Outline Plan

Amended June 2024

Trilogy Real Estate Group Inc.

THE PIERS

TECHNICAL ELEMENTS

Associated Engineering

Amended by:
Associated Engineering Alberta Ltd.
#1001, 400 – 4th Ave S
Lethbridge, AB T1J 4E1

TRILOGY REAL ESTATE GROUP INC. OUTLINE PLAN

APPENDICES

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HISTORICAL LAND TITLE CERTIFICATE

CURRENT TITLE WITH HISTORICAL DATA

S

LINC	SHORT LEGAL	TITLE NUMBER
0022 090 443	4;22;8;28;NE	041 418 077 +1

LEGAL DESCRIPTION
MERIDIAN 4 RANGE 22 TOWNSHIP 8
SECTION 28
QUARTER NORTH EAST
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 64.7 HECTARES (160 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE

MUNICIPALITY: CITY OF LETHBRIDGE

REFERENCE NUMBER: 041 418 063

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
041 418 077	02/11/2004	SEPARATION - INTERESTS		

OWNERS

ADDIE MAY PERDUE
OF 4330-4 AVE S
LETHBRIDGE
ALBERTA T1J 4B3
AS TO AN UNDIVIDED 1/2 INTEREST

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
741 091 031	27/09/1974	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE LETHBRIDGE NORTHERN IRRIGATION DISTRICT

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 006 966	27/01/1975	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "DISCHARGED EXCEPT FOR 20 FT. STRIPS (BY 761072088)"
981 066 294	04/03/1998	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - BONAVISTA PETROLEUM LTD.. P.O. BOX 22192,BANKERS HALL POSTAL OUTLET CALGARY ALBERTA T2P4H5 AGENT - DIANE VANDER VEEN (DATA UPDATED BY: TRANSFER OF CAVEAT 991026309) (DATA UPDATED BY: TRANSFER OF CAVEAT 011238126) (DATA UPDATED BY: TRANSFER OF CAVEAT 041187482)
991 026 309	28/01/1999	TRANSFER OF CAVEAT 981066294 TRANSFEREE - ENCOUNTER ENERGY INC.. 1940, 540 5 AVE SW CALGARY ALBERTA T2P0M2
001 162 343	15/06/2000	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - BONAVISTA PETROLEUM LTD.. P O BOX 22192 BANKERS HALL CALGARY ALBERTA T2P4H5 AGENT - JUSTIN EDWARDS
011 238 126	20/08/2001	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA OIL & GAS LTD.. 1100, 321 - 6 AVENUE SW CALGARY ALBERTA T2P3H3
041 187 482	25/05/2004	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA PETROLEUM LTD.. P.O. BOX 22192,BANKERS HALL POSTAL OUTLET CALGARY ALBERTA T2P4H5 AGENT - DIANE VANDER VEEN

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
041 429 593	10/11/2004	MORTGAGE MORTGAGEE - CANADIAN WESTERN TRUST COMPANY. 220, 666 BURRARD ST VANCOUVER BRITISH COLUMBIA V6C2X8 ORIGINAL PRINCIPAL AMOUNT: $53,500
061 072 316	17/02/2006	CAVEAT RE : OFFER TO PURCHASE AND AGREEMENT FOR SALE CAVEATOR - JOE MESZAROS C/O DIMNIK & CO 334-12 ST S LETHBRIDGE ALBERTA T1J2R1 AGENT - MICHAEL J DIMNIK
061 132 195	03/04/2006	CAVEAT RE : AGREEMENT FOR SALE CAVEATOR - 1229503 ALBERTA LTD.. C/O DIMNIK & COMPANY 334-12 ST SOUTH LETHBRIDGE ALBERTA T1J2R1 AGENT - MICHAEL J DIMNIK
061 132 196	03/04/2006	DISCHARGE OF CAVEAT 061072316
061 353 291	29/08/2006	DISCHARGE OF MORTGAGE 041429593

TOTAL INSTRUMENTS: 012

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 8 DAY OF NOVEMBER, 2007 AT 07:52 A.M.

ORDER NUMBER:9849229

CUSTOMER FILE NUMBER: 6838496

REGISTRAR OF LAND TITLES

END OF CERTIFICATE

(CONTINUED)

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

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HISTORICAL LAND TITLE CERTIFICATE

CURRENT TITLE WITH HISTORICAL DATA

S
LINC
0022 090 443

SHORT LEGAL
4;22;8;28;NE

TITLE NUMBER
041 418 077

LEGAL DESCRIPTION
MERIDIAN 4 RANGE 22 TOWNSHIP 8
SECTION 28
QUARTER NORTH EAST
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 64.7 HECTARES (160 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE

MUNICIPALITY: CITY OF LETHBRIDGE

REFERENCE NUMBER: 041 418 063

REGISTERED OWNER(S):

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
041 418 077	02/11/2004	SEPARATION - INTERESTS		

OWNERS

JEAN LAPOINTE
OF 1017-19A AVE
COALDALE
ALBERTA T1M 1A6
AS TO AN UNDIVIDED 1/2 INTEREST

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
741 091 031	27/09/1974	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE LETHBRIDGE NORTHERN IRRIGATION DISTRICT

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 006 966	27/01/1975	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "DISCHARGED EXCEPT FOR 20 FT. STRIPS (BY 761072088)"
981 066 294	04/03/1998	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - BONAVISTA PETROLEUM LTD.. P.O. BOX 22192,BANKERS HALL POSTAL OUTLET CALGARY ALBERTA T2P4H5 AGENT - DIANE VANDER VEEN (DATA UPDATED BY: TRANSFER OF CAVEAT 991026309) (DATA UPDATED BY: TRANSFER OF CAVEAT 011238126) (DATA UPDATED BY: TRANSFER OF CAVEAT 041187482)
991 026 309	28/01/1999	TRANSFER OF CAVEAT 981066294 TRANSFEREE - ENCOUNTER ENERGY INC.. 1940, 540 5 AVE SW CALGARY ALBERTA T2P0M2
001 162 343	15/06/2000	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - BONAVISTA PETROLEUM LTD.. P O BOX 22192 BANKERS HALL CALGARY ALBERTA T2P4H5 AGENT - JUSTIN EDWARDS
011 238 126	20/08/2001	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA OIL & GAS LTD.. 1100, 321 - 6 AVENUE SW CALGARY ALBERTA T2P3H3
041 187 482	25/05/2004	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA PETROLEUM LTD.. P.O. BOX 22192,BANKERS HALL POSTAL OUTLET CALGARY ALBERTA T2P4H5 AGENT - DIANE VANDER VEEN

(CONTINUED)

HISTORICAL LAND TITLE CERTIFICATE

CURRENT TITLE WITH HISTORICAL DATA

S

LINC	SHORT LEGAL	TITLE NUMBER
0025 602 905	4;22;8;33;SE	061 218 951

LEGAL DESCRIPTION

MERIDIAN 4 RANGE 22 TOWNSHIP 8
THE NORTH HALF OF THE SOUTH EAST
QUARTER OF SECTION 33
CONTAINING 32.4 HECTARES (80 ACRES) MORE OR LESS
EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: CITY OF LETHBRIDGE

REFERENCE NUMBER: 061 138 871

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
061 218 951	02/06/2006	TRANSFER OF LAND	$480,000	SEE INSTRUMENT

OWNERS

DEBRA L DUDLEY-OLAFSON
OF BOX 511
LETHBRIDGE
ALBERTA T1J 3Z4

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
741 091 031	27/09/1974	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE LETHBRIDGE NORTHERN IRRIGATION DISTRICT
751 006 966	27/01/1975	UTILITY RIGHT OF WAY

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
		GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "20 FOOT STRIP. BY 761072088"
981 066 289	04/03/1998	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. 909 - 11 AVENUE,S.W. CALGARY ALBERTA T2R1L8 (DATA UPDATED BY: TRANSFER OF CAVEAT 981078661)
981 078 661	17/03/1998	TRANSFER OF CAVEAT 981066289 TRANSFEREE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. 909 - 11 AVENUE,S.W. CALGARY ALBERTA T2R1L8
031 338 405	01/10/2003	MORTGAGE MORTGAGEE - CANADIAN IMPERIAL BANK OF COMMERCE. 701 - 4 AVENUE SOUTH, LETHBRIDGE ALBERTA T1J4A5 ORIGINAL PRINCIPAL AMOUNT: $600,000

TOTAL INSTRUMENTS: 005

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 8 DAY OF NOVEMBER, 2007 AT 07:53 A.M.

ORDER NUMBER:9849239

CUSTOMER FILE NUMBER: 6838496

REGISTRAR OF LAND TITLES

END OF CERTIFICATE

(CONTINUED)

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APPENDIX B - GEOTECHNICAL INVESTIGATION

Associated Engineering Alberta Ltd.

ISSUED FOR USE

GEOTECHNICAL EVALUATION – DESKTOP STUDY
PROPOSED PIERS RESIDENTIAL DEVELOPMENT (PHASE I AND II)
LETHBRIDGE, ALBERTA

L12101216

Resubmitted June 2008

EBA Engineering Consultants Ltd.
p. 403.329.9009 • f. 403.328.8817
442 - 10 Street N • Lethbridge, Alberta T1H 2C7 • CANADA

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1.0 INTRODUCTION

This report presents the results of a geotechnical evaluation, comprising a desktop study, conducted by EBA Engineering Consultants Ltd. (EBA) for the Avonlea Residential Subdivision, Phases I and II, to be located in West Lethbridge, Alberta.

The scope of work for the geotechnical evaluation was described in a proposal issued to Mr. Brian Johnson, R.E.T., of Associated Engineering Alberta Ltd. (AEAL) on November 1, 2007. The objective of this evaluation was to determine the general subsurface conditions in the area of the proposed development (from a desktop study of existing data) and to provide general recommendations for the geotechnical aspects of design and construction for the residential subdivision development.

This document is intended to be suitable for review at the Outline Plan stage of planning. This version of the report is a resubmission of a report issued in November, 2007, incorporating review comments made by the City of Lethbridge. This report is independent of the detailed geotechnical report completed for Phase 1 of this development in June, 2008 (EBA File L12101333).

Authorization to proceed with the evaluation was provided by Mr. Johnson.

EBA has also completed a Phase I Environmental Site Assessment for the subdivision (issued under separate cover). Environmental issues are not discussed in this report.

2.0 PROJECT DETAILS AND SCOPE OF WORK

The major components of this development will include single family and multifamily residential housing, and park areas across most of the property limits, as shown on the Figure 2 attached, a Conceptual Road Connections and Internal Circulation Plan. This figure was provided to EBA by AEAL for preliminary consideration. The foundation system for the housing will likely be shallow spread footings and a grade supported lower level floor slab, typical of other residential developments in the area.

The proposed street developments will be designed and constructed to City of Lethbridge Infrastructure Services Engineering Standards. The majority of the roadways may consist of designated 'local' pavement structures, with some arterial or collector pavement structures, as required. A detailed pavement design for the respective street sections has not been requested as part of this evaluation, but may be completed at a later date.

One major component of this development will include a stormwater management facility to be constructed, as depicted on Figure 2.

Previous geotechnical evaluations completed by EBA in the vicinity of the project site in 2005 and 2006 include the "Lands West of Benton Drive Project" (EBA File No. 0404-4400840) as well as the "West Lethbridge Combined High Schools and Library Project" (EBA File No. 0404-4401045).

The agreed work scope for this evaluation consisted of a desktop study of this existing geotechnical information and provision of general geotechnical recommendations for development consideration, suitable for the Outline Plan Stage.

3.0 SUBSURFACE CONDITIONS

3.1 SURFACE FEATURES

The land to be developed is bounded on the southeast by the Future Crossings Subdivision, by the School and Library Developments, which are currently under construction, and by 30 Street West (gravel surfaced). The land is bounded on the south, north and west by undeveloped farmland. The legal land description includes the majority of the NE ¼, Section 28-8-22-W4M.

The property was noted to be largely undeveloped at the time of fieldwork. The exception includes a farmstead located in the north/central area of the land. The farmstead property includes a large farmhouse, two barns and other smaller outbuildings, a silo and small livestock pens. The property also includes a septic tank and septic disposal field. To the west of the farmstead is a horse pasture. The farmstead is discussed in more detail in the Phase 1 ESA report.

It is also understood (from the Phase 1 ESA review and site reconnaissance) that two natural gas pipelines traverses the property (Bonavista Natural Gas).

The property at the time of fieldwork was surfaced in most areas with stubble crop, except where noted otherwise above. The ground surface was noted to be undulating. Site drainage generally appeared to be towards the low-lying areas, with marginal off-site drainage noted, resulting in seasonal surface water ponding in some areas. Seasonal wet areas were noted in the south/central, north, and west areas of the site, although ponded surface water was not noted at the time of this evaluation. These areas are discussed in subsequent sections of this report.

A similar low-lying area is noted to the northeast of the farmstead, at the northeast corner of the quarter section, with a stockpile of what appears to be topsoil or organics and debris noted at ground surface.

3.2 HISTORICAL AERIAL PHOTOGRAPHIC REVIEW

Based on EBA's knowledge of this property's history, including an air photo review from the 1950s to the present day, it has been utilized solely for agricultural purposes. However, several items of note are discussed as follows.

Within the south/central area of the property (within the proposed storm pond area), south of the farmstead, historical air photos indicate a large, low lying area. To the west of this low lying area, along the west property boundary, two smaller low lying areas are noted, possibly attributed to old sloughs which have been partially infilled (refer to Section 4.1). These areas are evident as small sloughs/depressions in older air photos prior to the 1980's,

but are not evident in recent photos, nor during the field work. Another seasonal wet area is noted to the west of the farmstead. In some air photos taken in wet seasons, the seasonal wet areas contain ponded surface water.

The low lying area in the northeast corner, with the stockpiles and surface debris, is evident on the more recent photographs. It is noted that the lands to the west of the farmstead have typically not been cultivated in recent years as this has been used as pastureland.

3.3 GENERAL SOIL CONDITIONS

The subsurface stratigraphy for the proposed development site is expected to be somewhat variable for the surficial soils, however, relatively consistent at lower depths (below 2 m). The site in general should consist of layers of topsoil, underlain by native lacustrine clay and silt, with predominantly glacial clay till at underlying depths below ground surface elevation.

The topsoil thickness should be expected to be variable, between 100 mm to 300 mm in thickness. It is important to note that based on the proposed stripping methodology (i.e. equipment usage) the thickness of stripping may vary. The method of stripping should therefore be taken into account when determining stripping volumes. Variable thickness of topsoil and clay fill should be expected in all areas.

Isolated areas of surface debris should be expected in low lying areas of the site noted above.

Based on borehole information in this area (from previous evaluations), layers of native lacustrine clay are expected underlying the topsoil, with typical layer thicknesses varying between 1 m and 3 m.

The native lacustrine clay is typically silty, with some sand to sandy, varying between damp to very moist, low to medium plastic, with some high plastic inclusions, varying between firm to very stiff in consistency and light brown coloured. The clay soil typically varies between somewhat dry to wet of its optimum moisture content (OMC). The lacustrine layer also often grades into native lacustrine silt, which is typically sandy with a trace of clay, damp to moist, low plastic, stiff to very stiff in consistency, and light brown coloured with occasional thin sand lenses and grey mottling. Moisture contents within the near surface lacustrine soils typically vary between approximately 10 and 22 percent, with isolated wetter or drier areas. The above noted low lying areas are expected to have wetter surficial soil conditions.

Underlying the near surface soil layers, glacial clay till is generally expected, extending to depths exceeding 9 m. The clay till is typically silty, with some sand to sandy, a trace of gravel, moist, medium plastic and varying between stiff to hard in consistency. The clay till also typically contains traces of fine coal fragments, zones of higher plastic inclusions, as well as occasional thin sand and silt lenses. Moisture contents within the clay till typically vary between 15 and 20 percent, with isolated wetter or drier zones. The clay till soil in this area is typically close to or several percent wet of its optimum moisture content.

Based on previous experience in this area, Standard Proctor maximum dry density values within the clay till typically range between approximately 1750 to 1850 kg/m^3, at optimum moisture contents of 15 to 18 percent. In addition, the results of laboratory hydraulic conductivity testing have resulted in measured state permeability (K) values in the order of approximately 2.0E-08 cm/sec.

The groundwater levels in this area typically vary between approximately 2 m to 7 m below ground surface. For geotechnical reporting purposes, based on the groundwater data obtained from previous evaluations, significant groundwater problems are not expected for the majority of excavations expected for this development and relatively minimal dewatering should generally be necessary in isolated areas. The above noted groundwater levels are considered to be localized water, which is perched or trapped within zones of sandy material within the clay till soil.

3.4 MINING ACTIVITY

Research was conducted to review the possible existence of mine workings within the boundary of the proposed development area (majority portion of Section 27-8-22 W4M), using a publication by ERCB (Coal Mine Atlas, 1988) and other literature in EBA's library. The review indicated that no mine workings exist within Section 27. However, it is noted that underground mine workings are present on adjacent lands to the north, as follows.

Within Sections 34 and 35 (north of site), Mine 1464, commonly referred to as Galt Mine No. 8, existed historically and was determined to be most recently owned and operated by Lethbridge Colleries Ltd., between 1935 and 1957.

Within Section 35 (northeast of site), Mine 0054 also existed historically and was determined to be most recently owned and operated by Lethbridge Colleries Ltd., between 1935 and 1941.

Both of these mines have been closed for many years and the existence of these mine workings should not impact the proposed development.

4.0 GENERAL CONSIDERATIONS

4.1 GENERAL SUBDIVISION DEVELOPMENT

Pending completion of a detailed geotechnical evaluation for this development, all construction recommendations presented in this summary report for consideration are based on the assumption that an adequate level of monitoring will be provided during construction and that all construction will be carried out by a suitably qualified Contractor, experienced in earthworks construction. An adequate level of monitoring for earthworks construction is considered to be full-time monitoring, compaction testing and complimentary laboratory materials analyses.

The initial topsoil stripping depth should be considered as being of particular importance. In this area, the surficial topsoil (A Horizon) layer is somewhat variable in thickness and can

be attributed to cultivation of the land surface. However, for such a development, the majority of any underlying B Horizon layer (organic stained, but inorganic) can likely remain in place during site stripping and incorporated into the fill mass during general site grading. Full-time monitoring by experienced personnel is recommended in order to avoid over-stripping and to ensure appropriate material mixing and placement.

With respect to the pipelines identified, it is assumed that they will be relocated prior to the development or alternatively, the appropriate setback distances will be adopted. Further discussion of the pipelines is not provided in this report.

Subgrade preparation is required in all subdivision development areas, including lot grading as well as all paved areas to City of Lethbridge Standards. This includes stripping of topsoil and deleterious soil, debris, or fill materials, scarification and moisture conditioning and compaction. The native medium plastic clay and clay till soils should be acceptable for site grading purposes in all areas. The near surface clay soil appears to be variable across the site and moisture conditioning (both wetting and drying) will be required to reduce the swelling potential of this soil and to achieve the compaction standards recommended. Isolated low lying wet areas should be expected. Proof-rolling within roadways to detect soft areas is also recommended.

Isolated wet areas should be expected, as discussed and possibly in other areas. These areas commonly have increased organic thickness as well as soft subgrade conditions. Special review of wet organic areas will be required and all organic topsoil must be removed from these areas. This also applies to the infilled sloughs identified in Section 3.2. The area of possible slough infilling should be identified during a more detailed geotechnical evaluation. All organics, wet and soft soils and debris must be removed from these areas during site grading. These areas should then be infilled with general engineered fill.

Isolated areas of debris should be expected within the old farmstead, at the northeast corner of the site as well as possibly within other areas. It is assumed that any buildings will be demolished and all site features will be removed. All debris must be removed from the site and properly disposed of. The Phase 1 ESA identifies the issue of disposal of demolished materials and debris.

The clay till soil should be suitable for compacted clay liner materials, as discussed in subsequent sections of this report. The clay soils may also be suitable, pending laboratory analysis of this soil type, however, lacustrine soils, particularly very silty clay or silt, in local experience should best be used in areas outside the containment area.

The construction methodology for installation of the utility services is anticipated to be open trench excavation. It is considered possible that trenchless technology may be given consideration for crossings at critical locations. As excavation proceeds, following stripping, the excavated soil will generally be comprised of a mixture of clay, silt, and clay till soils. Generally, variable soil moisture conditions should be expected in all areas, varying between dry of optimum and wet of optimum (sometimes significantly so).

Materials separation and treatment for approved backfill soils are discussed in the subsequent sections of this report. Moisture conditioning of all soil materials to closer to optimum moisture content should be expected by the contractor. Waste or unusable materials should be wasted off site, dried to more suitable moisture, or replaced with better quality trench backfill materials.

4.2 LOT GRADING

In general terms, the lot grading should be designed and carried out to the current City of Lethbridge Infrastructure Services Engineering Standards. All lots should be initially graded for drainage at a minimum gradient of 2.0 percent. The existing surficial site soils comprising medium plastic clay and clay till are suitable for use as 'landscape fill' materials or for use as 'general engineered fill' materials for lot grading.

Deleterious materials encountered should be removed from the site. These materials are not suitable for use as general engineered fill for this development. As noted, any organics, soft and wet soils or deleterious materials must be removed from infilled slough areas to expose the underlying native clay soil. The excavated areas must be backfilled with general engineered fill.

The moisture content of the site soil materials at surface is expected to be above or below the anticipated optimum moisture content for these soils in most areas. It is anticipated therefore, that moisture conditioning consisting of both wetting and drying will be required at the site for proper compaction. The earthwork contractor should, however, make his own estimate of the requirements and should consider such factors as weather and construction procedures.

General engineered fill materials for lot grading should be moisture conditioned to within a range of –1 percent of optimum to +2 percent of the optimum moisture content prior to compaction and compacted to a minimum of 98 percent of SPD.

4.3 STREET SUBGRADE PREPARATION

Subgrade preparation should be undertaken prior to pavement construction. The recommended standard for subgrade preparation is a minimum of 98% of Standard Proctor Density (SPD). Clay soils should be compacted with moisture content –1% to +2% of the Optimum Moisture Content (OMC). For cohesionless soil types, the moisture content should be ±2% of the OMC. A minimum depth of subgrade preparation of 300 mm is recommended for previously constructed embankments and areas within the utility trench backfill footprint. A 600 mm subgrade preparation depth is recommended for undisturbed areas.

In areas where clay fill soils are encountered, these should be removed, moisture conditioned, and replaced to design subgrade elevation as general engineered fill materials to the recommended compaction standards set out in this report.

Although the conditions expected from experience in this area, specifically in terms of groundwater levels, are generally not expected to be significantly adverse, it would be prudent to include a contingency for geotextile, should localized areas of subgrade instability be encountered. Use of geotextile should not be considered as an alternate for subgrade preparation as recommended, but an alternative should subgrade instability exist after subgrade preparation.

Based on EBA's local experience, the contractor should be made aware that subgrade difficulties often arise at moisture contents of 3 percent over optimum, as noted in the current City of Lethbridge Standards, where siltier soils are encountered. Therefore, in practice, the moisture content within proposed paved areas should be limited to no more than 2 percent over optimum for acceptable subgrade support conditions.

Backfill to raise these areas to subgrade level should be general engineered cohesive fill materials, as defined in this report, moisture conditioned and compacted as noted previously. The subgrade should be prepared and graded to allow drainage into catchbasins. Proof-rolling of the prepared surface is recommended to identify localized soft areas and for an indication of overall subgrade support characteristics.

It is imperative that positive surface drainage be provided to prevent ponding of water within the roadway structure and subsequent softening and loss of strength of the subgrade materials. Surrounding landscaping should be such that runoff water is prevented from ponding beside paved areas in order to avoid softening and premature failure of the pavement surface.

The pavement design should include provisions for subsurface drainage of the pavement granular layers. For urban sections it is considered appropriate to provide subsurface drainage in the form of longitudinal subdrains along the edge of the pavement structure. Subdrains will provide a means of evacuating water that infiltrates the pavement structure, either through cracks and vertical details (e.g. face of gutter), or from peripheral surface runoff. The subdrain should consist of a perforated flexible plastic drainpipe (100 mm diameter), complete with filter sock. The drain should be placed along the edge of the pavement section in a recessed area of the prepared subgrade. Positive outfall of the drains should be provided at catchbasin locations or other stormwater outfalls.

4.4 CONSTRUCTION EXCAVATIONS

Excavations should be carried out in accordance with the Alberta Occupational Health and Safety Regulations. For this project, the depth for the trench excavations could possibly vary between 2 m and 9 m below existing ground surface. The following recommendations notwithstanding, the responsibility of trench and all excavation cut slopes resides with the Contractor and should take into consideration site specific conditions concerning soil stratigraphy and groundwater. All excavations should be reviewed by a geotechnical engineer prior to personnel working within the base of the excavation.

As excavation proceeds, consideration should be given to separation of the varying soil materials encountered as far as practical and where economically viable. For example, clay soils with moisture contents of close to the optimum moisture content for the materials should be stockpiled separately from wetter clay soils, which will require mixing or drying.

Excavations within stiff clay soils which are to be deeper than 1.5 m should have the sides shored and braced or the slopes should be cut back no steeper than 1.0 horizontal to 1.7 vertical. Flatter sideslopes may be required in areas where groundwater is encountered within sand/silt seams, which may cause local sloughing and instability of the excavation sidewalls. In these instances, the excavation configuration design should be reviewed by a geotechnical engineer as required, prior to allowing personnel to enter the base of the excavation. Some widening of the trench slope (1.0H:1.0V) should be expected near the existing ground surface if wetter surficial soils will be encountered. Thin wedges of soil should not be left in place between separate trenches (i.e. between alignment of water lines versus sanitary lines) unless approved by qualified personnel (professional engineer).

