						
-2	•				trace sand, very stif	f, grey specks, m	oist.			'	MC = 12%		-2
-	P •				small carbon inclus	ions.		X		11	MC = 16%		
⁴ - -					– greyish-krown.			X		11	MC = 16%		
- 6 -	•			very stiff.			X		17	MC = 14%			
- - 6	•)•			brace sand and clay	y, hard, low to no	n-plastic.	X		26	MC = 15%			
					- some clay to claye	y, trace sand, stif	E.	X		13	MC = 17%		10
12		X											-12
- - -		39			SAND with fine grave SILT, some sand, trac grey.	ls, silty, very den: ce clay and grave	se, light brown, mo I, very dense, light	ist. 🗡		92/ I 150.1	MC = 20%		
-14													<u> </u> -14
16	•	20			Groundwater @ 3.0 n Monitoring Well Instal Screen from 15.7 m to	n at completion of led. o 12.7 m.	f drilling.	_		50/ 0.05	MC = 21%		
18					Solid from 12.7 m to s Cuttings from 15.7 m Bentonite from 0.3 m Groundwater level on surface. End of borehole at 15	surface. to 0.3 m. to surface. February 22, 20 1.7 m.	09 = 2.1 m below						- -
							LOGGED BY: DO	G	<u> </u>		COMPLETION	DEPTH: 15	7 m
Ϋ́							REVIEWED BY:	RM			COMPLETION	DATE: 17/2	/09
2													Page 1 of 1



