

MAR 20160002: PELICAN

A report on Sandstone exploration on the Pelican property near Wabasca.

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20160002

877384 ALBERTA LTD.

**2013 & 2015 EXPLORATION AND FIELDWORK
ON THE PELICAN FRAC SAND PROPERTY
METALLIC AND INDUSTRIAL MINERALS PERMIT,
NORTHEAST ALBERTA**

PART B

Metallic and Industrial Minerals Permit
9313120356 to 9313120376 and 9314010266 to 9314010271
Geographic Coordinates

55°50' N to 56°46' N
111°25' W to 112°50' W

NTS Sheets
074D/5-6, 083P/15-16, 084A/1-2, 084A/6-7, 084A/9-10 and 084A/15

Owner and Operator: 877384 Alberta Ltd.
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Consultant: Dahrouge Geological Consulting Ltd.
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Date Submitted: January 19, 2016

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1. SUMMARY

During November 2013, October 2015 and December 2015, two geologists from Dahrouge Geological Consulting Ltd. ("Dahrouge") carried out a preliminary exploration program on the Pelican Frac Sand Property (the "Property") Metallic & Industrial Minerals Permits No. 9313120356 to 9313120376 and 9314010266 to 9314010271.

Outcrops were mapped and 10 samples were collected at 10 separate locations. Several samples were examined under a microscope.

2. INTRODUCTION

The 2013 and 2015 exploration within the Pelican Frac Sand Property was conducted by Dahrouge, on behalf of 877384 Alberta Ltd. (877384). This assessment report describes the exploration conducted within MAIM Permits 9313120356 to 9313120376 and 9314010266 to 9314010271, owned by 877384, which straddle the Athabasca River in northeastern Alberta.

The objectives of the 2013 and 2015 exploration were to locate and better define sandstone units exposed on the banks of Athabasca River that could be favorable for use as hydraulic fracturing sand. This report includes information on the geology and quality of sandstones encountered during the mapping and sampling of outcrops within the permit area.

3. GEOGRAPHIC SETTING AND ACCESS

3.1. LOCATION AND ACCESS

The permits held by 877384 Alberta Ltd. for the Pelican Frac Sand Property straddle the Athabasca River as to turns east towards Fort McMurray (Fig. 3.1). The Property is located between Fort McMurray and Wabasca and stretches approximately 110 km in a north-south direction.

The Property lies on the border between the Lower Peace and Lower Athabasca Land Use Framework. The permits fall within the Lac La Biche County, Regional Municipality of Wood Buffalo and the M.D. of Opportunity No. 17. The forestry management units that encompass the Property are L3, A14 and A15.

Alberta primary highway 63 is located between 1 and 60 km east of the Property and parallels its length north to south. No public roads provide direct access to the Property. Access is by Snowmobile/ATV in the winter or by helicopter year-round.

Steep bluffs and cliffs supported by sandstones along both sides of the river reduce access to outcrops from above.

3.2. INFRASTRUCTURE

Accommodations, food, fuel and other necessary services are available in Fort McMurray. The local economy is primarily based on forestry and energy-based industries. Fort McMurray is situated near the Athabasca Oil Sands.

Fort McMurray, with a population of over 70,000, is 435 km (approximately 4.5 hours) northeast of Edmonton, following Highway 28 northeast for 75 km to Highway 63, then north on Highway 63 for 360 km to Fort McMurray. Fort McMurray has an international airport and CN rail network which service the surrounding areas.

3.3. TOPOGRAPHY, VEGETATION AND CLIMATE

The Pelican Frac Sand Property permit area lies at 480 to 530 m above sea level in the Northern Alberta Lowlands. The Athabasca River is at an elevation of 450 m at the south end of the Property, and 350 m at the north end of the Property with steep bluffs and cliffs up to 100 m high.

Most of the permit area is included in the Central Mixedwood Natural Subregion. This region is characterized by gently undulating plain and hummocky uplands. Drainage uplands comprise a majority of the area. Glaciolacustrine, glaciofluvial and eolian material can be found through the region. Cretaceous sandstone and shales are the dominant bedrock type in the region. Incision by the Athabasca River exposes Cretaceous, and in some parts upper Devonian material.