Vertical trench cuts utilizing trench box wall support is not recommended for this project due to the inherent difficulty in compacting the backfill materials to an engineered standard, as well as the potential of cave-ins of the excavation sidewalls against the utility box.

Any encountered groundwater seepage should be directed towards sumps for removal from the excavation. Conventional construction sump pumps should be capable of accommodating groundwater control.

The maximum allowable sideslopes for utility trenches may not be governed by OH&S regulations, but by construction methodology for ensuring appropriate transition lengths from backfill soils to native soils. As an example, an appropriate transition of 1H:1V is normally recommended to avoid abrupt changes in subgrade stiffness and subsequent consolidation/cracking of the pavement structure. However, areas of multiple trenches, varying trench depth, and position of trenches (parallel or perpendicular to roadway alignments) need to be considered. EBA would be pleased to provide further specific recommendations, once final roadway/utility configurations are known.

The composition and consistencies of the soils encountered along the utility alignment are such that conventional hydraulic excavators should be able to remove these materials. It should be noted that the risk of encountering boulders is considered to be low.

Temporary surcharge loads, such as spill piles, should not be allowed within a distance equal to the depth of the excavation from an unsupported excavation face while mobile equipment should be kept back at least 3.0 m. All excavation should be checked regularly for signs of sloughing, especially after rainfall periods. Small earth falls from the sideslopes are a potential source of danger to workmen and must be guarded against.

4.5 TRENCH BACKFILL AND COMPACTION

All utility pipes should be properly embedded within manufacturer approved granular bedding materials (pipe zone). The granular bedding should extend to a minimum of

100 mm and 300 mm below and above the utility pipe respectively, or to greater thicknesses if recommended by the utility pipe manufacturer. The granular bedding material should conform to the requirements and gradation presented in Appendix B of this report or to the standards set by City of Lethbridge.

The existing site soils comprising clay, silt, or clay till, are considered adequate for use as 'general engineered fill' within the trenches above the bedding zone. Requirements for 'general engineered fill' are defined in Appendix B.

The moisture content of the clay, silt, and clay till soils are estimated to be variable with respect to their Standard Proctor optimum moisture content (OMC). As such, moisture conditioning should be anticipated for this project. The earthwork contractor should, however, make his own estimate of the requirements and should consider such factors as weather and construction procedures.

The level of compaction of the backfill must be suitable to limit post construction trench settlement both for the road embankment as well as to maintain the design surface drainage (stormwater control) profile of the right-of-ways. Therefore, a minimum compaction level of 95 percent of Standard Proctor maximum dry density (SPD) is recommended for backfill within the pipe zone of the trench (to 300 mm above the top of pipe). For the remainder of the trench backfill, a minimum compaction standard of 98 percent of SPD should be utilized in all areas. The compacted thickness of each lift of backfill shall not exceed 250 mm. Moisture conditioning to minus 1 percent of optimum and 2 percent over optimum moisture content of the soils should be specified for general trench backfill. During placement of the backfill materials it is recommended that 'notching' of the excavation sidewalls (1H:1V) every 1 meter in height occur to develop a bond between the native soils and backfill materials, resulting in less potential for long-term settlement or consolidation.

Localized sand and/or silt pockets which may be encountered within the clay till should be 'wasted' or incorporated into the approved backfill materials, as specified by qualified personnel, ensuring the design intent of the backfill work is maintained.

It should be noted that the ultimate performance of the trench backfill is directly related to the uniformity of the backfill compaction. In order to achieve the uniformity, the lift thickness and compaction criteria should be strictly enforced. General recommendations regarding backfill materials and compaction are contained in Appendix B.

4.6 CONCRETE ISSUES

4.6.1 Concrete Type

For this development, based on EBA's experience and CSA A23.1-04, the recommended concrete exposure classification for general usage should be Class S-2 (CSA A23.1-04, Table 3). For this exposure classification, alternatives include the usage of Type HS (Sulphate Resistant) Portland cement, or blends of cement and supplementary cementing materials, conforming to Type MSb and/or Type HSb cements (CSA A3001-03).

For all concrete exposed to soil and/or groundwater (i.e., including all building foundation concrete, all below grade concrete, and surface works concrete), a maximum water/cementing materials (W/CM) ratio of 0.45 is recommended. Based on EBA's experience with Alberta aggregates, a W/CM ratio of 0.45 normally corresponds to a 28-day compressive strength of 28 MPa or greater (32 MPa at 56-days).

Air entrainment of 4 to 6 percent by volume is recommended for all concrete exposed to freezing temperatures, native soils and/or groundwater. This should be increased to 5 to 7 percent for exterior flatwork.

4.6.2 Concrete Surface Works

With respect to surface works concrete (i.e., specifically concrete curbs and sidewalks), the recommendations provided in this report for subgrade preparation, including moisture conditioning and compaction, are intended to provide relative uniformity in the subgrade. The intention of uniformity, with respect to material type and moisture content, is to reduce the risk of differential concrete movements due to soil volume changes as a result of fluctuating moisture content. For these types of developments, a gradual increase in moisture content is common, resulting from precipitation, reduced evaporation, and irrigation. However, some differential movement and subsequent cracking of concrete surface works should be anticipated, typical for the Lethbridge area.

With respect to providing a layer of granular material beneath surface works concrete, there are both positive and negative consequences. In the positive sense, it must be assumed that the subgrade will be uniformly graded properly such that any moisture gaining access beneath the concrete within the granular layer would be drained away quickly to an area designed to accommodate excess moisture (i.e., roadway weeping tile tied into the storm system). If well drained, the provision of granular material also serves to reduce some differential distortions, when washed materials are used, and has been documented as helping to reduce longitudinal cracking.

On the negative side, if free drainage of the granular layer is not designed, constructed, and maintained, granular materials provide easy access for excess moisture to pond below the concrete, causing swelling of the medium plastic subgrade soils and/or consolidation of fill soils. There is also a risk of softening of the adjacent roadway pavement edges.

The risk of differential movement of the subgrade soils and the economic consequence for either option should be given due consideration by the municipal engineer.

4.7 STORMWATER POND DEVELOPMENT

4.7.1 General

A stormwater containment pond is understood for this development. Specific design details of the pond have not yet been finalized, however, it is assumed that the deepest invert of pond will be approximately 4 m to 5 m below final design grades.

It is also understood that most portions of the stormwater pond will retain water throughout the year (wet pond). The retention ponds will provide overland stormwater drainage for this area in accordance with municipal regulations.

Based on similar developments in the City, it is recommended that the proposed sideslopes for the pond below normal operating level will be no steeper than 3 horizontal to 1 vertical. Above normal water level, the sideslopes are recommended to be no steeper than approximately 5 horizontal to 1 vertical.

In the preparation of the recommendations provided in this report for the geotechnical aspects of design and construction of the containment pond, EBA reviewed pertinent sections of the "Stormwater Management Guidelines for the Province of Alberta", dated January 1999 as prepared by the Municipal Program Development Branch of Alberta Environmental Protection (known now as Alberta Environment (AENV)).

4.7.2 General Pond Base Preparation

Following stripping of any organic material from the pond, the containment basin areas should be over-excavated beneath the proposed invert elevation in order to allow sufficient thickness of compacted clay base liner. The clay till soil within the base of the excavation should then be scarified to a minimum depth of 300 mm, moisture conditioned to between –1 percent and +2 percent of optimum moisture content, and recompacted to a minimum of 98 percent of SPD. The intent is to improve the base conditions and to provide a low permeable pond base, effectively increasing the clay liner thickness by 300 mm.

The basin sidewalls in the cut areas (up to high water level) should also be over-excavated a sufficient amount to allow the construction of a compacted clay liner with the exposed subgrade scarified, moisture conditioned, and compacted as noted above.

Monitoring of excavated soils within the pond footprint is recommended so that unsuitable materials, such as low plastic silts or cohesionless sands are wasted or incorporated only in general landscape areas (above high water level), where low permeability is not a requirement.

The composition and consistencies of the soils encountered on the property are such that conventional hydraulic excavators should be able to remove these materials. Cobbles and boulders may be present within the clay till matrix, albeit infrequently. General recommendations regarding backfill materials and compaction as well as construction excavations are given in Appendix B.

4.7.3 Remoulded Clay Liner

The following recommendations for the design and construction of remoulded clay liners are based on compliance with Alberta Environment's publication, "Stormwater Management Guidelines for the Province of Alberta", dated January 1999. This publication does not specifically provide permeability recommendations for wet ponds, however, it

does provide a guideline in Figure 6.10, Wet Detention Pond Plan Sections, for "suitable subgrade to prevent infiltration below permanent depth (Max = 1.2 m/Min = 0.6 m).

Pending laboratory analysis of the site soils in the specific pond area, based on previous experience, the clay till soils are most likely suitable for use as a compacted clay liner, in conformance with the guidelines. Based on previous experience, for preliminary consideration, it is recommended that the thickness of remoulded clay liner be 0.6 m along the base of the wet pond and 1.0 m along the sidewalls up to normal water elevation. The sidewall liner thickness may be reduced to 0.6 m from normal water level to high water level and in other areas which will normally not be below the water level. These thicknesses account of the potential of desiccation of the upper 0.2 m during the initial periods when the wet pond is empty. They also account for potential disturbance (primarily of the sidewalls) during storm events or during periods of shore maintenance. To clarify further, the 0.3 m initial subgrade preparation depth may be included as part of the total liner thickness, provided base preparation is completed in accordance with the recommendations of this report.

The plan dimensions of the excavation should exceed the final "toe to toe" interior basin dimensions to provide an overlap between the pond floor liner and berm or sideslope liner. The subgrade should be relatively level and proof-rolled to provide a good base for compacting the first liner lift to the specified density. Soft pockets that would prevent sufficient compaction of the liner must be overexcavated and replaced with compacted cohesive clay fill materials. In lieu of satisfying the compaction requirements, a geotextile fabric (such as Armtec 200) may be required on or about the elevation of any encountered soft subgrade, although this is not anticipated for the current site conditions.

Careful site observation and testing will be required to avoid incorporating low or non-plastic materials into the liner. It is recommended that materials with a liquid limit of less than 30 percent not be incorporated into the liner. However, low plastic clays, silt or sands not meeting liner requirements, may be used in the top area of the embankment above HWL or outside the liner zone for berms.

Soil moisture contents for the clay till are generally variable with respect to the optimum moisture content. Moisture conditioning will be required during liner construction for the pond. Appropriate methods of moisture conditioning should be reviewed with qualified construction personnel prior to final design of the liner system.

Subsequent to the preparation of the pond floor (to 0.3 m depth), the excavated clay soils (liner borrow material) should be moisture conditioned to between –1 percent of the optimum and +3 percent over the optimum moisture content as determined by the Standard Proctor Test. Each lift should then be compacted to a minimum of 98 percent of SPD in lifts of maximum 150 mm compacted thickness to a total placed liner thickness of 0.6 m for the base, as recommended above.

A maximum "clod" size of 100 mm during moisture conditioning (prior to compaction) will produce a relatively uniform moisture content throughout the soil matrix and a relatively

homogenous compacted soil structure. The size of the "clods" can be controlled with agricultural equipment such as a disk. As far as practical, the liner should be built up in a uniform fashion over the containment basin area, in order to avoid sections of "butted fill" where seepage paths may develop. Compaction should be carried out utilizing "kneading" type compaction equipment such as vibratory padfoot or sheepsfoot type compactors. Completed liner areas should have the surface smoothed by a vibratory smooth drum roller.

Sideslope liners in "cut" areas should have a minimum thickness (perpendicular to the slope face) of 1.0 m, as noted. The cohesive materials for the sideslope liners should be moisture conditioned and compacted as indicated above for the pond bottom.

If a lift of liner soil is allowed to become dry and desiccated prior to the placement of the next lift, the exposed surface should be scarified, re-moisture conditioned, and recompacted. Prior to lake filling and during maintenance periods when the pond is empty, the pond bottom should be prevented from drying out beyond 0.2 m as accounted for in the design liner thickness.

5.0 FOUNDATIONS

5.1 SHALLOW FOUNDATIONS

Shallow foundations, if considered, should be constructed approximately 1.4 m below the final design exterior ground surface (frost protection requirement). At this depth the foundation subgrade soil generally consists of firm to very stiff, damp to very moist, medium plastic, silty clay or clay till.

The net allowable static bearing pressure for the design of strip and spread footings for residential construction at this depth may be taken as 75 kPa, on native, undisturbed clay soils, subject to other recommendations in this report. The allowable static bearing pressure is based on correlation between Standard Penetration Test 'N' values. The factor of safety used from ultimate bearing capacity was 3.0. Footing dimensions should be in accordance with the minimum requirements of the Alberta Building Code 1997 (Section 9.15.3 Footings). Bearing certification is recommended to ensure that the footings are placed on competent native clay soils.

It is recommended to use a smooth edge-trimming bucket or Grade-All for final excavation to the foundation subgrade elevation to minimize disturbance of the founding soils. The foundation concrete should be placed immediately following excavation to ensure the bearing clay soil does not dry out to below the plastic limit.

The anticipated foundation clay soils are expected to be prone to volume changes (both heave and consolidation) with varying moisture content. Therefore, a permanent weeping tile system is also recommended around the outside perimeter of the structure at the foundation elevation to maintain a consistent moisture profile of the founding soils. This will reduce the potential of differential movement (heave or consolidation) of the foundations.

Settlement of footings designed and constructed in accordance with the above recommendations should be well within the normally tolerated values of 25 mm total and 20 mm differential.

Recommendations for minimum depth of cover for footings are presented under the heading 'Frost Protection' below. Further recommendations regarding shallow foundations are given in Appendix B.

5.2 BASEMENT CONSTRUCTION

5.2.1 Basement Floor Slabs

Slab-on-grade construction for basements is considered feasible providing certain precautions are undertaken. All excavation should be carried out remotely using a smooth-mouth bucket or Grade-All at final grade in order to minimize disturbance of the base. Basement floor slabs should be supported by a minimum of 150 mm compacted, clean, free-draining granular material.

In areas where floor slabs bear on a clay subgrade, the clay at this site may swell following completion of the floor slabs. Therefore, some movement should be anticipated. Any light columns in the basement designed to support the main floor of should be of the adjustable "telepost" type. If partitions are constructed in the basement, provision must be made so that, if the basement floor slab heaves, the partitions do not raise the main floor. A minimum allowance of 25 mm should be left between the top plates of basement partitions and the floor above them to accommodate heaving of the floor slab. This heaving allowance is less applicable for interior columns founded on spread footings.

The slab subgrade should be sloped to provide positive drainage to the edge of the slab. A minimum drainage gradient of 0.5 percent is recommended.

Slabs-on-grade should be separated from bearing members to allow some differential movement. If differential movement is unacceptable, a structurally supported floor system or crawlspace may be considered.

General recommendations regarding floor slab construction are also presented in Appendix B.

5.2.2 Basement Walls

All basement walls should be designed to resist lateral earth pressures in an "at-rest" condition. This condition assumes a triangular pressure distribution and may be calculated using the following:

$$P_o = K_o (\gamma H + q)$$

where:

P_o	=	lateral earth pressure "at-rest" condition (no wall movement occurs at a given depth)
K_o	=	co-efficient of earth pressure "at-rest" condition (use 0.5 for

		silt or clay backfill and 0.45 for sand and gravel backfill)
γ	=	bulk unit weight of backfill soil (use 19 or 21 kN/m^3 for clay or granular backfill, respectively)
H	=	depth below final grade (m)
q	=	surcharge pressure at ground level (kPa)

It is assumed that drainage is provided for all basement walls through the installation of weeping tile and hydrostatic pressures will not be a factor in design.

Backfill around concrete basement walls should not commence before the concrete has reached a minimum two-thirds of its 28-day strength and first floor framing are in place or the walls are laterally braced. Only hand operated compaction equipment should be employed within 600 mm of the concrete walls. Caution should be used when compacting backfill to avoid high lateral loads caused by excessive compactive effort. A compaction standard of 95 percent of Standard Proctor maximum dry density (SPD) is recommended. To avoid differential wall pressures, the backfill should be brought up evenly around the walls. A minimum 600 mm thick engineered clay cap should be placed at the ground surface to minimize the infiltration of surface water.

5.3 FOUNDATION PERIMETER DRAINAGE REQUIREMENTS

As part of this evaluation, a review included a document entitled, "A Consolidation of a By-Law of the City of Lethbridge Respecting a Sewerage Service Charge and Regulating the Disposal of Sewage and the Discharge of Liquids and Waste into the Lethbridge Sewerage System".

It is understood that all residential weeping tiles will be tied into the City storm sewer system. An acceptable weeping tile system should consist of a perforated weeping tile wrapped in a geosock or geotextile fabric, in turn surrounded with a minimum of 150 mm thick blanket of washed rock (maximum size 20 mm). The weeping tile should have a minimum 0.5 percent slope leading to a sump to then discharge as noted above.

5.4 FROST PROTECTION

For protection against frost action, perimeter footings in heated structures should be extended to such depths as to provide a minimum soil cover of 1.4 m. Isolated or exterior footings in unheated structures should have a minimum soil cover of 2.1 m unless provided with equivalent insulation.

5.5 SEISMIC DESIGN

The Site Classification recommended for Seismic Site Response is Classification D, as noted in Table 4.1.8.4.a of the National Building Code of Canada (NBCC) 2005.

6.0 DESIGN AND CONSTRUCTION GUIDELINES

Recommended general design and construction guidelines are provided in Appendix B, under the following headings.

- Shallow Foundations
- Construction Excavations
- Floor Slabs-on-Grade
- Backfill Materials and Compaction
- Proof-Rolling

These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to represent detailed specifications for the works although they may prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and Appendix B, the main text should govern.

7.0 REVIEW OF DESIGN AND CONSTRUCTION

EBA should be given the opportunity to review details of the design and specifications, related to geotechnical aspects of this project, prior to construction.

Bearing surfaces and foundation installation should be monitored by qualified geotechnical personnel during construction. EBA will provide these services, if requested.

8.0 LIMITATIONS

Preliminary recommendations presented herein are based on a review of available geotechnical information in the vicinity of the subject property. The conditions described are considered to be reasonably representative of the site. If, however, conditions other than those reported are noted during subsequent phases of the project, EBA should be notified and given the opportunity to review our current recommendations in light of new findings. As noted, a detailed geotechnical evaluation is pending for this property. Recommendations presented herein may not be valid if an adequate level of monitoring is not provided during construction.

This report has been prepared for the exclusive use of Associated Engineering Alberta Ltd., and their agents, for specific application to the development described in Section 2.0 of this report. It has been prepared in accordance with generally accepted soil and foundation engineering practices. No warranty is either expressed or implied.

For further limitations, reference should be made to the General Conditions in Appendix A of this report.

9.0 CLOSURE

We trust this report satisfies your present requirements. We would be pleased to provide further information that may be needed during design and to advise on the geotechnical aspects of specifications for inclusion in contract documents. Should you require additional information or monitoring services, please do not hesitate to contact our office.

Respectfully submitted,
EBA Engineering Consultants Ltd.

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Reviewed by:

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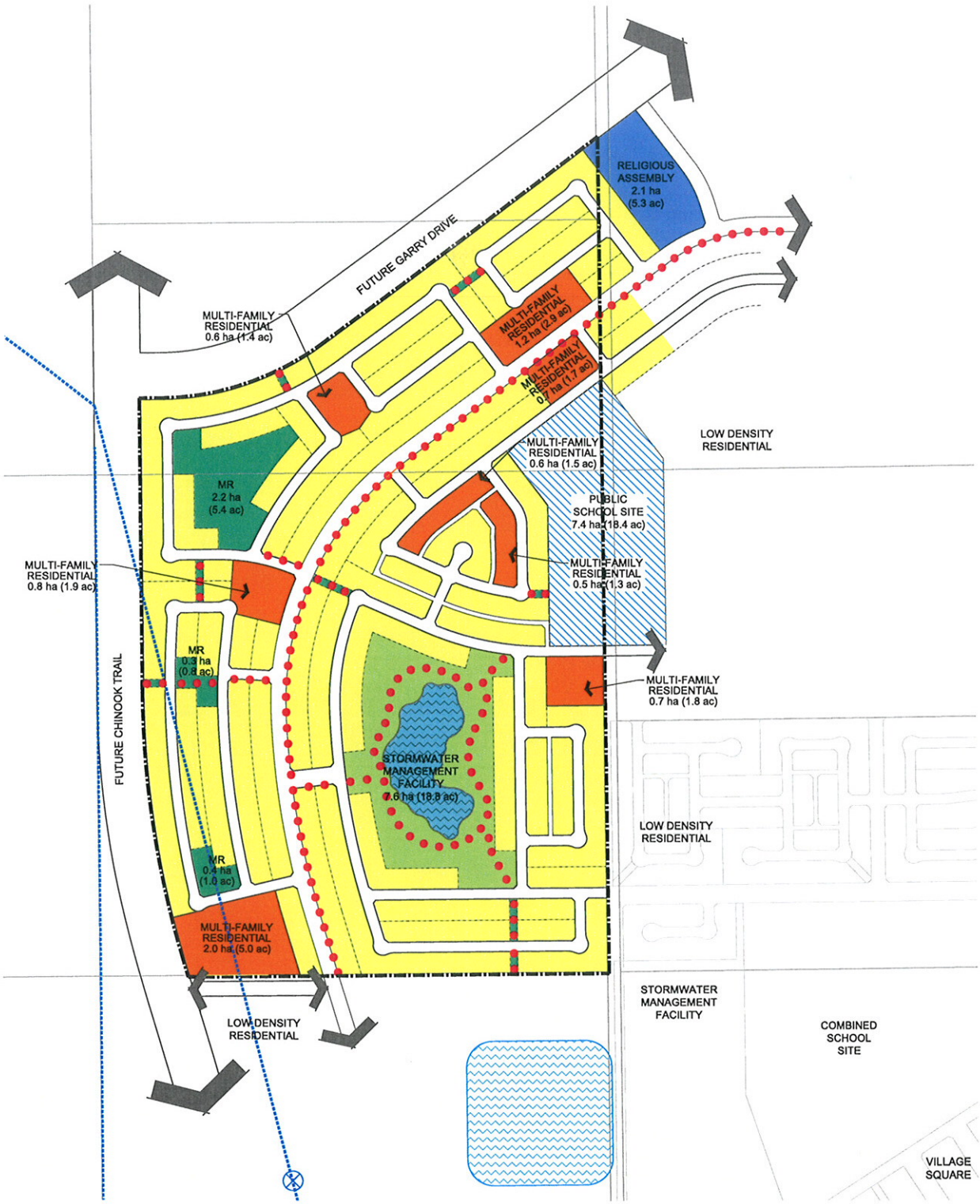
/sdt

PERMIT TO PRACTICE
EBA ENGINEERING CONSULTANTS LTD.
Signature _____
Date June 26, 2008
PERMIT NUMBER: P245
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

FIGURES



LEGEND

- LOW DENSITY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- RELIGIOUS ASSEMBLY
- PUBLIC SCHOOL SITE
- NEIGHBOURHOOD PARK
- STORMWATER MANAGEMENT FACILITY
- PATHWAYS
- HIGH PRESSURE PIPELINE
- SWEET GAS WELL
- OUTLINE PLAN BOUNDARY

Figure 2
Conceptual Road Connections and Internal Circulation

NOTE:
POND SHAPE IS CONCEPTUAL AND SUBJECT TO CHANGE THROUGH DETAILED DESIGN

0 37.5 75 150 m

N

Associated Engineering
in association with:
Armin A. Preiksaitis & Associates Ltd.

The Piers
Outline Plan

File: F:\AAP Project Files\Real Estate\06-057 Avonlea, Lethbridge\Mapping\AAP\Development Concept.dwg

Project No.: 06-057

Date: September 2007

APPENDIX

APPENDIX A GEOTECHNICAL REPORT – GENERAL CONDITIONS

GEOTECHNICAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

3.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

4.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

5.0 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

6.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

7.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

8.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

9.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

10.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

11.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

12.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the client's expense upon written request, otherwise samples will be discarded.

13.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practising under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

14.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

15.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

APPENDIX

APPENDIX B RECOMMENDED GENERAL DESIGN AND CONSTRUCTION GUIDELINES

SHALLOW FOUNDATIONS

Design and construction of shallow foundations should comply with relevant Building Code requirements.

The term 'shallow foundations' includes strip and spread footings, mat slab and raft foundations.

Minimum footing dimensions in plan should be 0.45 m and 0.9 m for strip and square footings respectively.

No loose, disturbed or sloughed material should be allowed to remain in open foundation excavations. Hand cleaning should be undertaken to prepare an acceptable bearing surface. Recompaction of disturbed or loosened bearing surface may be required.

Foundation excavations and bearing surfaces should be protected from rain, snow, freezing temperatures, excessive drying and the ingress of free water before, during and after footing construction.

Footing excavations should be carried down into the designated bearing stratum.

After the bearing surface is approved, a mud slab should be poured to protect the soil and provide a working surface for construction, should immediate foundation construction not be intended.

All constructed foundations should be placed on unfrozen soils, which should be at all times protected from frost penetration.

All foundation excavations and bearing surfaces should be inspected by a qualified geotechnical engineer to check that the recommendations contained in this report have been followed.

Where over-excavation has been carried out through a weak or unsuitable stratum to reach into a suitable bearing stratum or where a foundation pad is to be placed above stripped natural ground surface such over-excavation may be backfilled to subgrade elevation utilizing either structural fill or lean-mix concrete. These materials are defined under the separate heading 'Backfill Materials and Compaction'.

CONSTRUCTION EXCAVATIONS

Construction should be in accordance with good practice and comply with the requirements of the responsible regulatory agencies.

All excavations greater than 1.5 m deep should be sloped or shored for worker protection.

Shallow excavations up to about 3 m depth may use temporary sideslopes of 1H:1V. A flatter slope of 2H:1V should be used if groundwater is encountered. Localized sloughing can be expected from these slopes.