SPT Dring Noth Teriford Lake, Leduc, Alerta PROJECT NO. 69134 SMMPLE TYPE Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse SAMPLE TYPE Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse BACKFILL TYPE Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse BACKFILL TYPE Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse Image: Tuse Intellar Tuse Intellar Tuse Intellar Tuse Intellar Tuse	Gente	ch Development	is Ltd.				Proposed	d Industrial Su	ubdivision				В	OREHOLE NO:	BH-08		
Stylem. Solid Stem Auger See borehole location plan. ELEVATION BACKFILL TYPE eventowing Series Trues Acasia Continuous Backet aventowing Series Trues Solid Solid Continuous Backet aventowing Series Solid Solid Continuous Backet aventowing Solid Solid Solid Solid Contention (Series Trues) Backet aventowing Solid Solid Solid Solid Solid Contention (Series Trues) Backet aventowing Solid Solid Solid Solid Solid Solid Solid Contention (Series Solid) Solid Solid Solid Solid Solid Solid Solid Solid Solid	SPT	Drilling					North Te	lford Lake, Le	duc, Albert	a			P	Roject No: (3P1334		
SAMPLE TYPE ■HELEY TUBE QNO RECOVERY QISPT ■DISTURED →CAMMAG ©CONTINUOS RACKFILL TYPE ■ENTONITE DPEA GAVIEL ISLOUGH	150m	m Solid Stem Au	ger				See bore	hole location	plan.				E	LEVATION:			
BACKFILL TYFE BENTONITE JPEA GAULE IDESCRIPTION CONTINUE CONTINUE<	SAMP	LE TYPE	SHELBY TU	BE	[NO RECO	WERY		E	DISTURB	D		A-	CASING	CONT	NUOUS	5
Image: Description Image:	BACK	FILL TYPE	BENTONIT	E	[PEA GRA	VEL	SLOUGH	E.	GROUT			Zp	RILL CUTTINGS	SAND		
1 1	Depth (m)	20 40 PLASTIC MC 20 40	0 PEN (N)	USCS	SUL SYMBUL		DE	SOIL SCRIPTI	ON		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TE COMMEN	ests VTS	INSTRUMENTATION DATA	Depth (m)
-2 -37 refusal, elited cat. MC = 11% - - SULT, some sand, hard, low plastic, light larown, moist. SULT, some sand, hard, low plastic, light larown, domp. SULT, some sand, hard, low plastic, light larown, domp. - - - SULT, some sand, hard, low plastic, light larown, domp. SULT, some sand, hard, low plastic, light larown, domp. SULT, some sand, hard, low plastic, light larown, domp. SULT, some sand, hard, low plastic, light grey, moist. SULT, some sand, brace day, hard, light grey, moist. SULT, some sand to sandy. SULT, some sand, to sandy. SULT, some sa	- - -			<u>-21</u>		_TOPSOIL SILT, some	e sand, trac	e gravel, frozen	, light brown								-
4 50 MC = 19% 6 50 MC = 14% 6 50 MC = 14% 8 MC = 14% 50 9 50 MC = 16% 10 10 10 10 11 10 10 10 12 10 10 10 14 10 10 10 15 10 10 10 16 10 10 10 16 10 10 10 16 10 10 10 16 10 10	-2					- SPT reft SILT & SAI non-plastic	<u>usal, drilled</u> ND, trace fir , yellowish-l	out. ne gravel, very (brown, moist.	dense, low to)				MC = 11%			-2
	-	•	•								X		94	MC = 15%			
6 9 9 MC = 14% 6 9 9 MC = 16% 10 9 9 MC = 16% 110 9 9 MC = 16% 112 9 9 MC = 16% 112 9 9 MC = 16% 112 9 9 MC = 16% 113 9 9 MC = 17% 114 9 9 8 m at completion of drilling. Montoring VEI installed. Science from 15.7 m to 12.7 m. Solid from 12.7 m to surface. Groundwater (@ 9.8 m at completion of drilling. Montoring VEI installed. Science from 15.7 m to 12.7 m. Solid from 12.7 m to surface. Groundwater level on February 22, 2009 = 4.9 m below surface. End of korehole at 15.2 m. COMPLETION DEPTH: 15.2 m		•				SILT, some – sandy.	e sand, hard	ł, low plastic, lig	ht brown, da	mp.	×		50/ 150	MC = 14%			
	6 - -	● ≫■ SILT					e sand, trac	e clay, hard, lig	nt grey, mois	t	×	(50/).09	MC = 14%			6
- 10 - some sand to sandy. - 10 - some sand to sandy. - 10 - some sand to sandy. - 12 - some sand to sandy. - 14 - some sand to sandy. - 16 - some sand to sandy. - 18 - some sand to sandy. - 19 - some sand to sandy. - 10 - some sand to sandy. - 10 - some sand to sand	- - -8	SILT									~		50/).10	MC = 16%			- -
12 50/ 0.08 MC = 17% 14 16 16 16 16 16 17 m to surface. Cuttings from 15.7 m to 12.7 m. Solid from 12.7 m to surface. Cuttings from 15.7 m to 12.7 m. Solid from 0.3 m. Bentonite from 0.3 m. Bentonite from 0.3 m. 18 10 18 10 10 10 forehole at 15.2 m. 10 10 forehole at 15.2 m.	10	•	20	•		some sa	nd to sandy	y.			×	(50/).09	MC = 16%			-10
14 Groundwater @ 9.8 m at completion of drilling. 16 Monitoring Well Installed. Screen from 15.7 m to 12.7 m. Solid from 12.7 m to surface. Cuttings from 15.7 m to 0.3 m. Bertonite from 0.3 m to surface. Groundwater level on February 22, 2009 = 4.9 m below surface. End of korehole at 15.2 m.											×		50/).08	MC = 17%			-12
16 Groundwater @ 9.8 m at completion of drilling. Monitoring Well Installed. Screen from 15.7 m to 12.7 m. Solid from 12.7 m to surface. Cuttings from 15.7 m to 0.3 m. Bentonite from 0.3 m to surface. Cuttings from 15.7 m to 12.7 m. Image: Solid from 15.7 m to 12.7 m. Solid from 12.7 m to surface. Image: Solid from 15.7 m to 0.3 m. Bentonite from 0.3 m to surface. Image: Solid from 15.7 m to 12.7 m. Solid from 15.7 m to 0.3 m. Bentonite from 0.4 m to surface. Groundwater level on February 22, 2009 = 4.9 m below Image: Surface. End of borehole at 15.2 m. Image: Description Depth: 15.2 m COMPLETION DEPTH: 15.2 m																	-14
LOGGED BY: DG COMPLETION DEPTH: 15.2 m					Groundwat Monitoring Screen from Solid from Cuttings fro Bentonite f Groundwat surface. End of bore	er @ 9.8 m Well Instalk n 15.7 m to 12.7 m to si m 15.7 m t rom 0.3 m t er level on l ehole at 15.	at completion o ed. 12.7 m. urface. o 0.3 m. o surface. February 22, 20 2 m.	of drilling. 109 = 4.9 m k	oelow							- - - - - - - - - - - - - -	
BEVIEWED BY: BM COMPLETION DATE: 47/200	2								LOGGED	BY: DG				COMPLETION	DEPTH: 1	5.2 m	
Beneficial Communication (Communication Communication Comm									REVIEWE	D BY: RM				COMPLETION	DATE: 17/	2/09	1 of 4