The vegetation is primarily mixed aspen-dominated trees with white spruce and jack pine. The understories consist of low bushed cranberry, rose, green alder, Canada buffaloberry, hairy wild rye, bunchberry, wild sarsaparilla, and dewberry. Over half of the area is composed of poorly drained bogs and fens. Grasslands are rare, but do occur in patches with jack pine that are well drained.

The area is characterized by cool, short summers with moderate to high amounts of growing degree-day accumulations and long, cold winters. The mean annual temperature can range from -24° C to 33° C, with the average annual temperature just above 0° C. The mean annual precipitation is approximately 480 mm, with peak precipitation in June and July.

3.4. FIELD OPERATIONS

Field operations in 2013 were conducted by a two-person geological crew from Dahrouge, based out of a hotel in Fort McMurray, Alberta. Transportation to and from the Property was by helicopter.

During October 2015, a two day operation based out of a hotel in Athabasca, Alberta was conducted by a two-person crew from Dahrouge using truck and ATV. This was primarily to assess ground access to the Property. A further single day field operation was conducted by a two-person crew from Dahrouge in December 2015, using a truck and snowmobile.

Garmin GPSmap 60CSx and 64S instruments were used to mark sample locations and record access information. Compasses were set at a magnetic declination of 15°8' and 14°38' east respectively.

4. PROPERTY, EXPLORATION AND EXPENDITURES

4.1. PROPERTY SUMMARY

In December 2013, 877384 Alberta Ltd. acquired MAIM Permits 9313120356 to 9313120376, southwest of Fort McMurray, Alberta. In January 2014, 877384 Alberta Ltd. acquired MAIM Permits 9314010266 to 9314010271, southwest of Fort McMurray, Alberta. These permits cover Cretaceous sandstones of the Pelican Formation along the Athabasca River (Fig. 4.1) and total approximately 233,390 hectares in size.

4.2. 2013 EXPLORATION SUMMARY

On November 12th 2013, Dahrouge, on behalf of 877384 Alberta Ltd., conducted exploration for silica sands (with the potential for use as a proppant) within the Pelican Frac Sand property. The work was undertaken to determine the location, quality and extent of sandstone units within the permit area.

Sandstone outcrops were examined along both sides of the river and a total of 4 samples from 4 sites were collected (Fig. 4.2 and 4.3). A further 4 samples from 4 additional sites not on the permit were also collected. Geological observations were recorded, including lithologic information, and other pertinent details (Appendix 2). Samples were reviewed by microscopic examination.

4.3. 2015 EXPLORATION SUMMARY

On October 25th and 26th and on December 19th 2015, Dahrouge, on behalf of 877384 Alberta Ltd., conducted exploration for silica sands (with potential for use as a proppant) within the Pelican Frac Sand Property. The work was undertaken to follow up on reconnaissance carried out during the 2013 program and to sample an exposure highlighted by aerial imagery.

A sandstone outcrop on the eastern bank of the river was examined and 2 samples collected (Fig. 4.4). Geological information was recorded, including lithologic information, and other pertinent details (Appendix 2).

4.4. EXPLORATION EXPENDITURES

Expenditures for 2013 and 2015 totaled \$37,783.33 (including 10% administration cost) (Appendix 1). The Pelican Frac Sand Property (MAIM Permits 9313120356 to 9313120376 and 9314010266 to 9314010271) reached its renewal date on December 20, 2015, and hence these expenditures will extend the new expiry date to December 20, 2017. A reduction in the total area of the permit to 7,424 ha is proposed, dropping land in areas of thick overburden and poor access (Table 4.1).

Table 4.1: Land to Retain

MAIM Permit	Township	Land to Retain	Area to Retain
9313120356	4-17-079	29-32	1,024 ha
9313120356	4-17-080	5-6, 8-9, 16, 21, 28, 33	2,048 ha
9313120356 9313120357 9313120358	4-17-081	4-5, 8-10, 15-16, 21-22, 28, 33	2,816 ha
9313120358	4-17-082	2-4, 11, 14, 23	1,536 ha
		Total Area :	7,424 ha

Expenditures are allocated to the proposed reduced area of MAIM permits 9313120356 to 9313120358 as follows:

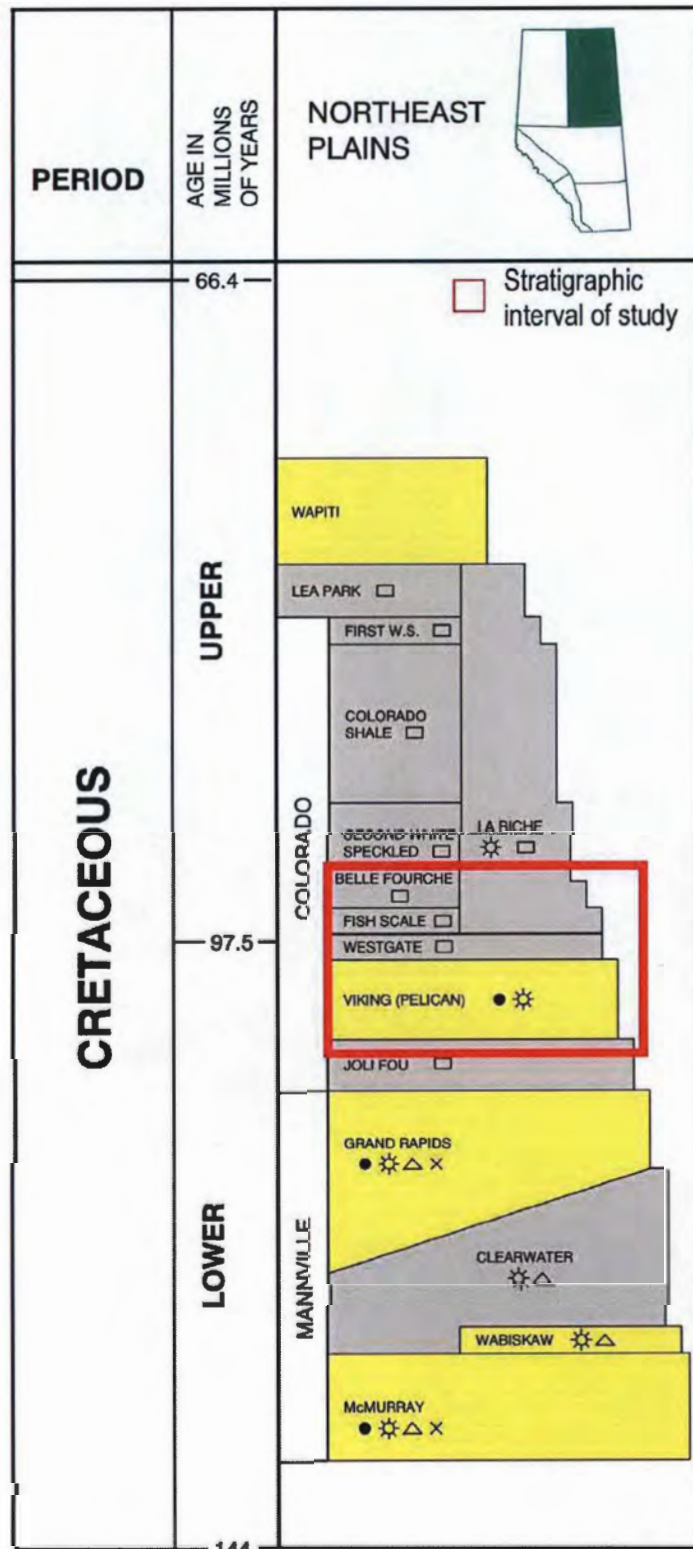
Table 4.2: Expenditures and Expiry Date

Agreement	Record Date	Original Size (ha)	Reduced Size (ha)	Due per (ha)	Required Spending	Expenditures	Excess Expenditures	Term Expiry
9313120356	Dec. 20, 2013	9216.0	3840.0	\$5.00	\$19,200	\$19,200	\$663.33	Dec. 20, 2027
9313120357	Dec. 20, 2013	9216.0	512.0	\$5.00	\$2,560	\$2,560	-	Dec. 20, 2027
9313120358	Dec. 20, 2013	9216.0	3072.0	\$5.00	\$15,360	\$15,360	-	Dec. 20, 2027

5.**REGIONAL GEOLOGY****5.1. STRATIGRAPHY**

The Pelican Frac Sand Property lies within the eastern margins of the Western Canadian Sedimentary Basin. The lower Cretaceous Colorado Group is exposed in the Athabasca river valley within the Property. In this area, the Colorado Group is composed of the Joli Fou Formation at the base, followed by the Pelican Formation above, and capped by the Westgate Formation (Table 5.1, Fig. 5.1).