Deep excavations or trenches may require temporary support if space limitations or economic considerations preclude the use of sloped excavations.

For excavations greater than 3 m depth, temporary support should be designed by a qualified geotechnical engineer. The design and proposed installation and construction procedures should be submitted to EBA for review.

The construction of a temporary support system should be monitored. Detailed records should be taken of installation methods, materials, in situ conditions and the movement of the system. If anchors are used, they should be load tested. EBA can provide further information on monitoring and testing procedures if required.

Attention should be paid to structures or buried service lines close to the excavation. For structures, a general guideline is that if a line projected down, at 45 degrees from the horizontal from the base of foundations of adjacent structures intersects the extent of the proposed excavation, these structures may require underpinning or special shoring techniques to avoid damaging earth movements. The need for any underpinning or special shoring techniques and the scope of monitoring required can be determined when details of the service ducts and vaults, foundation configuration of existing buildings and final design excavation levels are known.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.

FLOOR SLABS-ON-GRADE

All soft, loose or organic material should be removed from beneath slab areas. If any local 'hard spots' such as old basement walls are revealed beneath the slab area, these should be overexcavated and removed to not less than 0.9 m below underside of slab level. The exposed soil should be proof-rolled and the final grade restored by general engineered fill placement. If proof-rolling reveals any soft or loose spots, these should be excavated and the desired grade restored by general engineered fill placement. Proof-rolling should be carried out in accordance with the recommendations given elsewhere in this Appendix. The subgrade should be compacted to a depth of not less than 0.3 m to a density of not less than 98 percent Standard Proctor Maximum Dry Density (ASTM Test Method D698).

If, for economic reasons, it is considered desirable to leave low quality material in-place beneath a slab-on-grade, special ground treatment procedures may be considered, EBA could provide additional advice on this aspect if required.

A levelling course of 20 mm crushed gravel at least 150 mm in compacted thickness, is recommended directly beneath all slabs-on-grade. Alternatively a minimum thickness of 150 mm of pit-run gravel overlain by a minimum thickness of 50 mm of 20 mm crushed gravel may be used. Very coarse material (larger than 25 mm diameter) should be avoided directly beneath the slab-on-grade to limit potential stress concentrations within the slab. All levelling courses directly under floor slabs should be compacted to 100 percent of Standard Proctor maximum dry density.

General engineered fill, pit-run gravel and crushed gravel are defined under the heading 'Backfill Materials and Compaction' elsewhere in this Appendix.

The slab should be structurally independent from walls and columns supported on foundations. This is to reduce any structural distress that may occur as a result of differential soil movements. If it is intended to place any internal non-load bearing partition walls directly on a slab-on-grade, such walls should also be structurally independent from other elements of the building founded on a conventional foundation system so that some relative vertical movement of the walls can occur freely.

The excavated subgrade beneath slabs-on-grade should be protected at all times from rain, snow, freezing temperatures, excessive drying and the ingress of free water. This applies during and after the construction period.

A minimum slab concrete thickness of 100 mm is recommended. Control joints should be provided in all slabs. Typically for a 125 mm slab thickness; control joints should be placed on a 3 m square grid, should be sawn to a depth of one-quarter the slab thickness and have a width of approximately 3 mm.

Wire mesh reinforcement, 150 mm square grid, should be provided to reduce the possibility of uncontrolled slab cracking. The mesh should be adequately supported and should be located at mid-height of the slab with adequate cover.

BACKFILL MATERIALS AND COMPACTION

Maximum density as used in this section means Standard Proctor Maximum Dry Density (ASTM Test Method D698) unless specifically noted otherwise. Optimum moisture content is as defined in this test.

"Landscape fill" material may comprise soils without regard to engineering quality. Such soils should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90 percent of maximum density.

"General engineered fill" materials should comprise clean, inorganic granular or clay soils. "Select engineered fill" materials should comprise clean, well-graded granular soils or inorganic low plastic clay soils. Engineered fill materials should be placed in layers of 150 mm compacted thickness and should be compacted to 98 percent of maximum density.

Granular soils used for select engineered fills should consist of relatively clean, well graded, sand or mixture of sand and gravel (maximum size 75 mm).

Low plastic clay with the following range of Atterberg limits is generally considered suitable for use as select engineered fill.

Liquid Limit	= 20 to 40%
Plastic Limit	= 10 to 20%
Plasticity Index	= 10 to 30%

Clay fill materials should be compacted at or slightly above the optimum moisture content.

"Structural fill" materials should comprise clean, well-graded inorganic granular soils. Such fill should be placed in compacted lifts not exceeding 150 mm and compacted to not less than 100 percent of maximum density.

Backfill adjacent to and above footings, abutment walls, basement walls, grade beams and pile caps or below highway, street or parking lot pavement sections and base courses should comprise "general engineered fill" materials as defined above.

Backfill below slabs-on-grade or where increased volumetric stability is desired should comprise "select engineered fill" materials as defined above.

Backfill supporting structural loads should comprise "structural fill" materials as defined above.

Exterior backfill adjacent to footings, foundation walls, grade beams and pile caps and within 300 mm of final grade should comprise inorganic clay "general engineered" fill as defined above. Such backfill should provide a relatively impervious surface layer to reduce seepage into the subsoil.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction,

careful observation of the foundation wall for deflection should be carried out continuously. Where deflections are apparent, the compactive effort should be reduced accordingly.

In order to reduce potential compaction induced stresses, only hand held compaction equipment should be used in the compaction of fill within 500 mm of retaining walls or basement walls.

Backfill materials should not be placed in a frozen state, or placed on a frozen subgrade. All lumps of materials should be broken down during placement.

Where the maximum-sized particles in any backfill material exceed 50 percent of the minimum dimension of the cross-section to be backfilled, such particles should be removed and placed at other more suitable locations on-site or screened off prior to delivery to site.

Bonding should be provided between backfill lifts, if the previous lift has become desiccated. For fine-grained materials the previous lift should be scarified to the base of the desiccated layer, properly moisture-conditioned and recompacted and bonded thoroughly to the succeeding lift. For granular materials, the surface of the previous lift should be scarified to about a 75 mm depth followed by proper moisture-conditioning and recompaction.

Suggested specifications for various backfill types are presented below.

"Pit-Run gravel" and fill sand shall be reasonably well graded and should conform to the following gradings:

PERCENT PASSING BY WEIGHT		
SIEVE SIZE	PIT RUN GRAVEL (A.T. D6-C80)	FILL SAND
80.0 mm	100	--
50 mm	55-100	--
25 mm	38 – 100	100
16 mm	32 – 85	--
5.0 mm	20 – 65	75 – 100
630 µm	--	45 – 80
315 µm	6 – 30	--
80 µm	2 – 10	2 - 10

The Pit-Run gravel should be free of any form of coating and any gravel or sand containing clay, loam or other deleterious materials should be rejected. No oversize material should be tolerated. The percent of material passing the 80 µm sieve should not exceed 2/3 of the material passing the 315 µm sieve.

20 mm and 40 mm crushed gravel should be hard, clean, well graded, crushed aggregate, free of organics, coal, clay lumps, coatings of clay, silt and other deleterious materials. The aggregates should conform to the following Alberta Transportation gradation requirements when tested in accordance with ASTM C136:

PERCENT PASSING BY WEIGHT		
SIEVE SIZE	20 mm CRUSH (A.T. D2-C20)	40 mm CRUSH (A.T. D2-C40)
40 mm	--	100
25 mm	--	70 – 94
20 mm	100	--
16 mm	84 – 94	55 – 85
10 mm	63 – 86	44 – 74
5.0 mm	40 – 67	32 – 62
1.25 mm	20 – 43	17 – 43
630 µm	14 – 34	12 – 34
315 µm	9 – 26	8 – 26
160 µm	5 – 18	5 – 18
80 µm	2 – 10	2 – 10

A minimum of 60 percent of the material retained on the 5 mm sieve for the 20 mm crushed gravel should have at least two freshly crushed faces. Not less than 50 percent of the material retained on the 5 mm sieve for the 40 mm crushed gravel should have at least two freshly crushed faces.

The 20 mm granular course should be compacted in lifts not exceeding 150 mm to 100 percent of Standard Proctor maximum dry density.

"Coarse gravel" for bedding and drainage should conform to the following grading:

PERCENT PASSING BY WEIGHT		
SIEVE SIZE	28 mm GRAVEL	20 mm GRAVEL
40 mm	100	--
28 mm	95 - 100	100
20 mm	--	85 – 100
14 mm	25 - 60	60 – 90
10 mm	--	25 – 60
5 mm	0 - 10	0 – 10
2.5 mm	0 - 5	0 - 5

"Coarse sand" for bedding and drainage should conform to the following grading:

SIEVE SIZE (Square Openings)	PERCENT PASSING (By Weight)
10 mm	100
5 mm	95 - 100
2.5 mm	80 - 100
1.25 mm	50 - 90
630 µm	25 - 65
315 µm	10 - 35
160 µm	2 - 10
80 µm	0 - 4

"Lean-mix concrete" should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa.

PROOF-ROLLING

Proof-rolling is a method of detecting soft areas in an 'as-excavated' subgrade for fill, pavement, floor or foundations or detecting non-uniformity of compacted embankment. The intent is to detect soft areas or areas of low shear strength not otherwise revealed by means of testholes, density testing, or visual examination of the site surface and to check that any fill placed or subgrade meets the necessary design strength requirements.

Proof-rolling should be observed by qualified geotechnical personnel.

Proof-rolling is generally accomplished by the use of a heavy (15 to 60 tonne) rubber-tired roller having 4 wheels abreast on independent axles with high contact wheel pressures (inflation pressures ranging from 550 kPa (80 psi) up to 1030 kPa (150 psi).

A heavily loaded tandem axle gravel truck may be used in lieu of the equipment described in the paragraph above. The truck should be loaded to approximately 10 tonnes per axle and a minimum tire pressure of 550 kPa (80 psi).

Ground speed - maximum 8 km/hr recommended 4 km/hr.

The recommended procedure is two complete coverages with the proof-rolling equipment in one direction and a second series of two coverages made at right angles to the first series; one 'coverage' means that every point of the proof-rolled surface has been subjected to the tire pressure of a loaded wheel. Less rigorous procedures may be acceptable under certain conditions subject to the approval of an engineer.

Any areas of soft, rutted, or displaced materials detected should be either recompacted with additional fill or the existing material removed and replaced with general engineered fill, or properly moisture conditioned as necessary.

The surface of the grade under the action of the proof-roller should be observed, noting; visible deflection and rebound of the surface, formation of a crack pattern in the compacted surface or shear failure in the surface of granular soils as ridging between wheel tracks.

If any part of an area indicates significantly more distress than other parts, the cause should be investigated, by, for example, shallow auger holes.

In the case of granular subgrades, distress will generally consist of either compression due to insufficient compaction or shearing under the tires. In the first case, rolling should be continued until no further compression occurs. In the second case, the tire pressure should be reduced to a point where the subgrade can carry the load without significant deflection and subsequently gradually increased to its specified pressure as the subgrade increases in shear strength under this compaction.

APPENDIX C – ENVIRONMENTAL SITE ASSESSMENT

Avonlea Land Corporation Ltd.
c/o Associated Engineering Alberta Ltd.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
PORTIONS OF 720, 1030 AND 1220 – 30 STREET WEST
PORTIONS OF NE 1/4 28-8-22 W4M AND SE 1/4 33-8-22 W4M
LETHBRIDGE, ALBERTA

L22101100

December 2007

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EXECUTIVE SUMMARY

Foreword

Avonlea Land Corporation Ltd. c/o Associated Engineering Alberta Ltd. (AEAL) retained EBA Engineering Consultants Ltd. (EBA) to conduct a Phase I Environmental Site Assessment (ESA) of properties located in portions of NE 1/4 28-8-22 W4M and SE 1/4 33-8-22 W4M in Lethbridge, Alberta. The northeast quarter has a municipal address of 1220 – 30 Street West and the southeast quarter's municipal addresses are 720 and 1030 - 30 Street West. Together these properties will be referred to as the site.

The objective of the Phase I ESA was to comment on whether any past or present land use, either off site or on site, may have a potential to cause environmental impairment of the subject property. EBA understands that Avonlea Land Corporation Ltd. c/o AEAL requires this environmental investigation to obtain a development permit for future development.

The Phase I ESA was conducted in general accordance with the Canadian Standards Association (CSA) Phase I ESA standard Z768-01 (April 2003 revision).

Findings and Conclusions

Potential on-site sources of contamination or environmental concerns are noted in the table below.

POTENTIAL ON-SITE ISSUES

Area of Concern	Source of Information	Recommended Actions
Potential Building materials (Asbestos, PCBs, Lead and lead based paint, ODS, UFFI)	Based on age of structures.	Should the buildings be demolished or renovated, a building materials survey should be conducted and these materials should be managed and disposed of appropriately.
Former ASTs from the 1950s/60s.	Site interview with daughter of the current owner.	During the site development, evidence of staining or hydrocarbons should be appropriately characterized.
Waste burning, in burning barrels.	Site interview with daughter of the current owner.	Waste burning should cease on the site. If the ashes have been disposed of on the site, that area should be appropriately characterized.
Stockpile	Site inspection.	Appropriately characterize or determine the origin of the stockpiled material (or both).
Debris at stockpile	Site inspection	Remove debris from site. Determine if the waste is inert and ensure that there is no spillage of substances on the ground. Any spillage should be appropriately characterized.
Bonavista Natural Gas Pipeline	Desktop searches.	There are setback requirements for development from the pipeline right-of-ways. It is best to contact the current owner of the pipeline to confirm setbacks or discuss

		setback waivers. An alternative is to have the pipeline relocated. Should this be conducted, an environmental professional should be on-site to inspect the removal of the pipeline and assess any potential leaks or spills.
Wetlands	Site inspection, airphoto review.	There is a potential for methane generation from organics if these areas are buried, which would present a potential concern to nearby structures. Any buried organic soils should be removed in areas of future building development. A Water Act approval may be required for site development in wetland areas (ephemeral wetlands).
Septic tank and septic fields	Site interview with daughter of the current owner.	When ready these should be appropriately decommissioned.

There are no apparent off-site sources of environmental impairment relating to the property from historical or current off-site land uses.

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1.0 INTRODUCTION

1.1 GENERAL

Avonlea Land Corporation Ltd. c/o Associated Engineering Alberta Ltd. (AEAL) retained EBA Engineering Consultants Ltd. (EBA) to conduct a Phase I Environmental Site Assessment (ESA) of properties located in portions of NE 1/4 28-8-22 W4M and SE 1/4 33-8-22 W4M in Lethbridge, Alberta. The northeast quarter has a municipal address of 1220 – 30 Street West and the southeast quarter's municipal addresses are 720 and 1030 – 30 Street West. Together these properties will be referred to as the site.

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1.2 AUTHORIZATION

Mr. Brian Johnson of Avonlea Land Corporation Ltd. c/o Associated Engineering Alberta Ltd. provided written authorization to proceed with the present study via email to Ms. Mandi Parker of EBA on October 24, 2007.

1.3 SCOPE OF WORK

EBA conducted the following scope of work for the Phase I ESA:

- Conducted a site visit to evaluate the extent and manner that present and surrounding activities may impact upon these sites and the environment. Sampling was not included in the Phase I ESA.
- Reviewed available information from Alberta Land Titles; Petroleum Tank Management Association of Alberta (PTMAA); Abacus Datagraphics (AbaData) database for Alberta Energy and Utilities Board (EUB) information; Alberta Environment's (AENV's) Online Approval Viewer and Waterwell Database; Alberta Government Spatial Information System (SPIN2); the City of Lethbridge Development Services Department, City of Lethbridge Archives, the County of Lethbridge, Henderson Business Directories, Energy Resource Conservation Board (EUB) Coal Mine Atlas; and Fire Insurance Maps.
- Obtained and reviewed historical aerial photographs of the property for previous land use and the immediate surrounding areas.

- Prepared a report discussing the history of the site and identified the potential for environmental concerns resulting from past or present land use at the site and in the surrounding area.

1.4 QUALIFICATIONS OF ASSESSORS

Ms. Mireille Rigaux, B.Sc. conducted the historical research, records review, site reconnaissance and prepared this report. Ms. Rigaux is an Environmental Scientist for the Lethbridge Environmental Practice and has one year of experience in the environmental industry.

Ms. Mandi Parker, P.Ag. conducted the preliminary review and assisted with the interpretation of the findings. Ms. Parker is the Team Leader for the Lethbridge Environmental Practice and she has over seven years of experience in the environmental industry.

Mr. Sean Buckles, P. Eng conducted the final review of the report. Mr. Buckles is a project Engineer in EBA's environmental practice in Calgary and has over 12 years of experience in conducting ESAs.

2.0 SITE DETAILS

Ms. Mireille Rigaux of EBA visited the site on November 7, 2007. There were no barriers and the site was easily accessible; however, the inside of the farmstead buildings were not inspected.

The property is an irregular-shaped property and is currently harvested cropland with one farmstead located on it. A soil pile with various pieces of domestic debris is located on the east side of property. An ephemeral wetland is located on the southeast side of property that was dry at time of site reconnaissance. A farmyard is located on the property which contains a house, a barn and a garage. A corral and pasture is also located to the west of the farmstead.

The property is bounded by 30 Street West to the east and agricultural land to the north, west and south. 1220 – 30 Street West is zoned "UR" or Urban Reserve 720 and 1030 – 30 Street West are zoned "DC" or Direct Control. A radio tower is located to the west of the property.

Figure 1 shows the site location plan and Figure 2 shows the general site plan. The property boundary was provided to EBA by AEAL. Photographs of the property are presented in Appendix A of this report.

2.1 LOCATION, LEGAL DESCRIPTION AND OWNERSHIP

The property is located in Lethbridge, Alberta. The property location, legal description and ownership are summarized in the following table.

TABLE A: PROPERTY LOCATION, LEGAL DESCRIPTION AND OWNERSHIP		
Municipal Address	**Legal Description**	**Owner**
1220 – 30 Street West	NE 1/4 28-8-22 W4M	Addie May Perdue
720 and 1030 – 30 Street West	SE 1/4 33-8-22 W4M	Debra L. Dudley-Olafson

2.2 BUILDING DETAILS

One farmstead containing a house and three outbuildings is present on the property. Upon review of air photos, it appears that farmstead has been present since at least 1950. The inside of buildings were not inspected at time of site reconnaissance.

2.2.1 Water Supply

No known municipal water was supplied to the property at the time of the site reconnaissance; however, according to Mary-Lynn Muhly (farmstead resident's daughter), a cistern provides water to the site.

2.2.2 Sewer Systems

No known municipal sanitary sewer system was connected to the property. According to Mrs. Muhly, a septic tank is present at the farmstead of the property that has been recently upgraded.

2.2.3 Sumps and Drains

No known sumps or drains were present on the property.

2.2.4 Asbestos

Construction materials used prior to the late 1970s were known to possibly contain asbestos. Based on aerial photograph review, the farmhouse and outbuildings were present on the property in 1950, therefore, there is a potential for asbestos to be present in ceiling or floor tiles, drywall, and insulation for the walls, boiler, and piping and other areas. Asbestos is considered a health hazard if it is friable, airborne, and exposed to humans. Asbestos-containing materials were not observed during the site reconnaissance; however, intrusive investigation and sampling is not within the scope of a Phase I ESA.

Prior to demolition or renovation of buildings, a building materials survey should be completed.

2.2.5 Polychlorinated Biphenyls (PCBs)

The federal Environmental Contaminants Act (1976) has restricted the use and controlled the phase out of polychlorinated biphenyls (PCBs) in Canada. Additionally, the storage and disposal of PCBs is regulated. The Act prohibited the use of PCBs in electrical equipment installed after July 1, 1980. PCBs are commonly found in light ballasts, electrical

transformers (pole or ground mounted) and various other types of electrical equipment (i.e., rectifiers) dating back to the early 1980s or earlier.

PCBs are usually found in the ballasts for fluorescent lights or other electrical equipment. Based on estimated age of buildings on property (constructed prior to 1950), PCBs may be present in light ballasts; however, intrusive investigation and sampling is not within the scope of a Phase I ESA. PCB-containing light ballasts or electrical equipment should be disposed of appropriately at the end of their useful life.

A pole mounted transformer is located at the farmstead of the property. Generally, transformers are maintained by private utility companies. No staining was present in vicinity of property. Based on the approximate age of the farmyard, it is possible that PCBs may be present in the pole mounted transformer.

2.2.6 Ozone-Depleting Substances (ODS)

In December 1998, The Government of Canada enacted the *Ozone-Depleting Substances Regulations*, which governs the use, handling and release of ODS. ODS may include, but are not limited to, chlorofluorocarbons (CFCs), halons, carbon tetrachloride and methyl bromide. ODS are usually associated with operations such as fire extinguishing systems, foam manufacturing, fumigant and pesticide application, prescription metered dose inhalers, refrigeration and air-conditioning units, and solvent cleaning and degreasing facilities. ODS are not a health issue for people in the building, but are more a maintenance issue to limit or prevent their release. This is accomplished by regular maintenance by trained personnel.

ODS Containing equipment was not identified at the site at the time of the site visit, however, there is a potential for ODS containing equipment to be present in the residential refrigerator. An inspection of the buildings was not conducted as part of this investigation.

2.2.7 Lead

Lead can be associated with paints, plumbing solder, pipes and other products such as wall shielding in x-ray rooms. Lead-based paint was withdrawn from the market in the late 1970s. If present, lead-based paint is often concealed beneath multiple layers of paint applied over the years during renovations. Lead-based paint and plumbing equipment are not a direct health risk when concealed (sealed behind layers of non-lead paint) and/or in good condition. Lead-based paint should be considered, however, when planning future renovations, when particles could be released and/or ingested in the course of the work.

Based on the estimated age of buildings on the property (constructed prior to 1950), lead may be present in the paint and/or plumbing pipes and solder the property. Should the buildings be demolished or renovated, a building materials survey should be conducted. EBA did not inspect the inside of the buildings and can not comment on the condition of the paint.

2.2.8 Urea Formaldehyde Foam Insulation (UFFI)

Insulation materials used during the 1970s and 1980s were known to possibly contain UFFI. UFFI was banned in 1980 under the federal *Hazardous Products Act*. Based on the estimated age of buildings on the property (constructed prior to 1950), UFFI-containing materials may be present at the property; however, intrusive investigation of wall cavities and sampling is not within the scope of a Phase I ESA. Should the buildings be demolished or renovated it should be determined if there is any UFFI on-site and handled accordingly.

2.2.9 Radon

Radon gas is a product of the decay series that begins with uranium. Radon is produced directly from radium that can be commonly found in bedrock that contains black shale and/or granite. Radon gas can migrate through the ground and enter buildings through porous concrete or fractures. There was no radon gas testing reported for the subject site; however, based on information contained on geological maps, radon gas (naturally occurring) products are not expected. Additionally, there were no anthropogenic sources of radon gas identified.

2.2.10 Methane

Methane gas is a product of anaerobic decomposition of organic material (i.e., buried fill high in organic material). Methane is also associated with natural gas deposits. Methane gas can migrate through the ground and enter buildings through porous concrete, joints or fractures. There was no methane gas testing reported for the property and based upon information collected during this investigation (i.e., aerial photograph review), significant deposits of buried organics are not expected at the site.

Suspected areas of potential methane generation include the septic tank and septic field, filled in stock watering trench, wetland areas and manure from animals on-site mainly in the corral area.

It is unknown if there was organic fill material brought to the site. Refer to Section 2.3.5 regarding potential fill areas.

2.2.11 Mould

Mould can be found anywhere in a building; however, it is usually associated with enclosed, damp areas. There were no obvious signs of mould (e.g., visible mould growth larger than one square metre) observed during the site visit however an inspection of the buildings was not conducted as part of this investigation. Intrusive observation of wall and ceiling cavities is not included within the scope of this Phase I ESA.

2.2.12 Electromagnetic Fields

There were no high-tension transmission lines or electrical sub-stations that could generate significant electromagnetic fields identified within 100 m of the site.

2.2.13 Noise and Vibration

There were no major sources of noise or vibration noted on or adjacent to the site during the site reconnaissance.

2.2.14 Waste Storage and Recycling Facilities

No waste storage or recycling facilities were identified at property during site reconnaissance. According to Mrs. Muhly, domestic waste is collected by the tenant and burned in a burning barrel on the farmstead. It is unknown what is done with the ash once the waste has been burnt.

2.2.15 Storage Facilities

No storage facilities were identified at property during the site reconnaissance; however, comment cannot be made about the house and outbuildings.

2.3 SITE OBSERVATIONS

2.3.1 Surficial Stains

The ground was snow covered during the farmstead inspection and therefore it is not possible to make a comment on the surface staining. Should large surface stains be noted during stripping and site grading, further assessment may be warranted.

2.3.2 Vegetation

The majority of the property is cultivated agricultural land that had been previously harvested at the time of site reconnaissance. On the west side of the farmstead, a pasture containing pasture grasses was present. Grass appeared to be in good condition with no obvious signs of distress. However, it should be noted that site reconnaissance was conducted in November when grass was dormant and the site was snow covered.

2.3.3 Ponding of Water

No ponded water was observed on the site during the site reconnaissance; however, there are low spots located on the site that would collect water during wet years. An ephemeral wetland was observed on the western and the southern portion of the site. If future development would occur at these areas, an approval under the Water Act may be required.

For information purposes, the water act definition of a water body and the Alberta Environment's Provincial Restoration Compensation Guide definition of a wetland are provided below.

Under the Alberta Water Act, a "water body" refers to "any location where water flows or is present, whether or not the flow or the presence of water is continuous, intermittent or occurs only during a flood, and includes but is not limited to wetlands..." (Water Act, revised Statutes of Alberta 2000, Chapter W-3, Section 1). A wetland identified on the

property would be considered a "water body" under the Alberta Water Act and should therefore be included in the wetland compensation plan.