Gentech Developments Ltd.		Proposed Industrial Su	Ibdivision		B	OREHOLE NO:	BH-09	
SPT Drilling		North Telford Lake, Le	duc, Alberta		PF	ROJECT NO: G	P1334	
150mm Solid Stem Auger		See borehole location	plan.		EL	LEVATION:		
SAMPLE TYPE SHELBY TUBE	NO REC	COVERY SPT		D	A-4	CASING	CONTIN	luous
BACKFILL TYPE BENTONITE	PEA GR	RAVEL SLOUGH	GROUT			RILL CUTTINGS	SAND	
E 20 40 50 80 99 PLASTIC MC LIQUID 10 40 50 50 99	SOIL SYMBOL	SOIL DESCRIPTI	ON	SAMPLE TYPE SAMPLE NO	SPT (N)	OTHER TE: COMMEN	STS TS	INSTRUMENTATION DATA Depth (m)
	ASPHAL SILT, trac - trace to - very st SILT, son brown, m - light br - sandy, Borehole Backfilled End of bc	T (80 mm thickness). ce clay, sand, and gravel, ha o some clay. fff. me clay, trace sand and grav loist. rown. , trace clay. dry upon completion. d to surface with cuttings. prehole at 6.1 m.	nl, light brown, frozen.		3	MC = 18% MC = 17% MC = 24% MC = 16%		
GENOL			LOGGED BY: DG REVIEWED BY: RM			COMPLETION D	DEPTH: 6.1 DATE: 18/2	m 09 Page 1 of 1



Gente	ch Developments	s Ltd.			Pr	oposed Industri	al Subdivisio	on			E	BOREHOLE NO:	BH-10		
SPT)rilling				No	orth Telford Lak	e, Leduc, Al	berta			F	PROJECT NO: (3P1334		
150m	m Solid Stem Aug	ger			Se	ee borehole loca	tion plan.					Elevation:			
SAMP	LE TYPE	SHELBY TU	JBE		NO RECOVE	RY SPT		DISTURBE	ED			A-CASING	CONT	NUOU	5
BACK	FILL TYPE	BENTONIT	E		PEA GRAVEL	SLOU	IGH	GROUT			4	DRILL CUTTINGS	SAND	~	
Depth (m)	20 40 PLASTIC MC 20 40	PEN (N)	USCS	SOIL SYMBOL		SOI DESCRII	l Ption		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TE COMMEN	ests NTS	INSTRUMENTATION DATA	Depth (m)
		Ĩ			ASPHALT (80	mm thickness).			T						
F				Π	SILT, trace org	anics, trace sand	and clay, har	d, dark brown,							F
-2	•			0.6	SAND, fine gra	avels, trace sit, co	mpact, light b	rown, damp.				MC = 14%			-2
Ł	•			ÎÏ	SILT, some sa	nd, trace clay, firm	to soft, light l	brown.				MC = 20%			L
-4					thin sand se	am.									-4
-	•				Groundwater le End of korehol	evel @ 3.0 m at co le at 4.6 m.	ompletion of d	hling.				MC = 24%			-
- 6 -															- -6 -
-															-
-8															8
-															-
-															
ŀ															F
-12															12
-14															
- 16															- 16 -
															-
5 18 5 -															- 18
í –							LOGG	ED BY: DG				COMPLETION	DEPTH: 4.	6 m	
							REVIE	WED BY: RM				COMPLETION	DATE: 18/	2/09	
2							1					1		Page	1 of 1



Gente	ch Developmer	nts Ltd.				Propos	ed Industrial S	Subdivisio	n			[BOREHOLE NO	BH-11		
SPT D	rilling					North T	elford Lake, L	educ, Alb	erta			I	PROJECT NO:	GP1334		
150m	n Solid Stern A	uger				See bor	rehole location	n plan.					ELEVATION:			
SAMP	LE TYPE	SHELBY T	UBE			VERY			DISTURB	D			A-CASING	CONT	NUOU	5
BACK	FILL TYPE	BENTONIT	E		PEA GRAV	/EL	SLOUGH		GROUT			\square	DRILL CUTTINGS	SAND	-	
Depth (m)	20 40 PLASTIC 40 20 40	D PEN (N)	nscs	SOIL SYMBOL		D	SOIL ESCRIPT	ION		SAMPLE TYPE	SAMPLENO	(N) LdS	OTHER TO COMMEN	ests NTS	INSTRUMENTATION DATA	Depth (m)
					ASPHALT (FILL, sand a known, froze SILT, trace (SILT, some known, mois - some day Borehole dr Backfilled w End of korel	80 mm th and grave n. organics, clay, trac t. y upon co ith cutting hole at 4.	ickness). el, trace to som trace sand and se sand and gra yey. ompletion. gs to surface. 6 m.	e silt, comp I clay, dark wel, very st	act, medium brown, ff, light				MC = 25% MC = 22% MC = 17%			
CHEMOLE								LOGGE REVIEV	D BY: DG WED BY: RM				COMPLETION	DEPTH: 4. DATE: 18/	6 m 2/09 Page	1 of 1