Table 5.1: Generalized Stratigraphy of Northeastern Alberta



*Adapted Hay (2012)

5.1.1. Joli Fou Formation

The Joli Fou Formation is the basal unit of the Colorado Group and overlies the Grand Rapids Formation of the Mannville Group.

Formed in an offshore marine environment, the Joli Fou formation consists of dark grey shale, with minor interbedded fine- and medium-grained sandstone. In the upper part of the unit, near the Pelican Formation contact, it contains shaly quartzose and micaceous sandstones several centimetres thick.

The Joli Fou Formation is widespread throughout Western Canada. In the Athabasca River exposure it is about 33.5 m thick, in the Redwater area it is 16.8 m thick, and south of Lesser Slave Lake it thins to 10.7 m. It pinches out in the Rocky Mountain Foothills of southern Alberta.

5.1.2. Pelican Formation

The Pelican Formation overlies the Joli Fou Formation on an erosional surface. It consists of a relatively well washed and variably shaly, fine- to medium-grained glauconitic sandstone, with interbedded siltstone, mudstone, conglomerate and pebbly sandstone formed in a shoreface marine environment. The sandstones are cross-laminated and contain minor intercalations of shale and mudstone. Chert pebbles are abundant in conglomeritic layers which occur near the top of the unit. Coalified plant fragments are locally abundant. The main lithologies are arranged in coarsening upwards sequence.

The formation is widespread throughout northern Alberta and is on the order of 12.2 m thick.

5.1.3. Westgate Formation

The upper Albian aged Westgate Formation conformably overlies the Pelican Formation in northeastern Alberta. It is a dark gray to black, organic-rich, non-calcareous, finely laminated mudstone showing blocky fractures on weathered surfaces. Sulphur staining is common, especially along fractures and cone-in-cone calcite structures can also be observed. Fish scales are present but rare. The unit is about 20 m thick with the top drawn at the base of the Fish Scales Zone of the Belle Fourche Member.

5.2. STRUCTURE

There are no structures mapped within the Pelican Frac Sand project area.

6.

RESULTS

One day was spent sampling sandstone outcrops in November 2013 and was followed up by another day of sampling in December 2015. A further two days were spent assessing access to the Property in October 2015. The exploration concentrated on identifying stratigraphic units and contacts, and locating favorable horizons for potential hydraulic proppants for follow-up exploration.

Sandstones of the Pelican Formation were examined and sampled within MAIM Permits 9313120356, 9313120367, 9313120368, and 9313120371, along both banks of the Athabasca River in northeastern Alberta (Fig. 4.2 to Fig. 4.4). A total of 10 locations were examined with a total of 10 samples taken (Appendix 2). After microscope examination, it was decided not to send these samples for further analysis (Fig. 6.1 and 6.2).