Alberta Environment's Provincial Restoration and Compensation Guide (February 2007) defines a wetland as "land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment".

2.3.4 Washouts and Erosion

No washouts or indications of erosion were observed during the site reconnaissance.

2.3.5 Fill Areas

There was a historical stock watering trench on the site in a wetland area to the west of the farmstead. It appears to have been filled in.

A soil stockpile is located on the east side of the site. The origin of this stockpile is unknown. The debris included at the stockpile is a couch, wood, and a couple bags of domestic waste.

Prior to construction, the soil pile should be analysed to determine chemical quality or the origin of this stockpile should be verified.

It should also be noted that depths and exact locations of potential fill material can not be determined through a Phase I ESA. A geotechnical assessment should be conducted to determine soil suitability for development.

2.3.6 Oil / Gas Wells and Pipelines

An ATCO service pipeline crossing was identified on the south-eastern corner of the site. No Oil or Gas Wells were observed on the site; however, a gas pipeline belonging to Bonavista Petroleum Ltd. was identified in the AbaData search. Additional information regarding Oil and Gas Wells and pipelines is available in Section 6.3.2 (AbaData) and Section 6.3.3 (AENV SPIN2 website).

2.3.7 Chemical Storage

No outdoor chemical storage was observed on site at time of site reconnaissance. It should be noted that the buildings were not inspected. Three were empty barrels on the site however it is assumed that these are used for the burning of the domestic waste.

2.3.8 Transformers

One pole mount electrical transformer was located on the farmstead. No staining was present in the area around the transformer. Generally, transformers are maintained by private utility companies.

2.3.9 Hydraulic Elevators and Hoists

There were no hydraulic elevators or hoists observed at the site during the site reconnaissance. According to Mrs. Muhly, no hoists have ever been present at the site.

2.3.10 Vent Pipes and Underground Storage Tanks (USTs)

There were no vent pipes or USTs identified on the site during the site reconnaissance. According to Mrs. Muhly, no USTs have ever been present on site.

2.3.11 Aboveground Storage Tanks (ASTs)

One aboveground storage tank (a sliptank) was identified at the site during the site reconnaissance. This AST was empty and no staining can be commented on as the site was snow covered at the time of the inspection. According to Mrs. Muhly, an AST containing fuel was present on property during the 1950s and 1960s around the same location as the slip tank; however, it was no longer present during site reconnaissance.

2.3.12 General Housekeeping

The general housekeeping of the property was good with the exception of debris pile located on eastern boundary of property.

3.0 GEOLOGICAL INFORMATION

3.1 TOPOGRAPHY

Surface topography can influence the direction of migration of contaminants at the soil surface. The local topography is the topography at the property whereas regional topography is the overall expression of the soil surface in a given region. The surface topography at the property is gently undulating but slopes gently towards the east. Regional topography in the area is gently undulating, but slopes slightly towards the northeast[1].

3.2 GEOLOGY

The surficial geology in the area surrounding the property is characterized by moraine till deposits with sporadic lenses of gravel, sand and silt[2].

The stratigraphy of the Lethbridge area is generally comprised of 65 m to 70 m of surficial deposits overlying bedrock. Bedrock in the Lethbridge area consists of strata from the upper Oldman formation and the lower Bearspaw Formation, both of the late Cretaceous

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[1] 1993, "Lethbridge 82H". Canada Centre for Mapping, Natural Resources Canada.

[2] Shetson, I. 1981. Surficial Geology Lethbridge, Alberta. Alberta Research Council, Edmonton, Alberta.

age[3]. The bedrock has a relatively flat surface dipping slightly to the northwest and is locally encountered at about geodetic elevation 843 m. The bedrock strata consist of thin beds of predominantly weak mudstones, siltstones, and sandstones with occasional bentonite and coal seams.

3.3 HYDROLOGY AND HYDROGEOLOGY

Groundwater is of significance as a potential means of contaminant transport. Regional groundwater flow is the overall direction of groundwater flow in a given region. There may be local groundwater flow within a region that is in a different direction from the regional flow and that is controlled by topography and/or subsurface soil conditions.

The nearest surface water body is a manmade lake located approximately 1.6 km to the east of the property. It is anticipated that shallow and regional groundwater flow is northeast towards the Oldman River. Perched groundwater tables have also been encountered in many areas of Lethbridge. The depth to these perched tables can vary from approximately 2 m below ground level to considerable depths within gravel, sand and/or silt seams. The flow of these perched tables can also vary in any direction or be still, dependent on the horizontal and vertical dip and the extent of the sand and/or silt seams.

It should be noted that topography, geologic materials, land development and soil disturbances influence localized variances in groundwater movement and pattern. In addition, groundwater levels will fluctuate seasonally and in response to climatic conditions.

4.0 OFF-SITE OBSERVATIONS

The following table summarizes the surrounding land use.

TABLE B:SURROUNDING LAND USE

Observation	North of Site	South of Site	West of Site	East of Site
Land Use	Agricultural.	Agricultural.	Agricultural land and Radio Tower.	Agricultural land and Subdivision under construction.
Business Name(s)	N/A	N/A	N/A	N/A
Address(es)	520 – 30 Street West	2220 – 30 Street West	SW ¼ 33-8-22 W4M NE ¼ 28-8-22 W4M	1025, 1205 and 1415 – 30 Street West

[3] O. Tokarsky, 1974, hydrogeology of the Lethbridge and Fernie Area, Alberta, 74-1, Alberta Research Council, Edmonton, Alberta

The surrounding land is zoned primarily as Urban Reserve. No businesses were located in the area, however there was construction to the east of the site that has been indicted to be commercial, institutional and residential.

5.0 PERSONNEL INTERVIEWS

EBA interviewed the following personnel during the Phase I ESA. The findings of the personnel interviews, which have been incorporated into this report, are in general agreement with the records review conducted for the property.

TABLE C: INTERVIEW DETAILS

Item	Description
Interviewer	Ms. Mireille Rigaux
Interviewee	Mrs. Mary-Lynn Muhly
Position	Daughter of current owner, Mrs. Addie May Perdue.
Length of Involvement With Property	Property has belonged to Mrs. Muhly's family since the early 1900s. Information gathered from Mrs. Muhly was supplemented by her mother, Mrs. Perdue.

6.0 RECORDS REVIEW

6.1 LAND TITLE RECORDS

A historical and current land title search was initiated for NE ¼ 28-8-22 W4M (1220 – 30 Street West) back to 1911. The results of the land title search are summarized in the following table.

TABLE D: LAND TITLES SUMMARY NE ¼ 28-8-22 W4M (1220 – 30 STREET WEST)

Year(s) of Ownership	Owner(s)	EBA Evaluation
2004 to present	Addie May Perdue and Jean Lapointe	Liens, encumbrances and interests include the following: Bonavista Petroleum (ROW-1998), Encounter Energy Inc (transfer of caveat-1999), Bonavista Oil & Gas Ltd. (transfer of caveat-2001). There is a potential for a concern related to an oil and/or gas at the site.
1911 to 2004	Private landowners.	

A historical and current land title search was initiated for SE ¼ 33-8-22 W4M (720 and 1030 – 30 Street West) back to 1915. The results of the land title search are summarized in the following table.

TABLE E: LAND TITLES SUMMARY SE ¼ 33-8-22 W4M (720 AND 1030 - 30 STREET WEST)		
Year(s) of Ownership	**Owner(s)**	**EBA Evaluation**
1994 to present	Debra Dudley - Olafson	No obvious potential for environmental concern.
1993 to 1994	Private landowners.	
1993	838 Land Developments Ltd.	
1989 to 1993	Soroka Ventures Ltd. and Gemini Property & Land Developments Ltd.	
1988 to 1989	Soroka Developments Ltd.	
1982 to 1988	Krahn Homes Ltd.	
1915 to 1982	Private Landowners	

6.2 AERIAL PHOTOGRAPHS

Aerial photographs provide visual evidence of site occupancy, operational activities and general site details. Aerial photographs capture a view of the property and the surrounding areas at a given time. EBA reviewed aerial photographs (various scales) of the site and area from 1950 to 2006.

The following table provides a detailed historical review of the aerial photographs.

TABLE F: HISTORICAL AIRPHOTO SUMMARY

Year	Site	Off Site to the North	Off Site to the South	Off Site to the West	Off Site to the East
1950	Agricultural land and a farmstead with one residence and three outbuildings are present. A small pond is present on west side of farmstead. On the western property line west of the farmstead, a wetland is present. A low lying area is present to the southeast of the farmstead.	Agricultural land.	Agricultural land. There is water ponded in the low lying areas.	Agricultural land.	Agricultural land.
1961	Similar to 1950 aerial photograph, however pond to the west of the farmstead is no longer present. A stock watering trench is located in the wetland to the west, however the area appears to be dry. A round structure, likely a granary, has been added south of farmstead.	Similar to 1950 aerial photograph.	Similar to 1950 aerial photograph. Ponded water is no longer visible.	Similar to 1950 aerial photograph.	Similar to 1950 aerial photograph.
1970	Similar to 1961 aerial photograph. Additional granary has been added south of farmstead. Water is visible in the wetland to the west of the farmstead.	Similar to 1961 aerial photograph.	Similar to 1961 aerial photograph. Ponded water is in the low lying areas.	Similar to 1961 aerial photograph.	Similar to 1961 aerial photograph.
1984	Similar to 1970 aerial photograph. Granaries south of farmstead have been removed. The wetland appears to be dry.	Similar to 1970 aerial photograph.	Similar to 1970 aerial photograph. Ephemeral wetland no longer contains water.	Similar to 1970 aerial photograph.	Similar to 1970 aerial photograph. Approximately 2 km east, residential subdivision is being constructed.
1994	Three wetlands south of the farmstead have water visible. Soil pile has been added on boundary between NE 1/4 28-8-22 W4M and SE 1/4 33-8-22 W4M.	Similar to 1984 aerial photograph. Farmhouse with dugout has been constructed on eastern side of site.	Similar to 1984 aerial photograph. Ephemeral wetlands once again contain water.	Similar to 1984 aerial photograph. Compressor station has been constructed northwest of property.	Similar to 1984 aerial photograph.

TABLE F: HISTORICAL AIRPHOTO SUMMARY					
Year	Site	Off Site to the North	Off Site to the South	Off Site to the West	Off Site to the East
2007	Wetland south of farmstead appears larger and water is present. Debris has been added to soil pile.	Similar to 1994 aerial photograph.	Similar to 1994 aerial photograph.	Similar to 1994 aerial photograph. Radio Tower has been constructed.	Similar to 1994 aerial photograph.
Notes: To be read in conjunction with the accompanying report The aerial photographs are enlarged (where possible) for the review					

The majority of the surrounding area has been consistently agricultural land for over 57 years, with the exception of residential subdivision development in west Lethbridge in the 1980s.

6.3 REGULATORY INQUIRIES

The following sections summarize the responses received from the regulatory agencies. Copies of these responses are in Appendix B of this report.

6.3.1 Petroleum Tank Management Association of Alberta (PTMAA)

EBA contacted the PTMAA regarding the potential for registered petroleum storage tanks at the property. The PTMAA response indicated that no records exist for the property (NE 1/4 28-8-22 W4M and SE 1/4 33-8-22 W4M).

The PTMAA requires that all USTs be registered; however, only ASTs with a capacity greater than 2,500 litres are required to be registered and information has only been collected since 1992.

6.3.2 Abacus Datagraphics (AbaData)

AbaData was contacted to determine if oil/gas wells and/or pipelines exist or have existed at the site. The information provided by AbaData indicated the following:

There was one pipeline that is on the site. It is shown in Figure 2. The details collected on the pipeline are included below. Additional Information is in Appendix B. There were no spills or incidents associated with the licence number.

TABLE G: ON-SITE PIPELINE INFORMATION	
Licence Number	30255-1
Licence Date	October 28, 1997
Company	Bonavista Oil and Gas Ltd.
From Location	9-21-5-22 W4M
To Location	5-33-8-22 W4M
Length	3.33 km
Substance	Natural Gas
Status	Operational

The farmstead is also serviced by an Atco Gas line.

Off site to the west is natural gas pipeline with license number 30285-12, located on the western boundary of NE 1/4 28-8-22 W4M. This pipeline is 8.36 km long, beginning in 01-14-008-22 W4M and ending in 05-33-008-22 W4M. The pipeline is also 114.3 mm in diameter and belongs to Bonavista Petroleum Ltd.

Additionally there are wells in the area, but not directly on-site. A flowing gas well is located at 4-33-8-22 W4M and another at 7-28-8-22 W4M. Both are operational and were drilled in 1994.

High pressure pipeline and well information provided by AbaData is current to September 28, 2007 and information on low pressure pipelines is current to November 1, 2005. Figure 2 illustrates location of gas wells and pipelines in relation to property.

There are setback requirements for development from the pipeline right-of-ways. It is best to contact the current owner of the pipeline to confirm setbacks or discuss setback waivers. An alternative is to have the pipeline relocated. Should this be conducted, an environmental professional should be on-site to inspect the removal of the pipeline and assess any potential leaks or spills.

6.3.3 Alberta Environment (AENV)

The Online Approval Viewer allows the public to view approvals, licenses, registrations and permits issued under the Water Act and Enforcement Protection and Enhancement Act. There were no approvals, licenses, registrations and/or permits for the site.

The Water Well Database has one record of a water well located at 4-28-008-22 W4M. The well belongs to Lethbridge Collieries # 3 and was installed to a depth of 116 metres below grade. This water well is approximately 600 metres southwest of the site.

The Water Well Database has three records of water wells located within section 33-008-22 W4M. The owners of these wells are W.L. Hamilton, an unknown owner and Steve Soroka. Well depths range from four metres to 193 metres below grade. Wells are between approximately 300 to 600 metres north of site.

An additional two wells are located in 12 and 13-27-008-22 W4M approximately 400 metres to the east of the site. One well belongs to Lethbridge Collieries # 4 and the other has an unknown well owner. Wells range in depth from seven metres to 103 metres.

The SPIN 2 Website map for the site and surrounding area shows a pipeline right of way crossing the south-western corner of the site, which appears to be the Bonavista pipeline.

6.3.4 City of Lethbridge

The City of Lethbridge Development Services Department did not have records regarding potential environmental concerns for the site. The City of Lethbridge provided a site map for the site. In addition, the City of Lethbridge Archives at the Galt Museum were reviewed and no information was available for the site.

6.3.5 County of Lethbridge

The County of Lethbridge did not have records regarding any potential environmental concerns for the site. The site was annexed by the City of Lethbridge in 1984 and prior to that time was zoned as agricultural land.

6.3.6 Business Directories

No Henderson Business Directories were available for the property or surrounding area.

6.3.7 EUB Coal Mine Atlas

EBA reviewed the EUB Coal Mine Atlas for the Lethbridge area and found that an abandoned underground coal mine is located approximately 1.6 kilometres to the east of the property. The mine belonged to Canadian Pacific Railway in 1934 to 1935. From 1935 to 1957, the mine belonged to Lethbridge Colliers Ltd. The mine was closed in 1957 and is not identified as an environmental concern to the site.

6.3.8 Fire Insurance Maps

EBA reviewed the Canadian Underwriters Association fire insurance map for Lethbridge from 1955 (partially revised 1964), however, the map did not provide coverage for the property or the immediate surrounding area.

6.4 PREVIOUS REPORTS

No previous environmental reports were provided for the site.

6.5 OTHER INFORMATION SOURCES

No other information sources were provided for the site.

7.0 DISCUSSION/ FURTHER ACTION / RENDERING AN OPINION

7.1 GENERAL

In general terms, there are two distinct types of potential environmental risk to any property. The first type of risk is from potential contamination from on-site land use. This would include potential accidental spills or site practices that may contaminate the site directly. The second type of risk is from contamination caused by adjacent site owners, which might then be transported through the subsurface soils by groundwater, or in overland runoff onto the site.

7.2 POTENTIAL FOR IMPAIRMENT FROM ON-SITE SOURCES AND RECOMMENDATIONS

Potential on-site sources of contamination or environmental concerns are noted in the table below.

TABLE H: POTENTIAL ON-SITE ISSUES

Area of Concern	Source of Information	Recommended Actions
Potential Building materials (Asbestos, PCBs, Lead and lead based paint, ODS, UFFI)	Based on age of structures.	Should the buildings be demolished or renovated, a building materials survey should be conducted and these materials should be managed and disposed of appropriately.
Former ASTs from the 1950s/60s.	Site interview with daughter of the current owner.	During the site development, evidence of staining or hydrocarbons should be appropriately characterized.
Waste burning, in burning barrels.	Site interview with daughter of the current owner.	Waste burning should cease on the site. If the ashes have been disposed of on the site, that area should be appropriately characterized.
Stockpile	Site inspection.	Appropriately characterize or determine the origin of the stockpiled material (or both).
Debris at stockpile	Site inspection	Remove debris from site. Determine if the waste is inert and ensure that there is no spillage of substances on the ground. Any spillage should be appropriately characterized.
Bonavista Natural Gas Pipeline	Desktop searches.	There are setback requirements for development from the pipeline right-of-ways. It is best to contact the current owner of the pipeline to confirm setbacks or discuss setback waivers. An alternative is to have the pipeline relocated. Should this be conducted, an environmental professional should be on-site to inspect the removal of the pipeline and assess any potential leaks or spills.
Wetlands	Site inspection, airphoto review.	There is a potential for methane generation from organics if these areas are buried, which would present a potential concern to nearby structures. Any buried organic soils should be removed in areas of future building development. A Water Act approval may be required for site development in wetland areas (ephemeral wetlands).
Septic tank and septic fields	Site interview with daughter of the current owner.	When ready these should be appropriately decommissioned.

7.3 POTENTIAL FOR IMPAIRMENT FROM OFF-SITE SOURCES AND RECOMMENDATIONS

There are no apparent off-site sources of environmental impairment relating to the property from historical or current off-site land uses.

8.0 LIMITATIONS OF LIABILITY

Recommendations presented herein are based on a Phase I Environmental Site Assessment as described in Section 1.0. This report has been prepared for the exclusive use of Avonlea Land Corporation Ltd. c/o Associated Engineering Alberta Ltd. for the specific application described in Section 1.0 of this report. It has been prepared in accordance with generally accepted geo-environmental engineering practices. No other warranty is made, either expressed or implied. Engineering judgement has been applied in developing the recommendations of this report.

For further limitations, reference should be made to the General Conditions in Appendix C.

9.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

EBA Engineering Consultants Ltd.

Mireille Rigaux, B.Sc.
Environmental Scientist

Mandi Parker, P.Ag.
Environmental Scientist

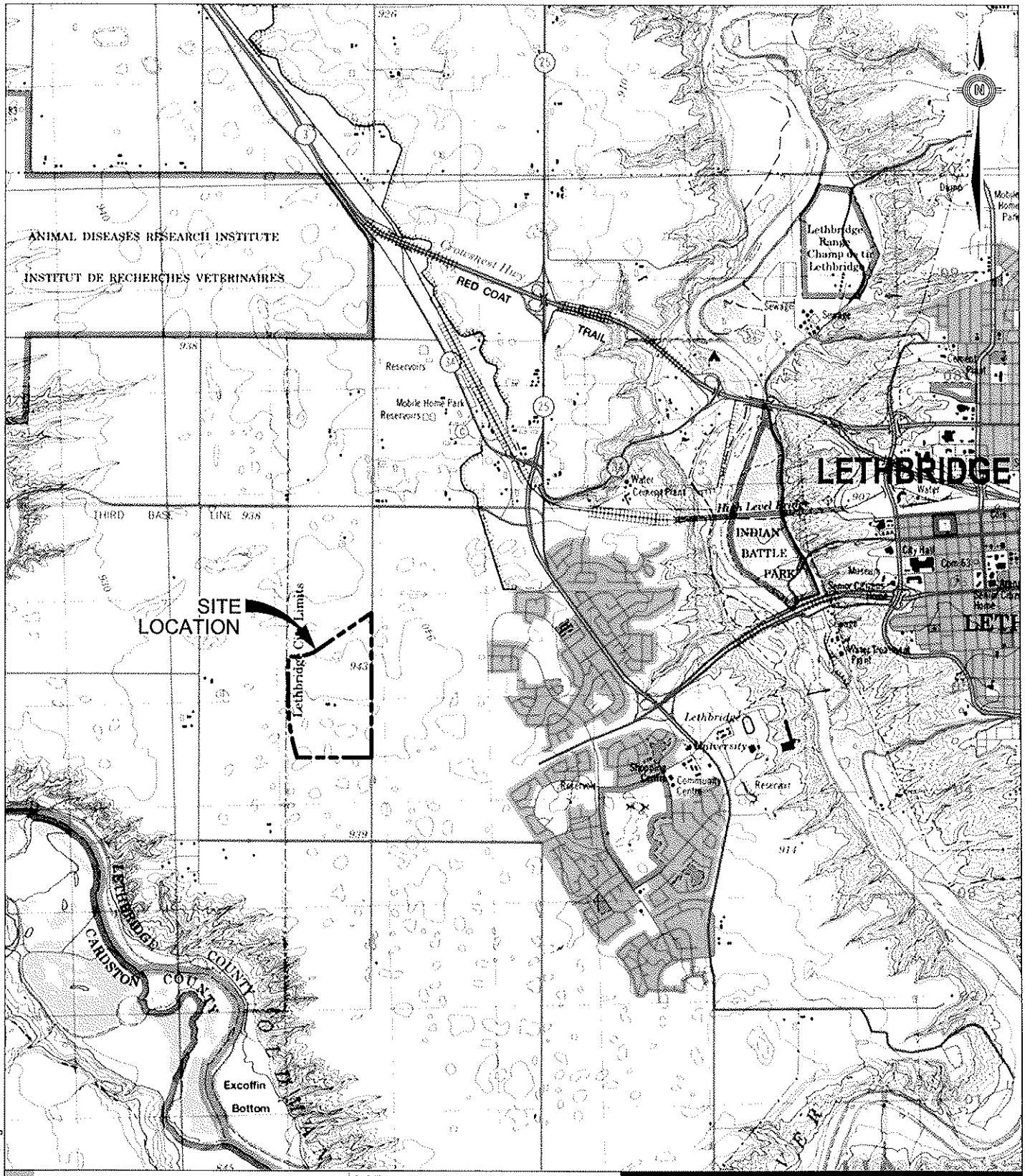
Reviewed by:
Sean Buckles, P. Eng
Project Engineer

/cld

PROFESSIONAL ENGINEER ALBERTA
MARC J. SABOURIN
Dec 7, 07

PERMIT TO PRACTICE
EBA ENGINEERING CONSULTANTS LTD.
Signature
Date Dec 7, 07
PERMIT NUMBER: P245
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

FIGURES



CLIENT

Avonlea Land Corporation c/o
Associated Engineering Ltd.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
NE 1/4 28-8-22 W4M AND SE 1/4 33-8-22 W4M

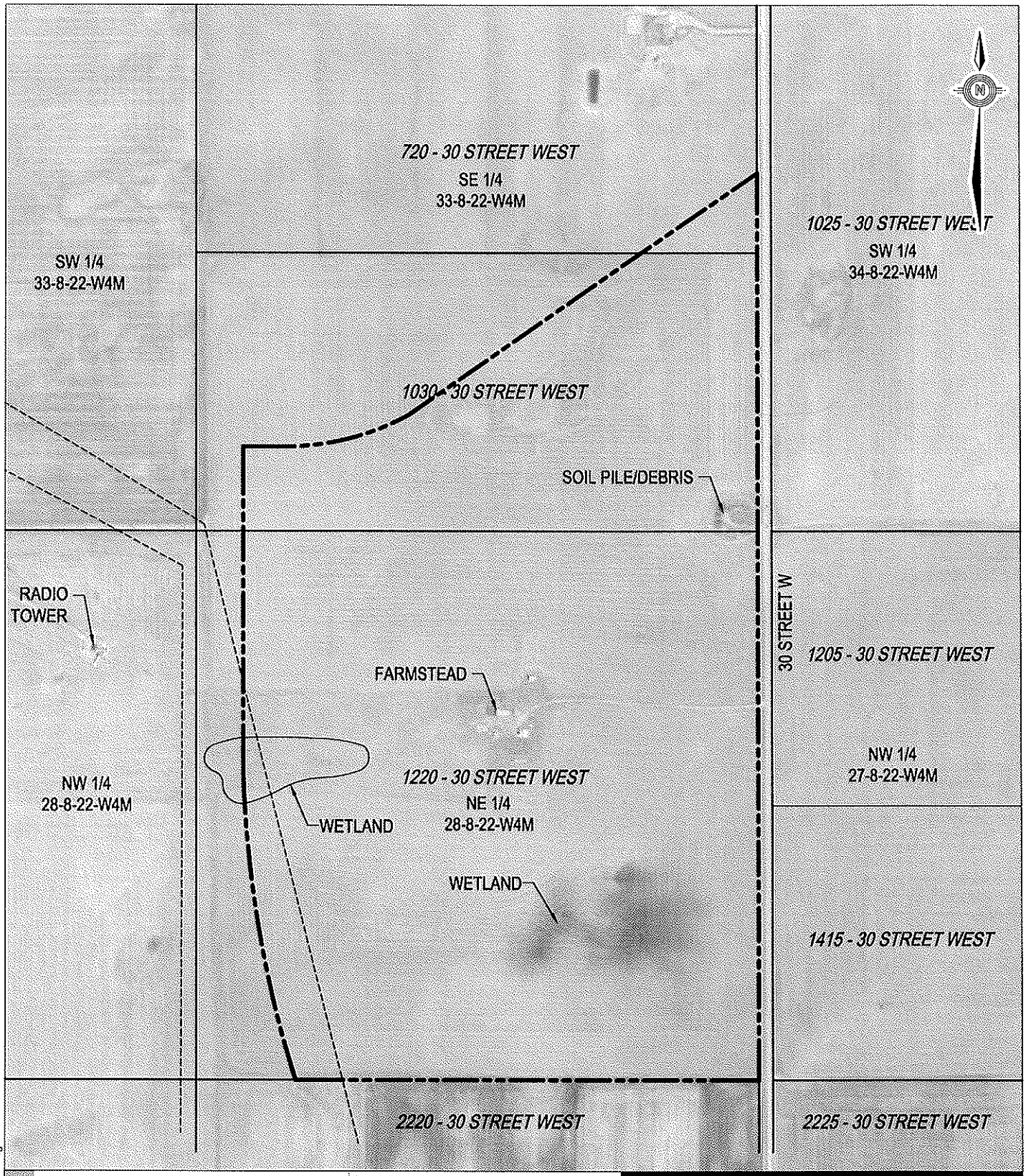
SITE LOCATION PLAN

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
L22101100	LCH	MR	0
OFFICE: EBA-Lethbridge	DATE: December 5, 2007		

Figure 1

\\sharepoint\L22101100\L22101100 site location.dwg



LEGEND

SITE BOUNDARY

OIL AND GAS PIPELINE LOCATION

0 100 200 400m

APPROXIMATE SCALE 1:7500

CLIENT

Avonlea Land Corporation c/o
Associated Engineering Ltd.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
NE 1/4 28-8-22 W4M AND SE 1/4 33-8-22 W4M

SITE DIAGRAM

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
L22101100	LCH	MR	0

OFFICE: EBA-Lethbridge

DATE: December 6, 2007

Figure 2

\\sharepoint\L22101100\L22101100 site plan.dwg

0 10 30 50m

SCALE 1:1000

CLIENT

Avonlea Land Corporation c/o
Associated Engineering Ltd.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
NE 1/4 28-8-22 W4M AND SE 1/4 33-8-22 W4M

SITE PLAN OF THE FARMSTEAD

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
L22101100	LCH	MR	0
OFFICE: EBA-Lethbridge	DATE: December 6, 2007		

Figure 3

\\sharepoint\L22101100\L22101100 site plan.dwg

APPENDIX

APPENDIX A SITE PHOTOGRAPHS

Photo 1
Looking east at NE ¼ -28-8-22 W4M northwest corner of property.