Gente	ch Developmen	ts Ltd.				Propos	ed Industrial (Subdivisio	n			E	BOREHOLE NO	: BH-12		
SPT D	Drilling					North T	elford Lake, l	educ, Alb.	erta			F	PROJECT NO: (GP1334		
150m	m Solid Stem Au	uger				See bo	rehole locatio	n plan.				E	ELEVATION:			
SAMP	LE TYPE	SHELBY T	UBE		NO REC	OVERY				ED		A	-CASING	CONT	NUOU	5
BACK	FILL TYPE	BENTONIT	Е		PEA GR	WEL	SLOUGH		GROUT	_		\mathbb{Z}^{o}	RILL CUTTINGS	SAND		
Depth (m)	20 40 PLASTIC M 20 40		uscs	SOIL SYMBOL		D	SOIL ESCRIPT	ION		SAMPLE TYPE	SAMPLENO	SPT (N)	OTHER TE COMMEI	ESTS NTS	INSTRUMENTATION DATA	Depth (m)
		Ĩ		ø.×-	ASPHALT	(90 mm tH	ickness).		/	t						
2	•				<u>SILT, trace</u> SILT, trace	<u>e sand and</u> e gravel, si	l clay, dark brou and and clay, lig	<u>vn, frozen.</u> Jht krown, f	rozen.				MC = 13%			
- - -	•				 some d mottled 	ay to claye light / dark	ey, very stiff, me : brown.	dium brow	ι.				MC = 15%			- - -
-4 - -	•			SILT, som \light grey, Borehole o Backfilled	e sand an moist. Iry upon ca with cutting	al clay, hard / ve ompletion. as to surface.	ry dense, k	w plastic,/				MC = 18%			4 - -	
- -6 -					End of bor	ehole at 4	6 m.									- 6 -
- 8 -																- 8 -
- 10 -																- - 10 -
- 12 -																- 12
anose1 10																-
																- -
18																-
3								LOGGE	D BY: DG	-			COMPLETION	DEPTH: 4	6 m	
								REVIEW	VED BY: RM				COMPLETION	DATE: 18/	2/09	
2								1					1		Page	1 of 1



Gentech Developments Ltd.					Proposed Industrial Subdivision						BC	BOREHOLE NO: BH-13					
SPT Drilling						North Telford Lake, Leduc, Alberta							PROJECT NO: GP1334				
150mm Solid Stem Auger					See bor	ehole location	plan.				EL	EVATION:					
SAMPLE TYPE SHELBY TUBE NO RECO			OVERY						_A-C	ASING CONTINUOUS			5				
BACKFILL TYPE BENTONITE		WEL	SLOUGH	0	GROUT		Ł		ILL CUTTINGS	SAND	_						
Depth (m)		EN (N)	USCS	SOIL SYMBOL		D	SOIL ESCRIPTI	ON		SAMPLE TYPE	SAMPLENO	Sk-1 (N)	OTHER TE COMMEN	ests VTS	INSTRUMENTATION DATA	Depth (m)	
_				d P	ASPHALT	(60 mm thi	ickness).		/	Ħ						_	
-	•				SILT, trace SILT, som	<u>e sand, clay</u> e clay, trac f, moist.	y and organics, d e sand, light brov	ark brown, fr vn, frozen.	ozen. /			м	IC = 13%			-	
-2	•				– medium	brown.						м	IC = 15%			2 	
- 4	•				- wet. SILT, som	e sand and	l day, hard / very	dense, low p	elastic,				IC = 18%			-4	
-					- sandy, l	hand.	n helnw surface :	at completion	of driling							-6	
-					End of bor	ehole at 4.	δm.	at compression	or uniting.							- - -	
8 - -																-8	
10																-10	
-																-	
- 14																-14	
16																	
18																	
5 F								LOGGED	Y: DG				COMPLETION		5 m		
								REVIEWED	BY: RM				COMPLETION	DATE: 18/2	2/09		
1															Page	1 of 1	