Photo 2
Looking northeast across SE ¼ -33-8-22 W4M from northwest corner of property.

Photo 3
Looking south at western boundary of property from northwest corner.

Photo 4
Looking east at southern boundary of property from southwest corner.

Photo 5
Looking north at eastern boundary of property from southeast corner.
Note: 30 Street West on right side of photo.

Photo 6
Looking northwest across property from southeast corner.
Note farmstead on right side of photo.

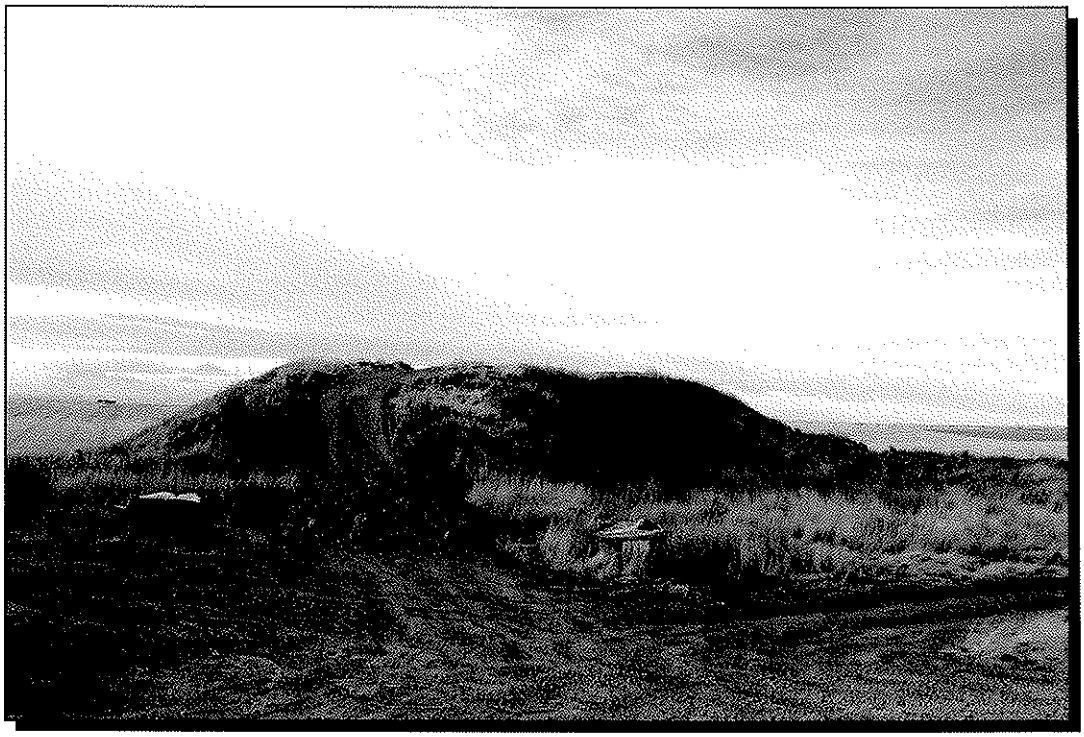


Photo 7
View debris and soil pile located on boundary between NE ¼ -28-8-22 W4M and SE ¼ 33-8-22 W4M.

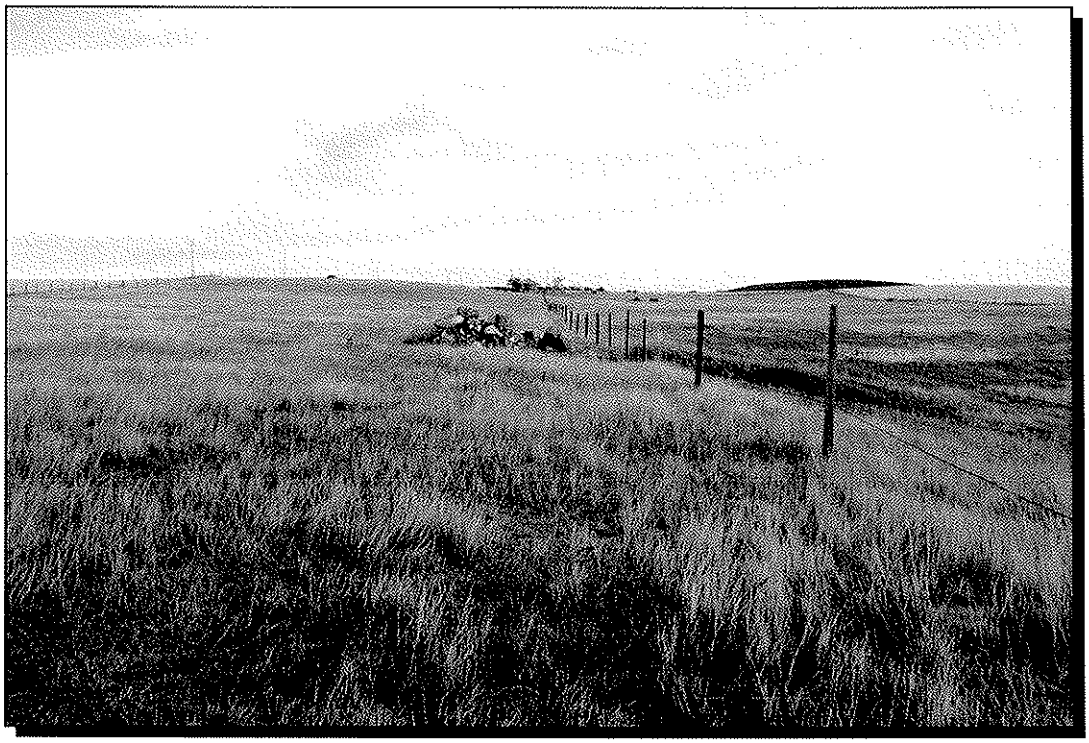


Photo 8
Distant view of farmstead from west the boundary. Note: rock pile in foreground.

Photo 9
Land use to the north: Agricultural.

Photo 10
Land use to the west: Agricultural with radio tower in centre.

Photo 11
Land use to the south: Agricultural (summer fallow).

Photo 12
Land use to the east: Subdivision under construction.

Photo 13
Empty 20 gallon barrels located in farmyard.

Photo 14
Empty slip tank with garage in background located at the farmstead.

APPENDIX

APPENDIX B REGULATORY INQUIRIES

HISTORICAL LAND TITLE CERTIFICATE

CURRENT TITLE WITH HISTORICAL DATA

S

LINC	SHORT LEGAL	TITLE NUMBER
0022 090 443	4;22;8;28;NE	041 418 077 +1

LEGAL DESCRIPTION
MERIDIAN 4 RANGE 22 TOWNSHIP 8
SECTION 28
QUARTER NORTH EAST
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 64.7 HECTARES (160 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE

MUNICIPALITY: CITY OF LETHBRIDGE

REFERENCE NUMBER: 041 418 063

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
041 418 077	02/11/2004	SEPARATION - INTERESTS		

OWNERS

ADDIE MAY PERDUE
OF 4330-4 AVE S
LETHBRIDGE
ALBERTA T1J 4B3
AS TO AN UNDIVIDED 1/2 INTEREST

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
741 091 031	27/09/1974	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE LETHBRIDGE NORTHERN IRRIGATION DISTRICT

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 006 966	27/01/1975	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "DISCHARGED EXCEPT FOR 20 FT. STRIPS (BY 761072088)"
981 066 294	04/03/1998	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - BONAVISTA PETROLEUM LTD.. P.O. BOX 22192,BANKERS HALL POSTAL OUTLET CALGARY ALBERTA T2P4H5 AGENT - DIANE VANDER VEEN (DATA UPDATED BY: TRANSFER OF CAVEAT 991026309) (DATA UPDATED BY: TRANSFER OF CAVEAT 011238126) (DATA UPDATED BY: TRANSFER OF CAVEAT 041187482)
991 026 309	28/01/1999	TRANSFER OF CAVEAT 981066294 TRANSFEREE - ENCOUNTER ENERGY INC.. 1940, 540 5 AVE SW CALGARY ALBERTA T2P0M2
001 162 343	15/06/2000	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - BONAVISTA PETROLEUM LTD.. P O BOX 22192 BANKERS HALL CALGARY ALBERTA T2P4H5 AGENT - JUSTIN EDWARDS
011 238 126	20/08/2001	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA OIL & GAS LTD.. 1100, 321 - 6 AVENUE SW CALGARY ALBERTA T2P3H3
041 187 482	25/05/2004	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA PETROLEUM LTD.. P.O. BOX 22192,BANKERS HALL POSTAL OUTLET CALGARY ALBERTA T2P4H5 AGENT - DIANE VANDER VEEN

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
041 429 593	10/11/2004	MORTGAGE MORTGAGEE - CANADIAN WESTERN TRUST COMPANY. 220, 666 BURRARD ST VANCOUVER BRITISH COLUMBIA V6C2X8 ORIGINAL PRINCIPAL AMOUNT: $53,500
061 072 316	17/02/2006	CAVEAT RE : OFFER TO PURCHASE AND AGREEMENT FOR SALE CAVEATOR - JOE MESZAROS C/O DIMNIK & CO 334-12 ST S LETHBRIDGE ALBERTA T1J2R1 AGENT - MICHAEL J DIMNIK
061 132 195	03/04/2006	CAVEAT RE : AGREEMENT FOR SALE CAVEATOR - 1229503 ALBERTA LTD.. C/O DIMNIK & COMPANY 334-12 ST SOUTH LETHBRIDGE ALBERTA T1J2R1 AGENT - MICHAEL J DIMNIK
061 132 196	03/04/2006	DISCHARGE OF CAVEAT 061072316
061 353 291	29/08/2006	DISCHARGE OF MORTGAGE 041429593

TOTAL INSTRUMENTS: 012

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 8 DAY OF NOVEMBER, 2007 AT 07:52 A.M.

ORDER NUMBER:9849229

CUSTOMER FILE NUMBER: 6838496

REGISTRAR OF LAND TITLES

END OF CERTIFICATE

(CONTINUED)

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

HISTORICAL LAND TITLE CERTIFICATE

CURRENT TITLE WITH HISTORICAL DATA

S

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EXCEPTING THEREOUT ALL MINES AND MINERALS
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REFERENCE NUMBER: 041 418 063

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
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OWNERS

JEAN LAPOINTE
OF 1017-19A AVE
COALDALE
ALBERTA T1M 1A6
AS TO AN UNDIVIDED 1/2 INTEREST

ENCUMBRANCES, LIENS & INTERESTS

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(CONTINUED)

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991 026 309	28/01/1999	TRANSFER OF CAVEAT 981066294 TRANSFEREE - ENCOUNTER ENERGY INC.. 1940, 540 5 AVE SW CALGARY ALBERTA T2P0M2
001 162 343	15/06/2000	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - BONAVISTA PETROLEUM LTD.. P O BOX 22192 BANKERS HALL CALGARY ALBERTA T2P4H5 AGENT - JUSTIN EDWARDS
011 238 126	20/08/2001	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA OIL & GAS LTD.. 1100, 321 - 6 AVENUE SW CALGARY ALBERTA T2P3H3
041 187 482	25/05/2004	TRANSFER OF CAVEAT 981066294 TRANSFEREE - BONAVISTA PETROLEUM LTD.. P.O. BOX 22192,BANKERS HALL POSTAL OUTLET CALGARY ALBERTA T2P4H5 AGENT - DIANE VANDER VEEN

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
041 429 593	10/11/2004	MORTGAGE MORTGAGEE - CANADIAN WESTERN TRUST COMPANY. 220, 666 BURRARD ST VANCOUVER BRITISH COLUMBIA V6C2X8 ORIGINAL PRINCIPAL AMOUNT: $53,500
041 439 438	18/11/2004	CAVEAT RE : AGREEMENT CHARGING LAND CAVEATOR - ADDIE MAY PERDUE KRUSHEL FARRINGTON 608-3 AVE SOUTH LETHBRIDGE ALBERTA T1J0H5 AGENT - JAMES R FARRINGTON
061 072 316	17/02/2006	CAVEAT RE : OFFER TO PURCHASE AND AGREEMENT FOR SALE CAVEATOR - JOE MESZAROS C/O DIMNIK & CO 334-12 ST S LETHBRIDGE ALBERTA T1J2R1 AGENT - MICHAEL J DIMNIK
061 132 195	03/04/2006	CAVEAT RE : AGREEMENT FOR SALE CAVEATOR - 1229503 ALBERTA LTD.. C/O DIMNIK & COMPANY 334-12 ST SOUTH LETHBRIDGE ALBERTA T1J2R1 AGENT - MICHAEL J DIMNIK
061 132 196	03/04/2006	DISCHARGE OF CAVEAT 061072316
061 353 291	29/08/2006	DISCHARGE OF MORTGAGE 041429593
061 417 304	07/10/2006	DISCHARGE OF CAVEAT 041439438

(CONTINUED)

TOTAL INSTRUMENTS: 014

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 8 DAY OF NOVEMBER, 2007 AT 07:52 A.M.

ORDER NUMBER:9849229

CUSTOMER FILE NUMBER: 6838496

END OF CERTIFICATE

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
		GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "20 FOOT STRIP. BY 761072088"
981 066 289	04/03/1998	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. 909 - 11 AVENUE,S.W. CALGARY ALBERTA T2R1L8 (DATA UPDATED BY: TRANSFER OF CAVEAT 981078661)
981 078 661	17/03/1998	TRANSFER OF CAVEAT 981066289 TRANSFEREE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. 909 - 11 AVENUE,S.W. CALGARY ALBERTA T2R1L8
031 338 405	01/10/2003	MORTGAGE MORTGAGEE - CANADIAN IMPERIAL BANK OF COMMERCE. 701 - 4 AVENUE SOUTH, LETHBRIDGE ALBERTA T1J4A5 ORIGINAL PRINCIPAL AMOUNT: $600,000

TOTAL INSTRUMENTS: 005

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 8 DAY OF NOVEMBER, 2007 AT 07:53 A.M.

ORDER NUMBER:9849239

CUSTOMER FILE NUMBER: 6838496

END OF CERTIFICATE

(CONTINUED)

HISTORICAL LAND TITLE CERTIFICATE

CURRENT TITLE WITH HISTORICAL DATA

S

LINC	SHORT LEGAL	TITLE NUMBER
0025 602 905	4;22;8;33;SE	061 218 951

LEGAL DESCRIPTION

MERIDIAN 4 RANGE 22 TOWNSHIP 8
THE NORTH HALF OF THE SOUTH EAST
QUARTER OF SECTION 33
CONTAINING 32.4 HECTARES (80 ACRES) MORE OR LESS
EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: CITY OF LETHBRIDGE

REFERENCE NUMBER: 061 138 871

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
061 218 951	02/06/2006	TRANSFER OF LAND	$480,000	SEE INSTRUMENT

OWNERS

DEBRA L DUDLEY-OLAFSON
OF BOX 511
LETHBRIDGE
ALBERTA T1J 3Z4

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
741 091 031	27/09/1974	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE LETHBRIDGE NORTHERN IRRIGATION DISTRICT
751 006 966	27/01/1975	UTILITY RIGHT OF WAY

(CONTINUED)

SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

Petroleum Tank Management
Association of Alberta
Suite 980, 10303 Jasper Avenue
Edmonton, Alberta T5J 3N6
PH: (780)425-8265 or 1-866-222-8265
FAX: (780)425-4722

November 6, 2007

Mireille Rigaux
EBA Engineering Consultants Ltd.
442 10 Street N
Lethbridge, AB
T1H 2C7

Dear Mireille Rigaux:

As per your request, the PTMAA has checked the registration of active tank sites and inventory of abandoned tank sites and there are no records for the properties with the legal land description:

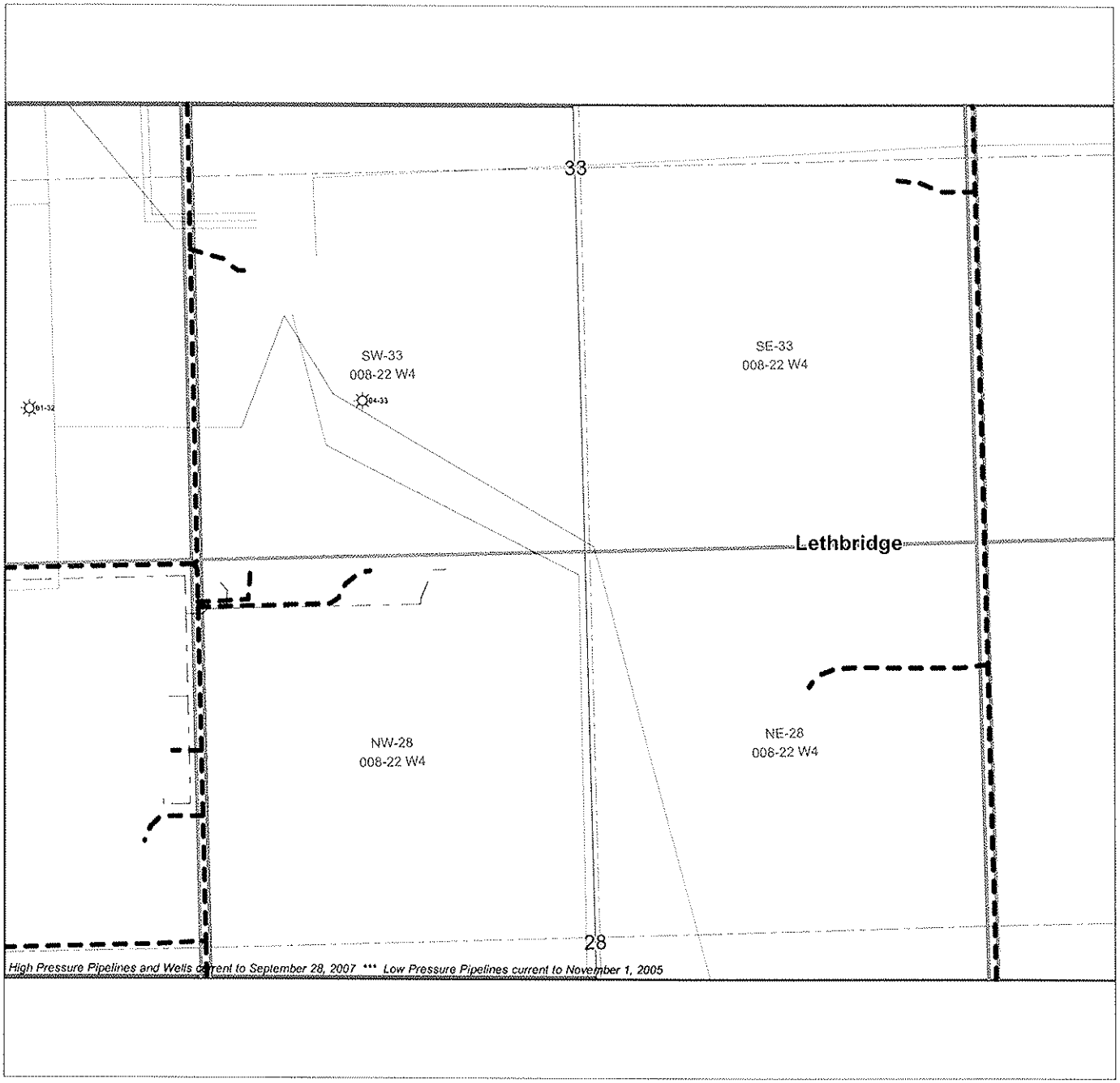
NE 28-8-22-W4, Lethbridge
SE 33-8-22-W4, Lethbridge

Please note that both databases are not complete. The main limitation of these databases is that they only include information reported through registration or a survey of abandoned sites completed in 1992 and should not be considered as a comprehensive inventory of all past or present storage tank sites. The PTMAA **cannot** guarantee that tanks do not or have not existed at this location. Information in the databases is based on information supplied by the owner and the PTMAA cannot guarantee its accuracy. Information on storage tanks or on past or present contaminant investigations may be filed with the local Fire Department or Alberta Environment.

Yours truly,

Connie Jacobsen
PTMAA

SE-33-008-22 W4 & NE-28-008-22-W4



N

Wellheads
- Abandoned Wellhead
- Suspended Gas Wellhead
- Suspended Oil Wellhead
- Flowing Gas Wellhead
- Location Wellhead
- Flowing Oil Wellhead
- Miscellaneous Wellhead
- Water Wellhead
- Well Downhole Location
- Newly Licenced Well
- Newly Spudded Well

High Pressure Pipelines
- Gas Pipeline
- Oil Pipeline
- Water Pipeline
- LVP/HVP Pipeline
- Foreign Pipeline (Only when a company is specified.)

Low Pressure Pipelines
- Gas Co-op Pipeline

EUB DATA | ATTACHED FILES

Close Screen

EUB PIPELINE INFORMATION
CURRENT TO SEPTEMBER 28, 2007

LICENCE/LINE #:	30255 - 1		**PERMIT DATE:**	APRIL 28, 1997	
ABACUS #:			**LICENCE DATE:**	OCTOBER 28, 1997	
COMPANY:	BONAVISTA OIL & GAS LTD.				
FROM LOCATION:	09-21-008-22 W4M WE		**TO LOCATION:**	05-33-008-22 W4M CS	
LENGTH:	3.33 kms	2.07 mi	**STATUS:**	O	
SUBSTANCE:	NG		**H2S:**	0 mol/kmol	0 ppm
OD:	114.3 mm	4.50 "	**WT:**	3.2 mm	0.13 "
MATERIAL:	S		**TYPE:**	Z245.1	
GRADE:	2901		**MOP:**	4960 kPa	719 psi
JOINTS:	W		**INTL COATING:**	U	
STRESS LEVEL:	31 %		**ENVIRONMENT:**		
ORIGINAL PERMIT DATE:	APRIL 28, 1997		**CONST. DATE:**		
ORIGINAL LICENCE/LINE #:	30255 - 1				

OPTIONS

View Company Info

View Installation Info

View Entire Licence

View Licence Ticket

View Spill Incidents

Highlight Line

Highlight Entire Licence

Print Screen

EUB DATA | ATTACHED FILES

Close Screen

EUB PIPELINE INFORMATION
CURRENT TO SEPTEMBER 28, 2007

LICENCE/LINE #:	30285 - 12		**PERMIT DATE:**	JUNE 12, 2000	
ABACUS #:			**LICENCE DATE:**	DECEMBER 12, 2000	
COMPANY:	BONAVISTA PETROLEUM LTD.				
FROM LOCATION:	01-14-008-22 W4M WE		**TO LOCATION:**	05-33-008-22 W4M CS	
LENGTH:	8.36 kms	5.19 mi	**STATUS:**	O	
SUBSTANCE:	NG		**H2S:**	0 mol/kmol	0 ppm
OD:	114.3 mm	4.50 "	**WT:**	3.2 mm	0.13 "
MATERIAL:	S		**TYPE:**	Z245.1	
GRADE:	2901		**MOP:**	4960 kPa	719 psi
JOINTS:	W		**INTL COATING:**	U	
STRESS LEVEL:	31 %		**ENVIRONMENT:**		
ORIGINAL PERMIT DATE:	JUNE 12, 2000		**CONST. DATE:**		
ORIGINAL LICENCE/LINE #:	30285 - 12				

OPTIONS

View Company Info

View Installation Info

View Entire Licence

View Licence Ticket

View Spill Incidents

Highlight Line

Highlight Entire Licence

Print Screen

protection & enforcement

Alberta ENVIRONMENT

Last Update/Review: **April 1, 2000**

Authorization /Approval Viewer

For advanced search help see: Authorization / Approval Viewer Help

The search used the following values:

Legal Land Location: M: 4 Rge: 22 Twp: 8 Sec: 28 QS: NE

Show Inactive Authorizations / Approvals: No

The resulting Authorizations / Approvals based on the search criteria will be displayed below. A will appear next to the Authorization / Approval when documentation is available for viewing or downloading. **Please click Authorization / Approval Viewer Help if you encounter problems viewing the approval document.**

The documents referenced from this page are in Adobe Acrobat Writer (.pdf) format. Click on Get Acrobat Reader to download Adobe Acrobat Reader.

No records match the search criteria.

Back to Search Page | Protection and Enforcement | Water | Top of Page

Comments regarding the Alberta Environment Authorization / Approval Viewer page may be directed to the Regulatory Approvals Centre RAC.Environment@gov.ab.ca

Alberta Connects

Alberta GOVERNMENT OF ALBERTA

protection & enforcement

Alberta ENVIRONMENT

Last Update/Review: **April 1, 2000**

Authorization /Approval Viewer

For advanced search help see: Authorization / Approval Viewer Help

The search used the following values:

Legal Land Location: M: 4 Rge: 22 Twp: 8 Sec: 33 QS: SE

Show Inactive Authorizations / Approvals: No

The resulting Authorizations / Approvals based on the search criteria will be displayed below. A will appear next to the Authorization / Approval when documentation is available for viewing or downloading. **Please click Authorization / Approval Viewer Help if you encounter problems viewing the approval document.**

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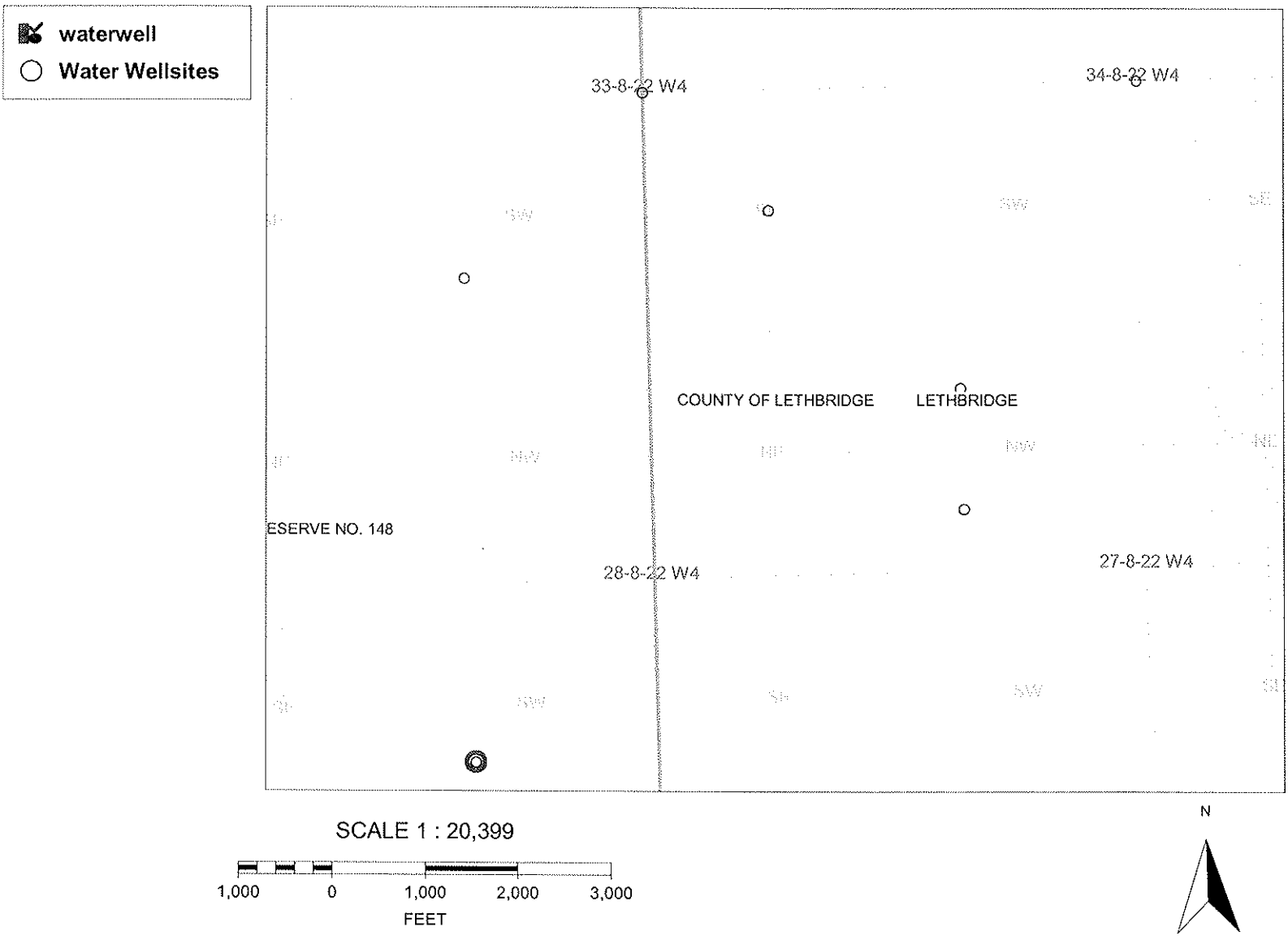
No records match the search criteria.

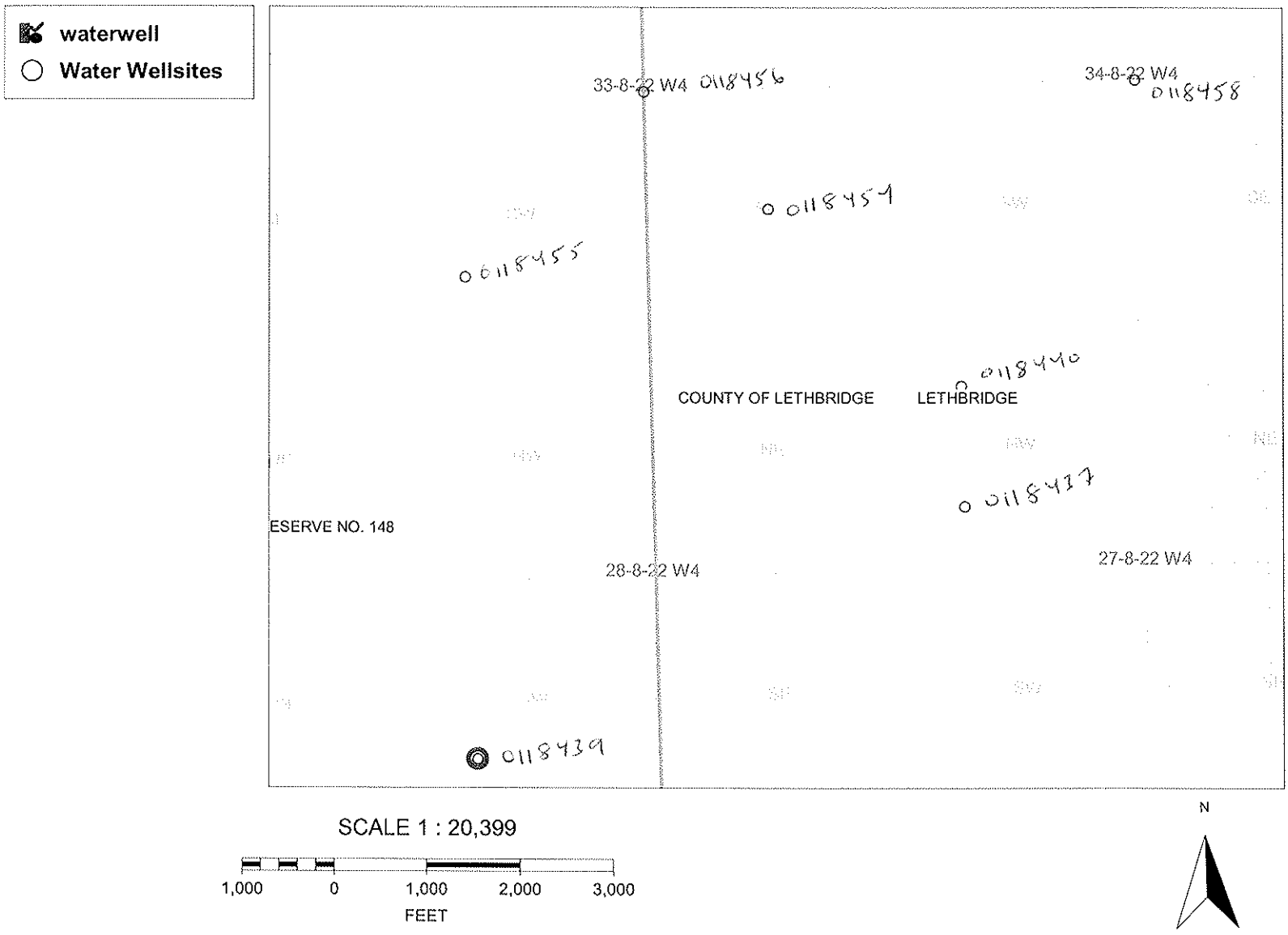
Back to Search Page | Protection and Enforcement | Water | Top of Page

Comments regarding the Alberta Environment Authorization / Approval Viewer page may be directed to the Regulatory Approvals Centre RAC.Environment@gov.ab.ca

TELUS Geomatics - Alberta Map



TELUS Geomatics - Alberta Map



Alberta Environment

Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:	0118439
Map Verified:	Field
Date Report Received:	
Measurements:	Imperial

1. Contractor & Well Owner Information

Company Name: UNKNOWN DRILLER		Drilling Company Approval No.: 99999
Mailing Address: UNKNOWN	City or Town: UNKNOWN AB CA	Postal Code:
WellOwner's Name: LETHBRIDGE COLL #3	Well Location Identifier:	
P.O. Box Number:	Mailing Address:	Postal Code:
City:	Province:	Country:

2. Well Location

1/4 or LSD	Sec	Twp	Rge	Westof M
04	28	008	22	4

Location in Quarter
0 FT from Boundary
0 FT from Boundary

Lot Block Plan

Well Elev: 3057 FT
How Obtain: Estimated

3. Drilling Information

Type of Work: Test Hole
Reclaimed Well
Date Reclaimed: Materials Used:
Method of Drilling: Drilled
Flowing Well:
Gas Present: No
Rate: Gallons
Oil Present: No

Proposed well use: Unknown
Anticipated Water Requirements/day 0 Gallons

4. Formation Log

Depth from ground level (feet)	Lithology Description
279	Glacial Drift
350	Blue Shale
351	Coal
360	Blue Shale
365	Shale
369	Coal
381	Gray Shale & Sandstone

5. Well Completion

Date Started(yyyy/mm/dd):
Date Completed (yyyy/mm/dd):

Well Depth: 381 FT
Borehole Diameter: 0 Inches

Casing Type:	Liner Type:
Size OD: 0 Inches	Size OD: 0 Inches
Wall Thickness: 0 Inches	Wall Thickness: 0 Inches
Bottom at: 0 FT	Top: 0 FT Bottom: 0 FT

Perforations
from: 0 FT to: 0 FT
from: 0 FT to: 0 FT
from: 0 FT to: 0 FT
Perforations Size:
0 Inches x 0 Inches
0 Inches x 0 Inches
0 Inches x 0 Inches

Perforated by:

Seal:
from: 0 FT to: 0 FT
Seal:
from: 0 FT to: 0 FT
Seal:
from: 0 FT to: 0 FT

Screen Type:	Screen ID: 0 Inches
from: 0 FT to: 0 FT	Slot Size: 0 Inches
Screen Type:	Screen ID: 0 Inches
from: 0 FT to: 0 FT	Slot Size: 0 Inches

Screen Installation Method:

Fittings
Top: Bottom:

Pack:
Grain Size: Amount:

Geophysical Log Taken:
Retained on Files:

Additional Test and/or Pump Data
Chemistries taken By Driller: No
Held: 0 Documents Held: 1

Pitless Adapter Type:
Drop Pipe Type:
Length: Diameter:

Comments:

6. Well Yield

Test Date (yyyy/mm/dd): Start Time:
Test Method:
Non pumping static level: FT
Rate of water removal: Gallons/Min
Depth of pump intake: FT
Water level at end of pumping: FT
Distance from top of casing to ground level: Inches

Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recovery

Total Drawdown: FT
If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: Gallons/Min
Recommended pump intake: FT
Type pump installed
Pump type:
Pump model:
H.P.:
Any further pumptest information?

7. Contractor Certification

Driller's Name: UNKNOWN DRILLER
Certification No.:

Alberta Environment

Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:	0118456
Map Verified:	Field
Date Report Received:	1937/01/01
Measurements:	Imperial

1. Contractor & Well Owner Information

Company Name: UNKNOWN DRILLER		Drilling Company Approval No.: 99999
Mailing Address: UNKNOWN	City or Town: UNKNOWN AB CA	Postal Code:
WellOwner's Name: HAMILTON, W.L.	Well Location Identifier:	
P.O. Box Number:	Mailing Address: BIENFAIT	Postal Code:
City:	Province:	Country:

2. Well Location

1/4 or LSD	Sec	Twp	Rge	West of M
00	33	008	22	4

Location in Quarter
0 FT from Boundary
0 FT from Boundary

Lot Block Plan

Well Elev: FT
How Obtain: Not Obtain

3. Drilling Information

Type of Work: Federal Well Survey
Reclaimed Well
Date Reclaimed: Materials Used:
Method of Drilling: Drilled
Flowing Well: Rate: Gallons
Gas Present: No Oil Present: No

Proposed well use: Unknown
Anticipated Water Requirements/day 0 Gallons

4. Formation Log

Depth from ground level (feet)	Lithology Description

5. Well Completion

Date Started(yyyy/mm/dd):	Date Completed (yyyy/mm/dd):
Well Depth: 633 FT	Borehole Diameter: 0 Inches
Casing Type:	Liner Type:
Size OD: 0 Inches	Size OD: 0 Inches
Wall Thickness: 0 Inches	Wall Thickness: 0 Inches
Bottom at: 0 FT	Top: 0 FT Bottom: 0 FT
Perforations from: 0 FT to: 0 FT from: 0 FT to: 0 FT from: 0 FT to: 0 FT	Perforations Size: 0 Inches x 0 Inches 0 Inches x 0 Inches 0 Inches x 0 Inches
Perforated by:	
Seal: from: 0 FT Seal: from: 0 FT Seal: from: 0 FT	to: 0 FT to: 0 FT to: 0 FT
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Installation Method:	
Fittings Top:	Bottom:
Pack: Grain Size:	Amount:
Geophysical Log Taken: Retained on Files:	
Additional Test and/or Pump Data Chemistries taken By Driller: No Held: 0	Documents Held: 1
Pitless Adapter Type: Drop Pipe Type: Length:	Diameter:
Comments:	

6. Well Yield

Test Date (yyyy/mm/dd): Start Time:
Test Method:
Non pumping static level: FT
Rate of water removal: Gallons/Min
Depth of pump intake: FT
Water level at end of pumping: FT
Distance from top of casing to ground level: Inches

Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recovery

Total Drawdown: FT
If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: Gallons/Min
Recommended pump intake: FT
Type pump installed
Pump type:
Pump model:
H.P.:
Any further pumptest information?

7. Contractor Certification

Driller's Name: UNKNOWN DRILLER
Certification No.:

Water Well Drilling Report

Alberta Environment

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:	0118455
Map Verified:	Field
Date Report Received:	
Measurements:	Imperial

1. Contractor & Well Owner Information

Company Name: UNKNOWN DRILLER		Drilling Company Approval No.: 99999
Mailing Address: UNKNOWN	City or Town: UNKNOWN AB CA	Postal Code:
WellOwner's Name:	Well Location Identifier:	
P.O. Box Number:	Mailing Address:	Postal Code:
City:	Province:	Country:

2. Well Location

1/4 or LSD	Sec	Twp	Rge	Westof M
04	33	008	22	4

Location in Quarter
0 FT from Boundary
0 FT from Boundary

Lot Block Plan

Well Elev: 3065 FT
How Obtain: Estimated

3. Drilling Information

Type of Work: Well Inventory
Reclaimed Well
Date Reclaimed: Materials Used:
Method of Drilling: Hand Dug
Flowing Well: Rate: Gallons
Gas Present: No Oil Present: No

Proposed well use: Unknown
Anticipated Water Requirements/day 0 Gallons

4. Formation Log

Depth from ground level (feet)	Lithology Description

5. Well Completion

Date Started(yyyy/mm/dd):	Date Completed (yyyy/mm/dd):
Well Depth: 14 FT	Borehole Diameter: 0 Inches
Casing Type:	Liner Type:
Size OD: 0 Inches	Size OD: 0 Inches
Wall Thickness: 0 Inches	Wall Thickness: 0 Inches
Bottom at: 0 FT	Top: 0 FT Bottom: 0 FT
Perforations from: 0 FT to: 0 FT from: 0 FT to: 0 FT from: 0 FT to: 0 FT	Perforations Size: 0 Inches x 0 Inches 0 Inches x 0 Inches 0 Inches x 0 Inches
Perforated by:	
Seal: from: 0 FT	to: 0 FT
Seal: from: 0 FT	to: 0 FT
Seal: from: 0 FT	to: 0 FT
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Installation Method:	
Fittings Top:	Bottom:
Pack: Grain Size:	Amount:
Geophysical Log Taken: Retained on Files:	
Additional Test and/or Pump Data Chemistries taken By Driller: No Held: 0	Documents Held: 1
Pitless Adapter Type: Drop Pipe Type: Length: FT	Diameter: Inches
Comments:	

6. Well Yield

Test Date (yyyy/mm/dd): 1964/08/01	Start Time: 11:00 AM
Test Method:	
Non pumping static level:	12 FT
Rate of water removal:	Gallons/Min
Depth of pump intake:	0 FT
Water level at end of pumping:	FT
Distance from top of casing to ground level:	Inches

Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recovery
Total Drawdown: 0 FT

If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: 0 Gallons/Min
Recommended pump intake: 0 FT

Type Pump Installed
Pump Type:
Pump Model:
H.P.:
Any further pumptest information?

7. Contractor Certification

Driller's Name:	UNKNOWN DRILLER
Certification No.:	

Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:	0118454
Map Verified:	Not Verified
Date Report Received:	1988/12/01
Measurements:	Imperial

1. Contractor & Well Owner Information

Company Name: UNKNOWN DRILLER		Drilling Company Approval No.: 99999
Mailing Address: UNKNOWN	City or Town: UNKNOWN AB CA	Postal Code:
WellOwner's Name: SOROKA, STEVE	Well Location Identifier:	
P.O. Box Number:	Mailing Address: 11 MIC MAC PL, LETHBRIDGE	Postal Code: T1K 5H6
City:	Province:	Country:

2. Well Location

1/4 or LSD	Sec	Twp	Rge	West of M
SE	33	008	22	4

Location in Quarter
0 FT from Boundary
0 FT from Boundary

Lot Block Plan

Well Elev: FT
How Obtain: Not Obtain

3. Drilling Information

Type of Work: Chemistry
Reclaimed Well
Date Reclaimed: Materials Used:
Method of Drilling: Unknown
Flowing Well: Rate: Gallons
Gas Present: No Oil Present: No

Proposed well use: Domestic
Anticipated Water Requirements/day 0 Gallons

4. Formation Log

Depth from ground level (feet)	Lithology Description

5. Well Completion

Date Started(yyyy/mm/dd):	Date Completed (yyyy/mm/dd):
Well Depth: 0 FT	Borehole Diameter: 0 Inches
Casing Type:	Liner Type:
Size OD: 0 Inches	Size OD: 0 Inches
Wall Thickness: 0 Inches	Wall Thickness: 0 Inches
Bottom at: 0 FT	Top: 0 FT Bottom: 0 FT
Perforations from: 0 FT to: 0 FT from: 0 FT to: 0 FT from: 0 FT to: 0 FT	Perforations Size: 0 Inches x 0 Inches 0 Inches x 0 Inches 0 Inches x 0 Inches
Perforated by:	
Seal: from: 0 FT Seal: from: 0 FT Seal: from: 0 FT	to: 0 FT to: 0 FT to: 0 FT
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Installation Method:	
Fittings Top:	Bottom:
Pack: Grain Size:	Amount:
Geophysical Log Taken: Retained on Files:	
Additional Test and/or Pump Data Chemistries taken By Driller: No Held: 1	Documents Held: 1
Pitless Adapter Type: Drop Pipe Type: Length:	Diameter:
Comments:	

6. Well Yield

Test Date (yyyy/mm/dd): Start Time:
Test Method:
Non pumping static level: FT
Rate of water removal: Gallons/Min
Depth of pump intake: FT
Water level at end of pumping: FT
Distance from top of casing to ground level: Inches

Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recovery

Total Drawdown: FT
If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: Gallons/Min
Recommended pump intake: FT
Type pump installed
Pump type:
Pump model:
H.P.:
Any further pumptest information?

7. Contractor Certification

Driller's Name: UNKNOWN DRILLER
Certification No.:

Water Well Drilling Report

Alberta Environment

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:	0118440
Map Verified:	Field
Date Report Received:	
Measurements:	Imperial

1. Contractor & Well Owner Information

Company Name: UNKNOWN DRILLER		Drilling Company Approval No.: 99999
Mailing Address: UNKNOWN	City or Town: UNKNOWN AB CA	Postal Code:
WellOwner's Name:	Well Location Identifier:	
P.O. Box Number:	Mailing Address:	Postal Code:
City:	Province:	Country:

2. Well Location

1/4 or LSD	Sec	Twp	Rge	Westof M
13	27	008	22	4

Location in Quarter
0 FT from Boundary
0 FT from Boundary

Lot Block Plan

Well Elev: 3075 FT
How Obtain: Estimated

3. Drilling Information

Type of Work: Well Inventory
Reclaimed Well
Date Reclaimed: Materials Used:
Method of Drilling: Unknown
Flowing Well:
Gas Present: No
Rate: Gallons
Oil Present: No
Proposed well use: Unknown
Anticipated Water Requirements/day
0 Gallons

4. Formation Log

Depth from ground level (feet)	Lithology Description

5. Well Completion

Date Started(yyyy/mm/dd):	Date Completed (yyyy/mm/dd):
Well Depth: 25 FT	Borehole Diameter: 0 Inches
Casing Type:	Liner Type:
Size OD: 0 Inches	Size OD: 0 Inches
Wall Thickness: 0 Inches	Wall Thickness: 0 Inches
Bottom at: 0 FT	Top: 0 FT Bottom: 0 FT
Perforations from: 0 FT to: 0 FT from: 0 FT to: 0 FT from: 0 FT to: 0 FT	Perforations Size: 0 Inches x 0 Inches 0 Inches x 0 Inches 0 Inches x 0 Inches
Perforated by:	
Seal: from: 0 FT	to: 0 FT
Seal: from: 0 FT	to: 0 FT
Seal: from: 0 FT	to: 0 FT
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Installation Method:	
Fittings Top:	Bottom:
Pack: Grain Size:	Amount:
Geophysical Log Taken: Retained on Files:	
Additional Test and/or Pump Data Chemistries taken By Driller: No Held: 0	Documents Held: 1
Pitless Adapter Type: Drop Pipe Type: Length: FT	Diameter: Inches
Comments:	

6. Well Yield

Test Date (yyyy/mm/dd): 1964/08/01	Start Time: 11:00 AM
Test Method:	
Non pumping static level:	24 FT
Rate of water removal:	Gallons/Min
Depth of pump intake:	0 FT
Water level at end of pumping:	FT
Distance from top of casing to ground level:	Inches

Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recovery
Total Drawdown: 0 FT

If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: 0 Gallons/Min
Recommended pump intake: 0 FT
Type Pump Installed
Pump Type:
Pump Model:
H.P.:
Any further pumptest information?

7. Contractor Certification

Driller's Name:	UNKNOWN DRILLER
Certification No.:	

Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:	0118437
Map Verified:	Field
Date Report Received:	
Measurements:	Imperial

1. Contractor & Well Owner Information

Company Name: UNKNOWN DRILLER		Drilling Company Approval No.: 99999
Mailing Address: UNKNOWN	City or Town: UNKNOWN AB CA	Postal Code:
WellOwner's Name: LETHBRIDGE COLL #4	Well Location Identifier:	
P.O. Box Number:	Mailing Address:	Postal Code:
City:	Province:	Country:

2. Well Location

1/4 or LSD	Sec	Twp	Rge	Westof M
12	27	008	22	4

Location in Quarter
0 FT from Boundary
0 FT from Boundary

Lot Block Plan

Well Elev: 3075 FT
How Obtain: Estimated

3. Drilling Information

Type of Work: Test Hole
Reclaimed Well
Date Reclaimed: Materials Used:
Method of Drilling: Drilled
Flowing Well:
Gas Present: No
Rate: Gallons
Oil Present: No

Proposed well use: Unknown
Anticipated Water Requirements/day 0 Gallons

4. Formation Log

Depth from ground level (feet)	Lithology Description
317	Glacial Drift
320	Pebbly Shale
326	Blue Soft Shale
329	Coal
330	Shale
337	Gray Silty Sandstone

5. Well Completion

Date Started(yyyy/mm/dd):	Date Completed (yyyy/mm/dd):
Well Depth: 337 FT	Borehole Diameter: 0 Inches
Casing Type:	Liner Type:
Size OD: 0 Inches	Size OD: 0 Inches
Wall Thickness: 0 Inches	Wall Thickness: 0 Inches
Bottom at: 0 FT	Top: 0 FT Bottom: 0 FT
Perforations from: 0 FT to: 0 FT from: 0 FT to: 0 FT from: 0 FT to: 0 FT	Perforations Size: 0 Inches x 0 Inches 0 Inches x 0 Inches 0 Inches x 0 Inches
Perforated by:	
Seal: from: 0 FT Seal: from: 0 FT Seal: from: 0 FT	to: 0 FT to: 0 FT to: 0 FT
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Installation Method:	
Fittings Top:	Bottom:
Pack: Grain Size:	Amount:
Geophysical Log Taken: Retained on Files:	
Additional Test and/or Pump Data Chemistries taken By Driller: No Held: 0	Documents Held: 1
Pitless Adapter Type: Drop Pipe Type: Length:	Diameter:
Comments:	

6. Well Yield

Test Date (yyyy/mm/dd): Start Time:
Test Method:
Non pumping static level: FT
Rate of water removal: Gallons/Min
Depth of pump intake: FT
Water level at end of pumping: FT
Distance from top of casing to ground level: Inches

Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recovery

Total Drawdown: FT
If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: Gallons/Min
Recommended pump intake: FT
Type pump installed
Pump type:
Pump model:
H.P.:
Any further pumptest information?