Gentech Developments Ltd.					Proposed Industrial Subdivision						BOREHOLE NO: BH-14					
SPT Drilling					North Te	lford Lake, Le		PROJECT NO: GP1334								
150mm Solid Stem Auger					See borehole location plan.						ELEVATION:					
SAMPLE TYPE SHELBY TUBE			NO REC					D		-CASING CONTINUOUS			5			
BACKFILL TYPE BENTONITE			PEA GRAVEL			<u></u>	GROUT		\square	DRILL CUTTINGS SAND						
Depth (m)	STANDARD PEI 20 40 60 PLASTIC MC 20 40 60		NSCS SOIL SYMBOL		DE	SOIL ESCRIPTI	ON		SAMPLE TYPE SAMPLE NO	SPT (N)	OTHER TI COMME	ESTS NTS	INSTRUMENTATION DATA	Depth (m)		
_			***	ROAD MU	LCH.									_		
-			Ĩ	SILT FILL SILT, som	some grav e clay, trace	<u>el, trace clay, lig</u> e sand and grave	<u>ht brown, froz</u> el, light brown	en. , frozen.						_		
- 2 -	•			- very stil	f, medium k Iv. trace da	rown. v. verv stiff. liaht	brown, moist				MC = 24%			- 2 -		
-	•			SILT, som	e sand to sa	andy, trace clay,	very stiff to h	ard, light			MC = 20%			- - -		
4 - -	•		Ш	Borehole (iry upon cor	mpletion.					MC = 18%			4 - -		
- - -6				End of bor	ehole at 4.6	im.								- - 6 -		
- - - -8														- - 8 -		
														- - 10		
-														-		
														-		
-14																
														- 16 		
														- 		
1				1			LOGGED P	V: DG		1			5 m	Ľ		
							REVIEWED	BY: RM			COMPLETION	DATE: 18/2	2/09			
5													Page	1 of 1		



Gentech Developments Ltd.					Proposed Industrial Subdivision						BC	BOREHOLE NO: BH-15				
SPT Drilling					North Telford Lake, Leduc, Alberta						PF	PROJECT NO: GP1334				
150m	m Solid Stern Aug	er			See bore	ehole location	plan.				EL	EVATION:				
SAMPLE TYPE SHELBY TUBE NO RECO							D	[A-C	A-CASING CONTINUO			5			
BACKFILL TYPE BENTONITE		PEA GR	AVEL SLOUGH			E		LL CUTTINGS SAND								
Depth (m)	STANDARD 20 40 PLASTIC MC 20 40	PEN (N)	SOIL SYMBOL		DE	SOIL ESCRIPTI	ON		SAMPLE TYPE	SAMPLENO	(N) - X5	OTHER TO COMME	ests VTS	INSTRUMENTATION DATA	Depth (m)	
-				\ <u>ROAD MU</u> SILT FILL	LCH. , trace clay a	and gravel, light	brown, froa	zen.							-	
-2	•			SILT, trac some c clayey, some c	e clay and g lay, trace sa trace sand, lay, trace sa	ravel, light brow nd, very stiff, m stiff, light browr nd, very stiff, m	m, frozen. edium brow 1. edium brow	vn, moist. vn.			N	AC = 16%			- 2	
-	•										N	AC = 25%				
	•		Ш	stiff. Borehole (Backfilled	iry upon cor to surface w	npletion. ith cuttings.					N	/C = 24%				
- -6				End of bo	enole at 4.6) m.									-6	
-10																
12															-12	
															- 14 	
16															- 16 	
18															- 	
1							LOGGED	BY: DG				COMPLETION	DEPTH: 4.	6 m		
							REVIEW	ED BY: RM				COMPLETION DATE: 18/2/09				
<1 N							1					1		Mage	1 of 1	



Gentech Developments Ltd.	Proposed Industrial Subdivision						BOREHOLE NO: BH-16					
SPT Drilling	North T	elford Lake, Leo	PROJECT NO: GP1334									
150mm Solid Stem Auger		See bo	rehole location p	olan.				ELEVATION:				
SAMPLE TYPE SHELBY TUBE	NO REC	OVERY						A-CASING	ASING CONTINUOUS			
BACKFILL TYPE BENTONITE	KFILL TYPE BENTONITE C		SLOUGH	<u></u>	GROUT		E	DRILL CUTTINGS	SAND	_		
(E) 20 40 60 50 SS 20 40 50 SS 20 50 SS	SOLL SYMBOL	D	SOIL ESCRIPTIO	NC		SAMPLE TYPE	SAMPLENO	COMME	ESTS NTS	INSTRUMENTATION DATA	Depth (m)	
	ROAD MI SILT, sor - very st - stiff. - trace b Borehole Backfilled End of bo	J <u>JCH</u> ne clay, trac iff, moist. o some sand, tra moist. dry upon co with cutting rehole at 4.	e sand and grave	y dense, low	plastic,			MC = 16% MC = 17% MC = 23% MC = 16%	NDEPTH: 4	6 m		
(Marcine)				REVIEWED	BY: RM			COMPLETION	COMPLETION DATE: 18/2/09 Page 1 of 1			