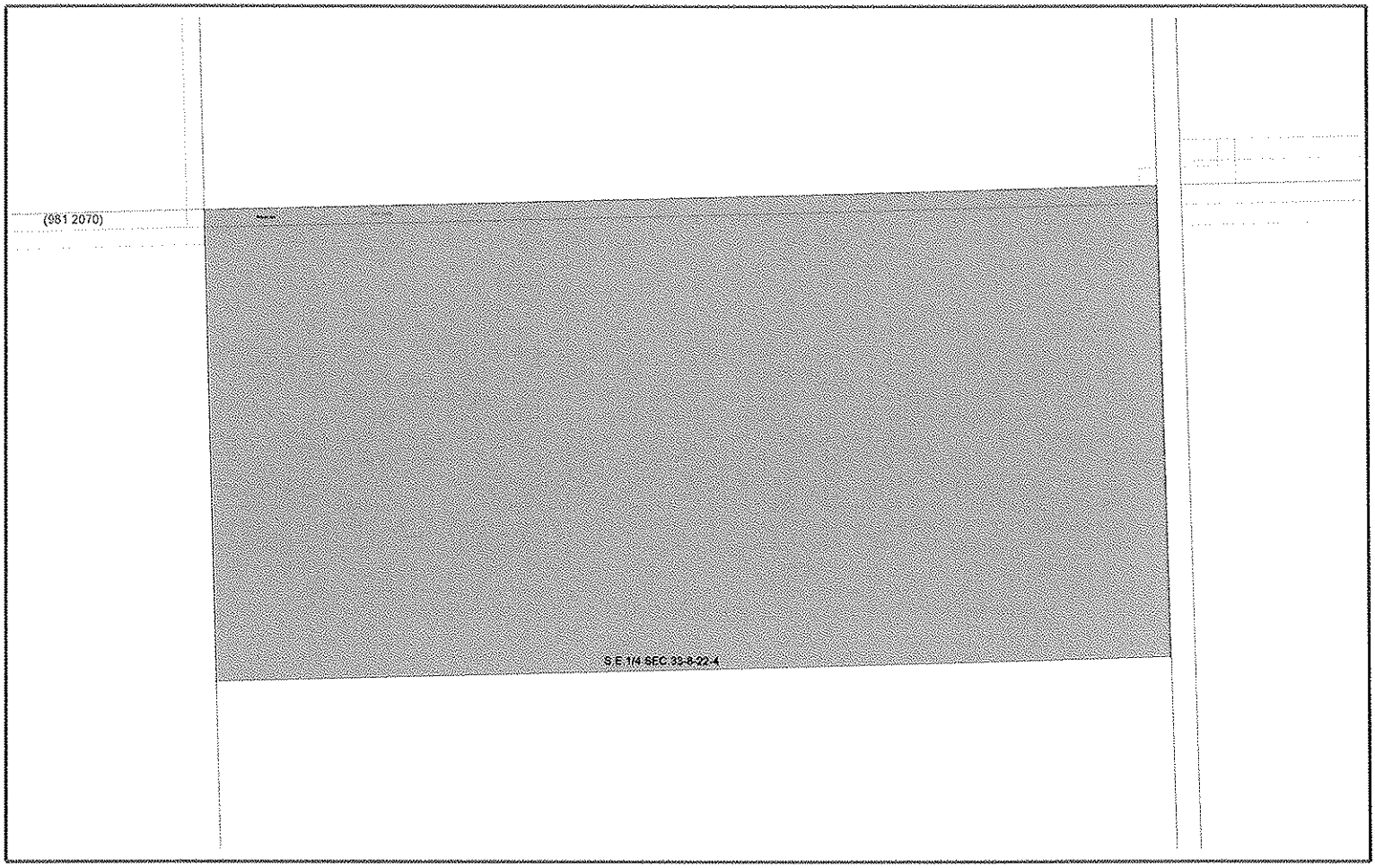
7. Contractor Certification

Driller's Name: UNKNOWN DRILLER
Certification No.:

Alberta Spatial Information System

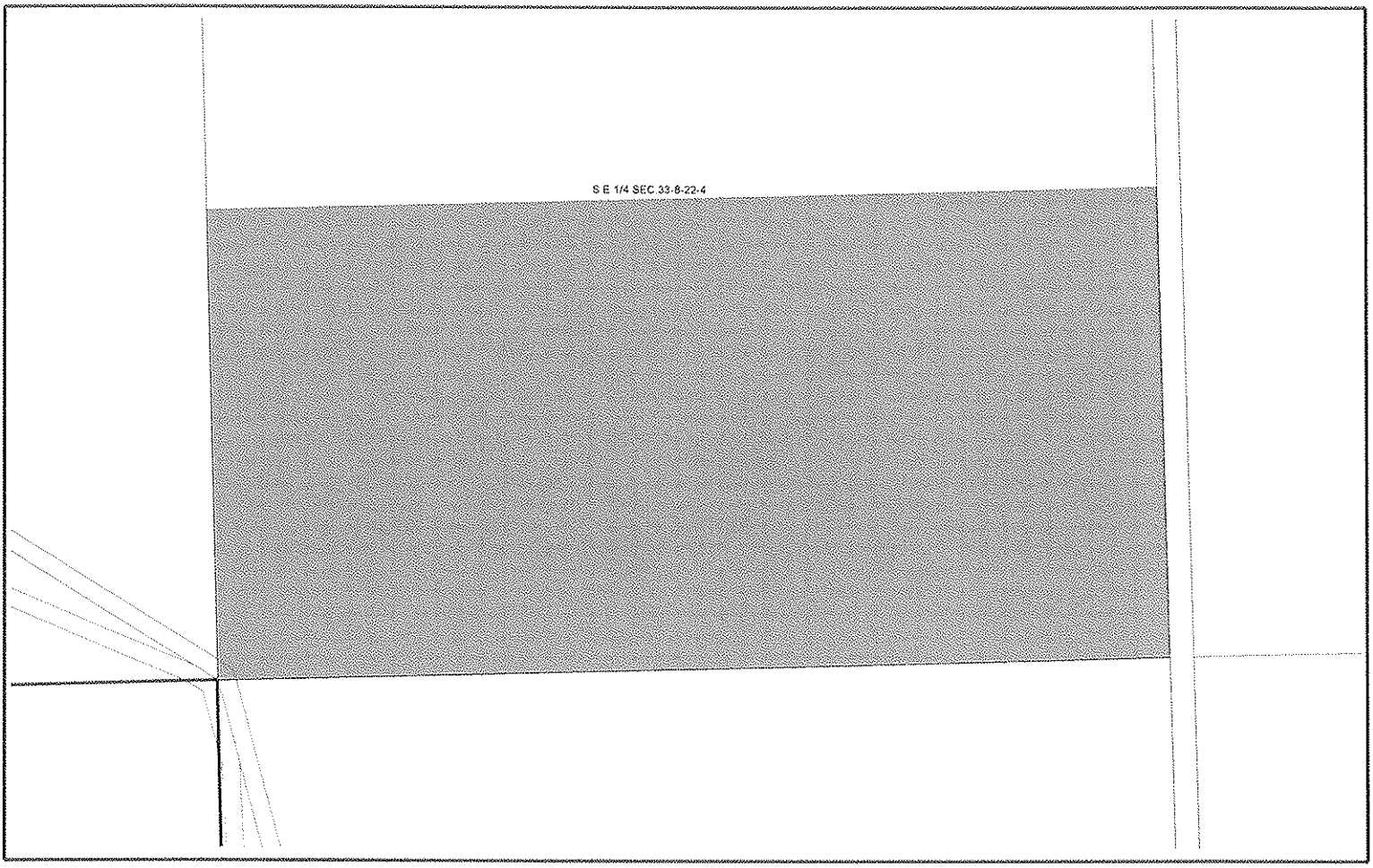
03:03PM Monday November 05, 2007

Alberta Spatial Information System



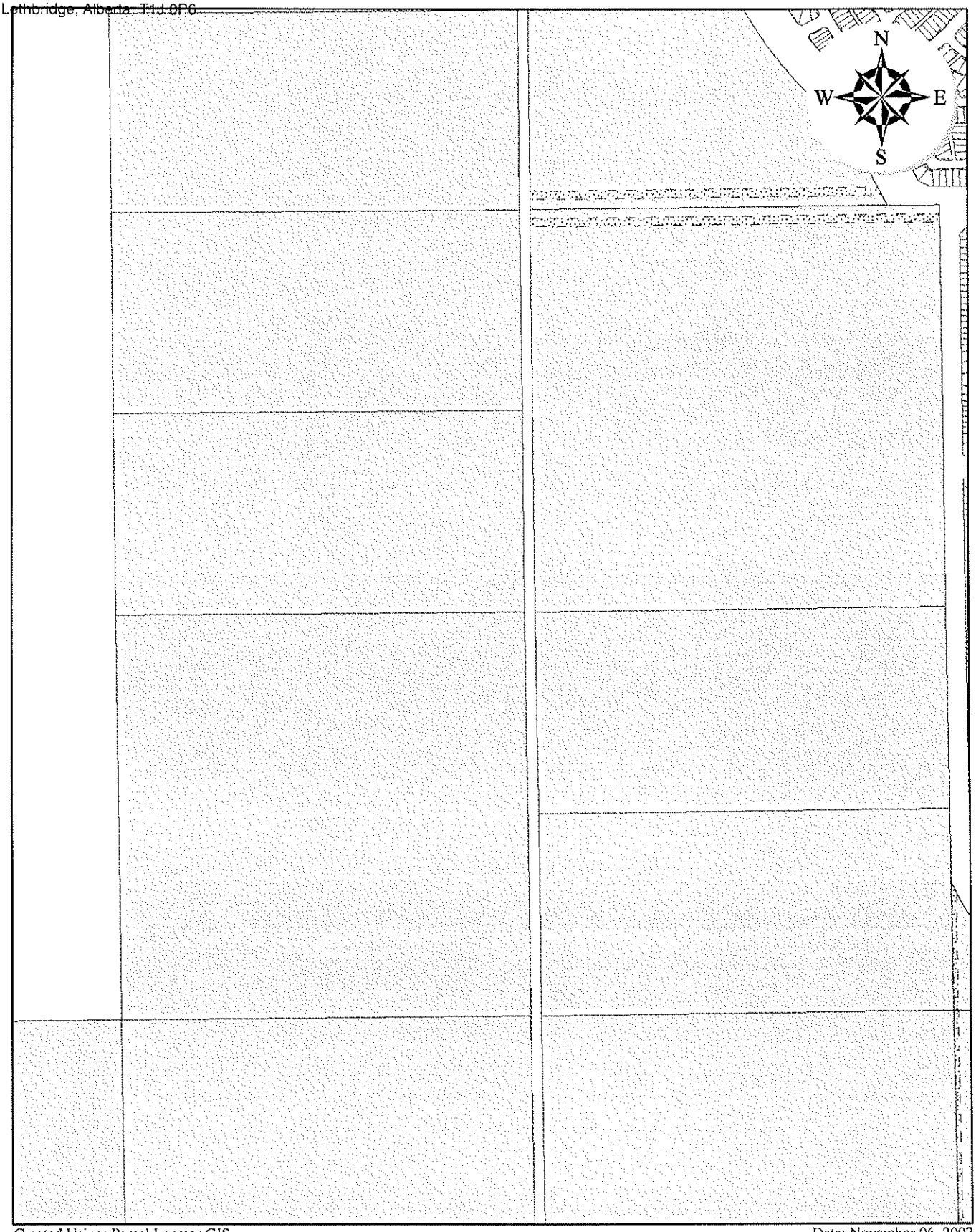
03:07PM Monday November 05, 2007

Alberta Spatial Information System



04:33PM Monday November 05, 2007

CITY OF
Lethbridge
910 - 4 Avenue South
Lethbridge, Alberta T1J 0P6



Created Using: Parcel Locator GIS
Created By: dsc

Date: November 06, 2007

County of Lethbridge

#100, 905 - 4th Avenue South, Lethbridge, Alberta T1J 4E4

F:\USERS\Lorraine\EBA Engineering Ltr 2.doc

November 7, 2007

Mireille Rigaux, B.Sc.
Environmental Scientest
EBA Engineering Consultants Ltd.
442 – 10 Street North
Lethbridge, AB
T1H 2C7

Dear Ms. Rigaux:

Re: N.E. 28-8-22-W4
S.E. 33-8-22-W4
N.W. 22-8-22-W4

Further to your enquiry regarding the above lands, we have no records on them since, as you pointed out, they were annexed by the City of Lethbridge in 1984. Prior to that time the properties in question were zoned and utilized for agriculture.

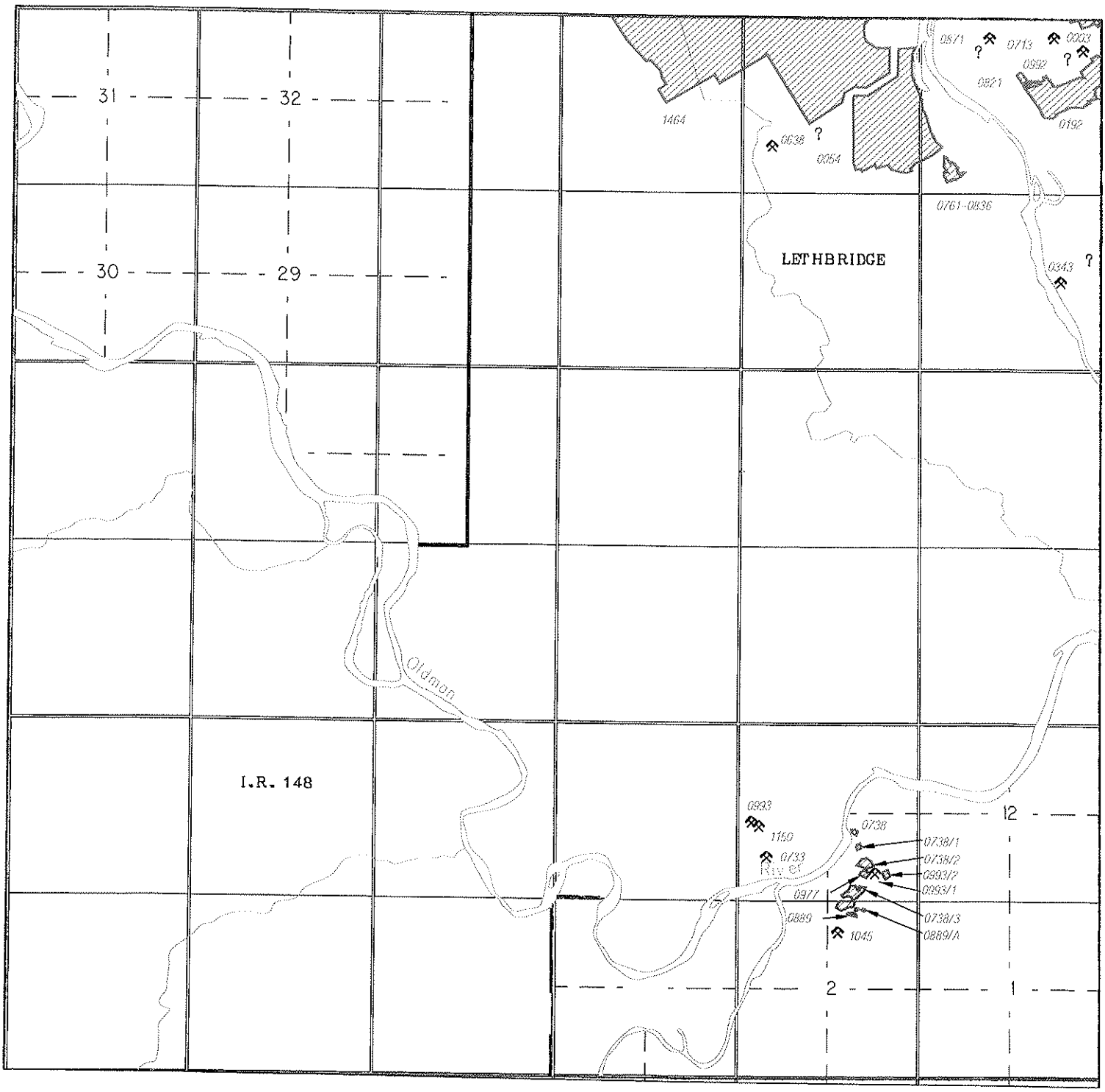
I trust the above is satisfactory.

Yours truly,

Nick Paladino
Supervisor of Planning and Development

/di

Tel: (403) 328-5525 E-Mail: mailbox@county.lethbridge.ab.ca Fax: (403) 328-5602



EUB

ALBERTA COAL MINE LOCATIONS IN

TOWNSHIP 008 RANGE 22 WEST 4 MERIDIAN

REVISION DATE: 29 Nov 2001

?	Mine location uncertain	or	Underground mine
9999	Mine number	or	Surface mine
C99-99	Mine permit number		Mine permit boundary (area currently approved for mining)

kilometres 1 0 1 2 3

miles 1 0 1 2

CAUTION: The abandoned coal mine information represents the best available to the EUB at this time but cannot be guaranteed as to its accuracy.

MAP 400822

EUB DATA | ATTACHED FILES

Close Screen

EUB PIPELINE INFORMATION
CURRENT TO OCTOBER 31, 2007

LICENCE/LINE #:	30255 - 1		**PERMIT DATE:**	APRIL 28, 1997	
ABACUS #:			**LICENCE DATE:**	OCTOBER 28, 1997	
COMPANY:	BONAVISTA OIL & GAS LTD.				
FROM LOCATION:	09-21-008-22 W4M WE		**TO LOCATION:**	05-33-008-22 W4M CS	
LENGTH:	3.33 kms	2.07 mi	**STATUS:**	O	
SUBSTANCE:	NG		**H2S:**	0 mol/kmol	0 ppm
OD:	114.3 mm	4.50 "	**WT:**	3.2 mm	0.13 "
MATERIAL:	S		**TYPE:**	Z245.1	
GRADE:	2901		**MOP:**	4960 kPa	719 psi
JOINTS:	W		**INTL COATING:**	U	
STRESS LEVEL:	31 %		**ENVIRONMENT:**		
ORIGINAL PERMIT DATE:	APRIL 28, 1997		**CONST. DATE:**		
ORIGINAL LICENCE/LINE #:	30255 - 1				

OPTIONS

View Company Info

View Installation Info

View Entire Licence

View Licence Ticket

View Spill Incidents

Highlight Line

Highlight Entire Licence

Print Screen

EUB SPILL INCIDENTS
FOR
LICENCE #: 30255

This Licence number does not have any spills associated with it.

OPTIONS

View Licensee Info

View In Excel

Print Screen

Close Screen

APPENDIX

APPENDIX C ENVIRONMENTAL REPORT – GENERAL CONDITIONS

ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 LIMITATIONS OF REPORT

This report is based solely on the conditions which existed on site at the time of EBA's investigation. The client, and any other parties using this report with the express written consent of the client and EBA, acknowledge that conditions affecting the environmental assessment of the site can vary with time and that the conclusions and recommendations set out in this report are time sensitive.

The client, and any other party using this report with the express written consent of the client and EBA, also acknowledge that the conclusions and recommendations set out in this report are based on limited observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

The client acknowledges that EBA is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the client.

2.1 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of this report, EBA may have relied on information provided by persons other than the client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

3.0 LIMITATION OF LIABILITY

The client recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising out of the presence of those materials. In consideration of these risks, and in consideration of EBA providing the services requested, the client agrees that EBA's liability to the client, with respect to any issues relating to contaminants or other hazardous wastes located on the subject site shall be limited as follows:

1. With respect to any claims brought against EBA by the client arising out of the provision or failure to provide services hereunder shall be limited to the amount of fees paid by the client to EBA under this Agreement, whether the action is based on breach of contract or tort;

2. With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject site, the client agrees to indemnify, defend and hold harmless EBA from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by EBA, whether the claim be brought against EBA for breach of contract or tort.

4.0 JOB SITE SAFETY

EBA is only responsible for the activities of its employees on the job site and is not responsible for the supervision of any other persons whatsoever. The presence of EBA personnel on site shall not be construed in any way to relieve the client or any other persons on site from their responsibility for job site safety.

5.0 DISCLOSURE OF INFORMATION BY CLIENT

The client agrees to fully cooperate with EBA with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The client acknowledges that in order for EBA to properly provide the service, EBA is relying upon the full disclosure and accuracy of any such information.

6.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

7.0 EMERGENCY PROCEDURES

The client undertakes to inform EBA of all hazardous conditions, or possible hazardous conditions which are known to it. The client recognizes that the activities of EBA may uncover previously unknown hazardous materials or conditions and that such discovery may result in the necessity to undertake emergency procedures to protect EBA employees, other persons and the environment. These procedures may involve additional costs outside of any budgets previously agreed upon. The client agrees to pay EBA for any expenses incurred as a result of such discoveries and to compensate EBA through payment of additional fees and expenses for time spent by EBA to deal with the consequences of such discoveries.

8.0 NOTIFICATION OF AUTHORITIES

The client acknowledges that in certain instances the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

9.0 OWNERSHIP OF INSTRUMENTS OF SERVICE

The client acknowledges that all reports, plans, and data generated by EBA during the performance of the work and other documents prepared by EBA are considered its professional work product and shall remain the copyright property of EBA.

10.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

APPENDIX D - LETTER FROM ALBERTA COMMUNITY DEVELOPMENT

Alberta
COMMUNITY DEVELOPMENT

Cultural Facilities and
Historical Resources
Heritage Resource Management

Old St. Stephen's College
8820 - 112 Street
Edmonton, Alberta
Canada T6G 2P8
www.cd.gov.ab.ca/hrm

Telephone 780/431-2300
Fax 780/427-5598

August 3, 2004

Project File: 4835-04-134

Mr. Armin Preiksaitis
Armin A. Preiksaitis & Associates Ltd.
#408 The Boardwalk
10310 – 102 Avenue
Edmonton, AB T5J 2X6

Dear Mr. Preiksaitis:

SUBJECT: ARMIN A. PREIKSAITIS & ASSOCIATES LTD.
WEST LETHBRIDGE AREA STRUCTURE PLAN
SECTIONS 21, 22, 23, 27, 28, 33, & 34, TOWNSHIP 8, RANGE 22, W4M
***HISTORICAL RESOURCES ACT* REQUIREMENTS**

The Cultural Facilities and Historical Resources Division ("CFHRD") of Alberta Community Development has completed the review of the WEST LETHBRIDGE AREA STRUCTURE PLAN. **A Historical Resources Impact Assessment is not required.** Therefore, Armin A. Preiksaitis & Associates Ltd. has *Historical Resources Act* clearance for the WEST LETHBRIDGE AREA STRUCTURE PLAN.

HISTORICAL RESOURCES ACT REQUIREMENTS

Pursuant to Section 31 of the *Historical Resources Act*, should any historic resources be encountered during construction activities, please contact George Chalut, Resource Management Planner, Cultural Facilities and Historical Resources Division, Alberta Community Development, 8820 – 112 Street, Edmonton, Alberta, T6G 2P8; telephone at (780) 431-2329 or fax (780) 427-3956. It will then be necessary for the CFHRD to issue further instructions regarding the documentation of these resources. On behalf of the Cultural Facilities and Historical Resources Division, I would like to thank you and officials of the Armin A. Preiksaitis & Associates Ltd. for your continued cooperation in our endeavour to conserve Alberta's past.

Sincerely,

George Chalut
Resource Management Planner
Protection & Stewardship Section

APPENDIX E - LAND USE POPULATION STATISTICS

Outline Plan

Amended June 2024

Trilogy Real Estate Group Inc.

THE PIERS

LAND USE CONCEPT

Associated Engineering

Amended by:
Associated Engineering Alberta Ltd.
#1001, 400 – 4th Ave S
Lethbridge, AB T1J 4E1

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1 LAND USE CONCEPT

1.1 Overview

The purpose of The Piers Outline Plan is to establish a framework for the future subdivision and development of lands within the NE ¼ 28-8-22-4 east of Chinook Trail and South of Garry Drive. The West Lethbridge Phase II Area Structure Plan (ASP) was approved by City Council on May 16, 2005. Based upon the planning principles and objectives within the ASP, this Outline Plan provides more detailed information on land use and their intensity, the location of the elementary school sites, parks, open spaces, and pedestrian and vehicular circulation with The Piers Outline Plan area.

The Piers Outline Plan amendment was prepared to comply with requirements within the adopted West Lethbridge Phase II Area Structure Plan and is consistent with the City of Lethbridge Design Standards 2021 Edition. The purpose of this amendment is to relocate the stormwater management pond to a location that accommodates a natural drainage path and emergency overflow.

The technical analysis supporting The Piers land use concept overview is documented separately in *The Piers Outline Plan Technical Elements* report.

2 LAND USE STATISTICS

Table 2-1 Land Use Statistics

	AREA (ha)	% of GDA
Gross Development Area	**59.87**	
Municipal Reserve – Including:	**5.40**	**9.02**
• *Parks*	*1.75*	*2.92*
• *Separate Elementary School Site*	*1.78*	*2.98*
• *Public Elementary School Site*	*1.87*	*3.12*
Stormwater Management	**3.11**	**5.19**
Public Utility Lot/Walkway	**0.15**	**0.25**
Roadways – Including:	**16.31**	**27.24**
• *Community Entrance Roadway*	*1.09*	*1.82*
• *Major Collector Roadway*	*3.68*	*6.15*
• *Minor Collector Roadway*	*1.06*	*1.77*
• *Local Roadway*	*8.40*	*14.03*
• *Lane*	*2.08*	*3.47*
Total Residential Area	**34.90**	**58.29**

Table 2-2 **Residential Land Uses**

RESIDENTIAL	AREA (ha)	DENSITY (UPH)	TOTAL UNITS	PERSONS/UNIT	AREA POPULATION	% GDA
Low Density Residential	*28.48*	*25*	*712*	*2.9*	*2065*	*47.57*
Medium Density Residential	*2.92*	*75*	*219*	*1.9*	*416*	*4.88*
Swing Site	*3.5*	*75*	*263*	*1.9*	*499*	*5.85*
Total Residential Area	**34.90**	**34.2**	**1194**	-	**2980**	**58.30**

Notes:

1. GDA = Gross Development Area
2. UPH = Units Per Hectare
3. Medium Density Residential (MDR) (37UPH-75UPH) sites may be developed for street-orientated dwelling units, including townhouses, row houses, and multi-family dwellings.
4. Swing Sites (27UPH-75UPH) may be developed for single detached dwellings, semi-detached dwellings, street-orientated dwelling units, or multi-family dwellings. The housing type will be dependent on the City's housing needs and market demand.
5. The upper limit permitted densities of the medium and swing site areas (75UPH) will be used to calculate servicing and traffic impact analysis. The City's Municipal Development Plan requires a minimum of 27UPH for the overall subdivision. This minimum will dictate how many lower limited permitted densities may be used in the MDR (37-75UPH) and Swing Site (27UPH-75UPH) areas, ensuring that >27UPH overall is still achieved.

Table 2-3 **Anticipated Student Generation**

STUDENT GENERATION	ESTIMATED NO. STUDENTS PER DWELLING UNIT	STUDENT GENERATION ESTIMATE
Public School District		
Elementary Age (grades K-5)	0.170	203
Middle School Age (grades 6-8)	0.085	102
High School Age (grades 9-12)	0.113	135
Separate School District		
Elementary/Middle School Age (grades K-9)	0.125	150
High School Age (grades10-12)	0.040	48
Total Students per Area Estimate		**638**

Note:

1. The Estimated No. of Students per Dwelling Unit used to calculate the student generation estimates is from Appendix C Student Generation in the West Lethbridge Phase II ASP.

3 LAND USE DESCRIPTION

3.1 Low Density Residential

Low Density Residential is proposed to be the predominant land use within The Piers Outline Plan, comprising 28.48 ha or 47.57% of the gross developmental area. Low density residential uses will include single detached and semi-detached housing types. Narrow lots are proposed for blocks with rear lane access to provide off-street parking and rear garage access.

Opportunities for secondary suite development in Low Density Residential will be supported on parcels with rear lane access, preferably (but not limited to) corner parcels and not on cul-de-sac bulbs without lane access.

Walk-out basements are proposed in locations primarily adjacent to the stormwater management facilities where the grade is suitable for this method of construction.

It is proposed that all lands designated for low density residential be redistricted from their current designation of Future Urban Development (FUD) before subdivision. The proposed land use concept shown in **Figure 3-1**.

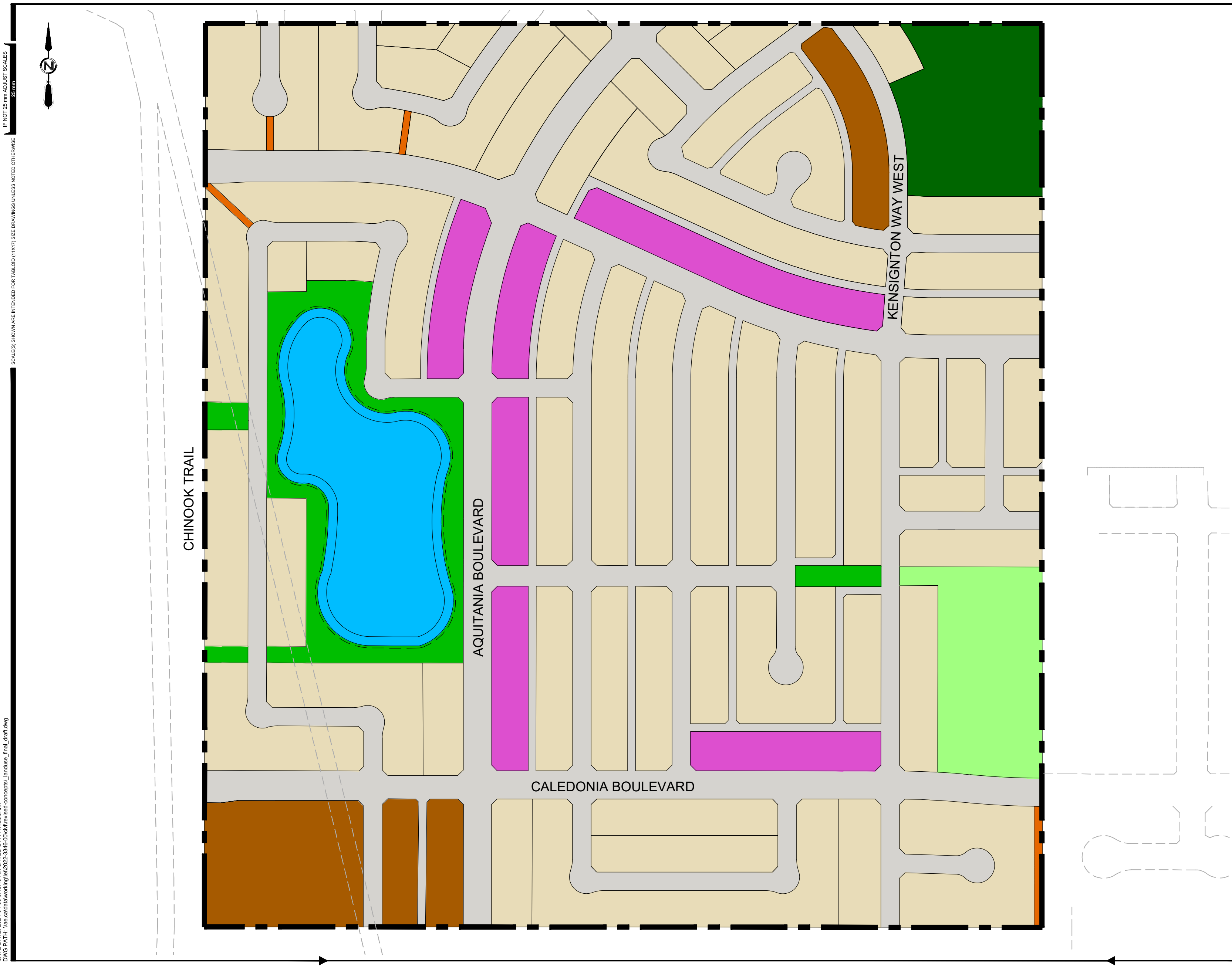
3.2 Medium Density Residential

Medium Density residential developments are proposed to encompass 2.92 ha or 4.88% of the gross development area. Street-oriented housing with rear yard access is anticipated to be the predominant form of housing in this category. The larger block of land in the southwest corner of the plan area along Chinook Trail offers the opportunity to potentially host apartment development. Medium density has been strategically located along higher-order roadways to offer convenient access for commuting and establish a strong street presence in the community. Housing in this category is also situated near future school sites and public greenspaces to offset the reduced private yard space resulting from higher density development.

3.3 Swing Site

Several areas have been identified as Swing Sites, providing flexibility to be developed for either single-detached dwellings or multi-unit dwelling types with rear vehicle access, such as townhouses, duplexes and four-plexes. The Swing Sites provide the opportunity for secondary suites. The location and basis for development of secondary suites will be subject to the regulations established by the City's Land Use Bylaw. The various forms of housing anticipated by this designation all fit well with The Piers and could be made available to respond to the local market demand as the area is built out. These sites are strategically located along collector roads, ensuring convenient access to various modes of transportation, and facilitating connections to green spaces, school sites, trails along Chinook Trail, and other nearby amenities. The use of a swing site designation allows the plan to adjust over time to changing circumstances without necessitating formal plan amendments, allowing development to respond rapidly to market demands and priorities.

Figure 3-1 Land Use Concept



Associated Engineering

BEST MANAGED COMPANIES
Platinum member

OUTLINE PLAN STATISTICS

THE PIERS	HECTARE	% OF GDA
GROSS DEVELOPABLE AREA	59.87	
NON-CREDIT MUNICIPAL RESERVE	**0.15**	**0.25**
PARKS AND OPEN SPACE		
PARKS	1.75	2.92
SEPARATE ELEMENTARY SCHOOL SITE	1.78	2.98
PUBLIC ELEMENTARY SCHOOL SITE	1.87	3.12
SUM OF PARKS AND OPEN SPACE	**5.40**	**9.02**
STORM WATER MANAGEMENT	**3.11**	**5.19**
ROADWAYS	**16.31**	**27.24**
RESIDENTIAL		
LOW DENSITY	28.48	47.57
MEDIUM DENSITY	2.92	4.88
SWING SITE	3.50	5.85
SUM OF RESIDENTIAL	**34.90**	**58.29**

FIGURE 1 - OULINE PLAN
LAND USE CONCEPT

THE PIERS

CIVIL
PLAN

AE PROJECT No.	2022-3258
SCALE	1:1000
APPROVED	B CRAWFORD
DATE	2024APR29
REV	A
DESCRIPTION	ISSUED FOR AMENDMENT

3.4 Parks and Open Space

Two elementary school sites are planned that will serve the surrounding neighbourhoods. Both proposed sites straddle adjacent neighbourhoods and require a partial dedication. The separate school site requires the dedication of 1.78 ha whereas the proposed public school site will require the dedication of 1.87 ha from The Piers. The two elementary school sites will provide park spaces to support active and passive recreation in The Piers.

The two trailheads connecting to Chinook Trail will provide pedestrians, cyclists, and other non-vehicular modes of transportation with a welcoming entrance into the Piers with soft and hard landscaped features along a pathway.

One linear park (0.14 ha) is located in the eastern portion of the plan area. It connects to a future separate elementary school site that will include soft landscaped features and a pathway for pedestrians, cyclists, and other non-vehicular modes of transportation to the school site.

The stormwater management facility will provide functional and attractive open space to The Piers Neighbourhood.

Cash-in-lieu will be made in place of a shortfall in municipal reserve dedication.

3.5 Future Land Recapture

It is understood that the existing Tamarack Gas Line located within the future Chinook Trail right-of-way (ROW) is expected to be abandoned and realigned (or removed) in the future. This future realignment/removal and additional infrastructure planning, including deep and shallow utilities, may reduce the Chinook Trail right-of-way requirements. If the realignment of the Tamarack Gas Line and other utility requirements leads to a reduced ROW requirement for Chinook Trail, the Piers would be able to recapture the additional land and plan for it as a part of the development area.

APPENDIX F - TRANSPORTATION IMPACT ASSESSMENT

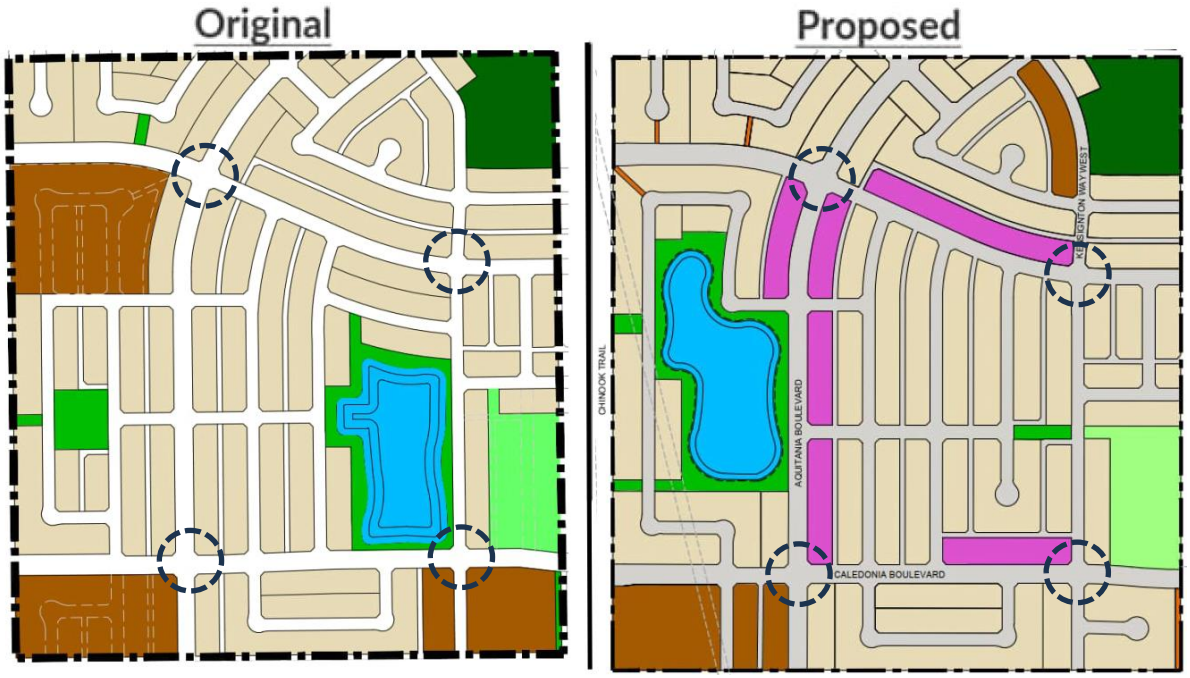
Date:	May 14, 2024	**File:**	2022-3346
To:	Adam St. Amant	**Page:**	Page 1 of 6
From:	Breanna Jackson, P.Eng		
Project:	Trilogy Real Estate Group Inc.		
Subject:	The Piers Traffic Impact Study Update Scope		

1 OVERVIEW

The Piers Traffic Impact Study (TIS) was completed in 2017 to support the 2017 submission of the Piers Outline Plan (OLP). Since the submission of the OLP, there have been adjustments to the concept plan and a new layout has been proposed. Updating the traffic use and trip generation has resulted in a small reduction in development traffic, and therefore little impact on overall traffic volumes. For the purpose of the proposed land use plan, a new TIS is not required and we recommend maintaining the 2017 TIS. This memo will review the changes between the 2017 land use plan and the current proposed plan with respect to trip generation.

The land use plan was changed to address stormwater details, but the goal was to minimize changes to existing road network and land-use blocks. The land use changes have resulted in a small decrease in developable area from 58.66 ha to 58.29 ha. Overall, there have not been significant changes to the road network, and the key intersections reviewed in the 2017 TIS have not changed.

Figure 1-1 shows the original plan compared to the updated plan.



In 2022, a study was completed for an elementary school located northeast of the Piers. The Garry Station Elementary School Traffic Impact Assessment (2022) reviewed additional traffic through the Piers due to the proposed elementary school.

2 LAND USE CHANGES

The updated land use plan has a reduction in medium density land use and the addition of swing sites. The separate elementary school site is assumed to have 450 students (was previously assessed as a middle school) and an elementary school has been planned in Garry Station adjacent to northeast corner of The Piers. The largest change in areas is due to the relocation of the stormwater pond. Overall there is an increase of 1.34ha residential land use proposed. The low-density land use types are assumed to accommodate 25 units per hectare and the medium density land use types are assumed to 75 units per hectare.

Figure 2-1 shows the change in area, and **Table 2-1** shows the changes in land use between the 2017 plan and the current plan.

Figure 2-1 Land Use Comparison

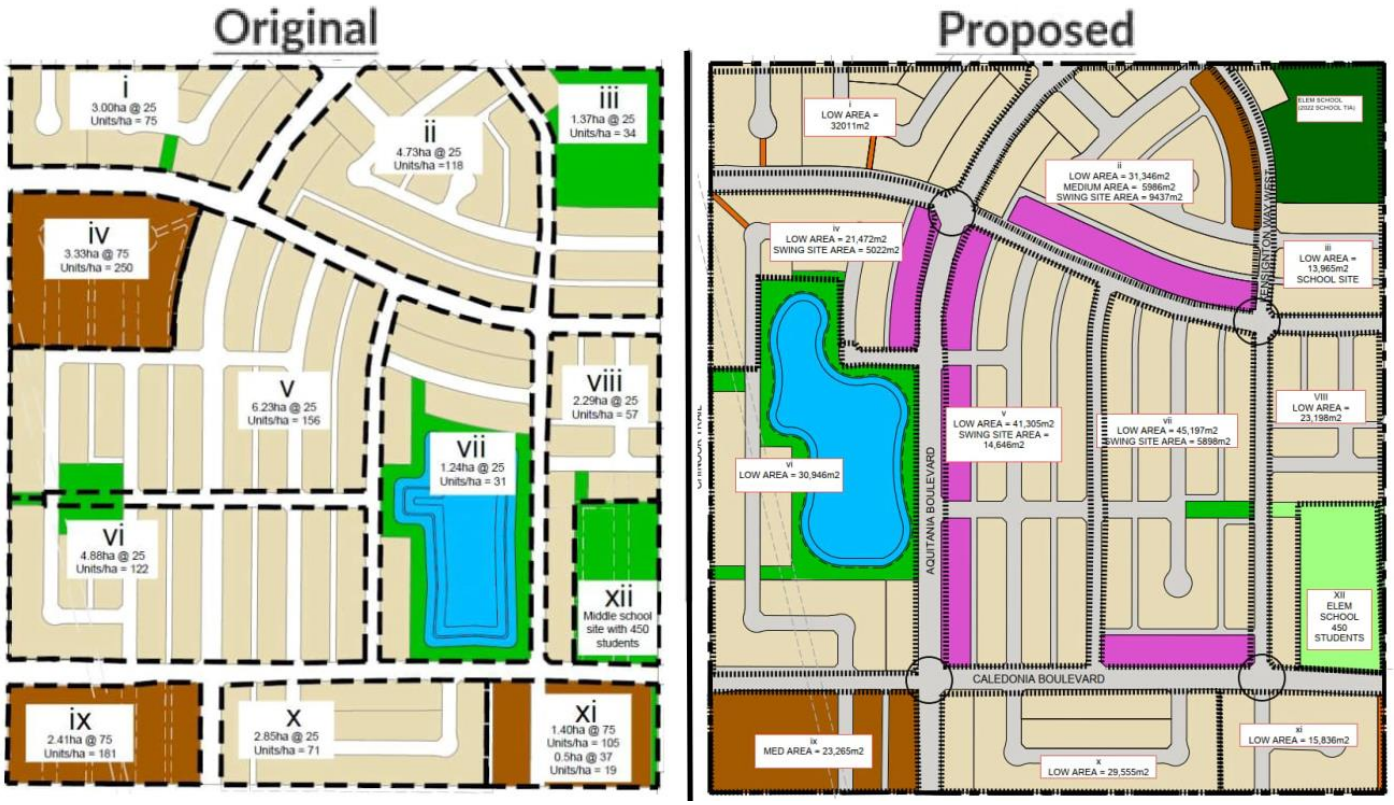


Table 2-1 Land Use Area Change

Zone	2017 ha	2024 ha	Change in Area
zone i	3.00	3.20	0.20
zone ii	4.73	4.68	-0.05
zone iii	1.37	1.40	0.03
zone iv	3.33	2.65	-0.68
zone v	6.23	5.60	-0.63
zone vi	4.88	3.09	-1.79
zone vii	1.24	5.11	3.87
zone viii	2.29	2.32	0.03
zone ix	2.41	2.33	-0.08
zone x	2.85	2.96	0.11
zone xi	1.90	1.58	-0.32
Total	**34.22**	**34.91**	**0.69**

3 TRIP GENERATION ADJUSTMENTS

The 2017 TIS used trip generation rates provided in the City of Lethbridge Traffic Impact Study Guidelines (2008). The current proposed trip generation will continue to reference the CoL guidelines. The swing sites will reference the medium density land use type, and the school reference will be updated from a middle school to an elementary school. **Table 3-1** compares the change in ITE Trip Generation rates.

Table 3-1 Trip Generation Rate Comparison

Land Use Type	ITE TGM9 Code	CoL/TGM 9 Trip Rates AM (PM)	% Trips In/Out AM (PM)	ITE TGM11 Code	CoL/TGM 9 Trip Rates AM (PM)	% Trips In/Out AM (PM)
LOW	N/A	0.77 (1.02)	26/74 (64/36)	N/A	0.77 (1.02)	26/74 (64/36)
MEDIUM	N/A	0.75 (0.92)	29/71 (61/39)	N/A	0.75 (0.92)	29/71 (61/39)
SWING	N/A	N/A	N/A	N/A	0.75 (0.92)	29/71 (61/39)
SCHOOL	522	0.55 (0.30)	55/45 (45/55)	520	0.75 (0.45)	54/46 (46/54)

The analysis for the public school in Garry Station was documented in the 2022 Garry Station Elementary School TIA. Although the school itself is not located within the Piers, traffic generated by the school will be included for consistency with between the two assessments. 20.4% of the traffic generated by the school (Zone iii) will travel through the Piers (approximately 80 vehicles during the AM peak hour and 50 during the PM peak hour).

The following tables summarize the current trip generation volumes, the 2017 trip generation volumes, and the change between the two.

Table 3-2 2024 Proposed Trip Generation

	AM PEAK HOUR			PM PEAK HOUR		
ZONE	TRIPS IN	TRIPS OUT	TOTAL	TRIPS IN	TRIPS OUT	TOTAL
i	16	46	62	52	29	82
ii	37	110	147	116	70	186
iii	50	57	107	45	39	84
iv	18	52	70	56	33	89
v	41	121	162	127	75	202
vi	15	44	60	51	28	79
vii	31	89	120	99	57	156
viii	12	33	45	38	21	59
ix	33	98	131	98	61	159
x	15	42	57	48	27	75
xi	8	23	30	26	15	40
xii	128	108	235	65	77	142

Table 3-3 2017 Trip Generation

	AM PEAK HOUR			PM PEAK HOUR		
ZONE	TRIPS IN	TRIPS OUT	TOTAL	TRIPS IN	TRIPS OUT	TOTAL
i	15	43	58	49	27	76
ii	24	67	91	77	43	120
iii	7	19	26	22	13	35
iv	55	133	188	140	90	230
v	31	89	120	102	57	159
vi	24	70	94	79	45	124
vii	6	18	24	20	12	32
viii	11	33	44	37	21	58
ix	39	97	136	102	65	167
x	14	41	55	46	26	72
xi	27	66	93	70	44	114
xii	135	110	245	61	72	133

Table 3-4 Net Change in Trips

	AM PEAK HOUR			PM PEAK HOUR		
ZONE	TRIPS IN	TRIPS OUT	TOTAL	TRIPS IN	TRIPS OUT	TOTAL
i	1	3	4	3	2	6
ii	13	43	56	39	27	66
iii	43	38	81	23	26	49
iv	-37	-81	-118	-84	-57	-141
v	10	32	42	25	18	43
vi	-9	-26	-34	-28	-17	-45
vii	25	71	96	79	45	124
viii	1	0	1	1	0	1
ix	-6	1	-5	-4	-4	-8
x	1	1	2	2	1	3
xi	-19	-43	-63	-44	-29	-74
xii	-7	-2	-10	4	5	9
Total	**15**	**35**	**51**	**16**	**17**	**32**

Overall, there is a small increase in trips generated during the AM and PM peak hours due to the inclusion of trips generated by the Garry Station school site (Zone iii) only. In total it is expected to add only 50 trips during the AM peak hour, and 30 trips during the PM peak hour. The trips balance in the other zones since the proposed land use plan is very similar to the 2017 plan.

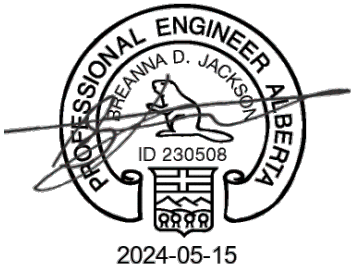
The notable increases are in zones ii, v and vii. Zone ii increase is due to addition of medium density and swing site land uses. Zones v and vii increase due to the relocation of the pond. Similarly the decreases in zones iv and vi are due to the relocation of the pond to these areas. The decrease of trips in zone xi are due to the change from medium density land use to low density land use. Overall the increases and decreases are balanced.

4 NEXT STEPS

Overall, there is a slight increase in traffic due to the traffic generated by the Garry Station School Site. This was previously reviewed as part of the 2022 TIA. The proposed land use plan updates within the Piers produced negligible changes in trip generation. As the results of the 2017 TIS and 2022 TIA will not change significantly, we suggest no changes are warranted to the Piers TIS as this analysis maintains reasonable prediction of traffic and resulting roadway/intersection performance for the proposed land use plan updates.

The updated Outline Plan (OLP) submission, to be provided as a future submission, will include further discussion on pedestrian and cycling connections and traffic calming considerations throughout the development.

Prepared by:



2024-05-15

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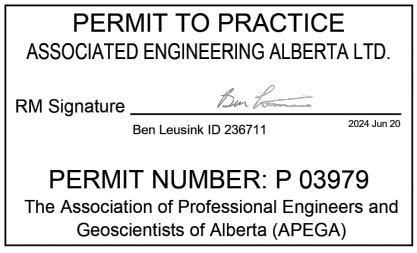

[permit to practice]