Figure 6.1: Sample 82240

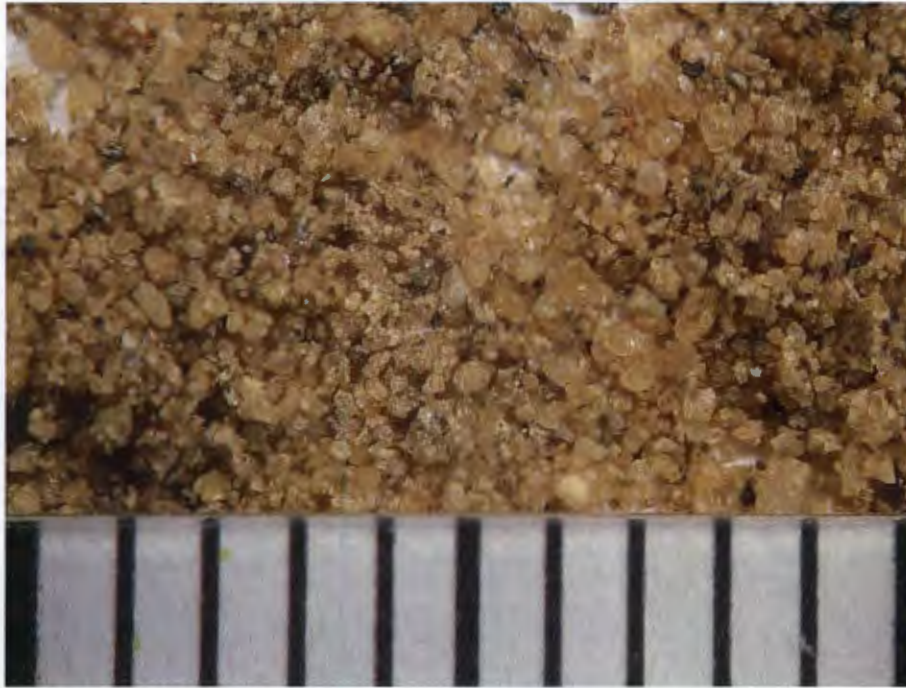


Figure 6.2: Sample 82242

7.

CONCLUSIONS

Sandstone of the Pelican formation was examined and sampled along the Athabasca River south of Fort McMurray, within MAIM Permits 9313120356, 9313120367, 9313120368, and 9313120371. A total of 10 discrete intervals were sampled and described in detail. Based on the samples collected and units mapped during the 2013 and 2015 exploration, along with overall property assessment, only a small portion of the Property will be retained (7,424 ha) dropping land in areas of thick overburden and poor access.

Currently, access to the Property is limited. In summer access is restricted to helicopter or Argo. In winter it is additionally possible to use snowmobiles or quads to access some of the Property using seasonal oil/forestry roads but access to the sandstone cliffs is still challenging. The steepness of cliffs frequently prevents systematic sampling, particularly of the upper part of the Pelican Formation below the Westgate.

Samples indicate that sands along this part of the Athabasca River in the Pelican Formation have lower than optimal silica content, poor sorting, and contain coalified plant fragments. An effort should be made sample the full thickness of the Pelican Formation with the potential for improved sand quality in other parts of the Formation. Future exploration should expand on previously conducted work in the area, confirming or redefining past geological

interpretations and determining the potential for quality hydraulic fracturing sand within the permit area.

8.

REFERENCES

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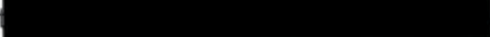
Hay, D.C., Banks, C.J., and Prior, G.J. (2012) Measured Outcrop Sections T79-R17W4-01 (Stony Rapids) and T81-R17W4-01 (Pelican Cliffs) of the Pelican, Westgate, Fish Scales, and Belle Fourche Formations near Stony Rapids, Athabasca River, Northeastern Alberta (NTS 83P/15 and NTS 84A/02). *Energy Resources Conservation Board, Alberta Geological Survey*; ERCB/AGS Open File Report 2012-02.

Leckie, D.A., Bhattacharya, J.P., Bloch J., Gilboy C.F., Norris, B. (1994) Cretaceous Colorado/Alberta Group of the Western Canada Sedimentary Basin; in *Geological Atlas of the Western Canada Sedimentary Basin: G.D. Mossop and I. Shetsen (compilers), Canadian Society of Petroleum Geologists and Alberta Research Council; online version, Chapter 20.*

Stott, D.F. and Aitken, J.D. (1993) Sedimentary Cover of the Craton in Canada; *Geological Survey of Canada, Geology of Canada Series no. 5.*

9.

STATEMENT OF QULIFICATIONS

I, Jody Dahrouge, residing at  do hereby certify that:

I am a geologist of Dahrouge Geological Consulting Ltd., Suite 18, 10509 - 81 Ave. NW, Edmonton, Alberta, T6E 1X7.

I am a graduate of the University of Alberta, Edmonton, Alberta with a B.Sc. in Geology, 1988 and a Special Certificate (Sp.c.) in Computing Science in 1994.

I have practiced my profession as a geologist intermittently from 1988 to 1994, and continuously since 1994.

I am a registered Professional Geologist with the Association of Professional Engineers and Geoscientists of Alberta, member M48123.

I hereby consent to the copying or reproduction of this Assessment Report following the one-year confidentiality period.

I am the author of the report entitled "2013 & 2015 Exploration and Fieldwork on the Pelican Frac Sand Property Metallic and Industrial Minerals Permit, Northeast Alberta" and accept responsibility for the veracity of technical data and results.

Dated this 19th day of January, 2016.



Jody Dahrouge, B.Sc., P.Geol.

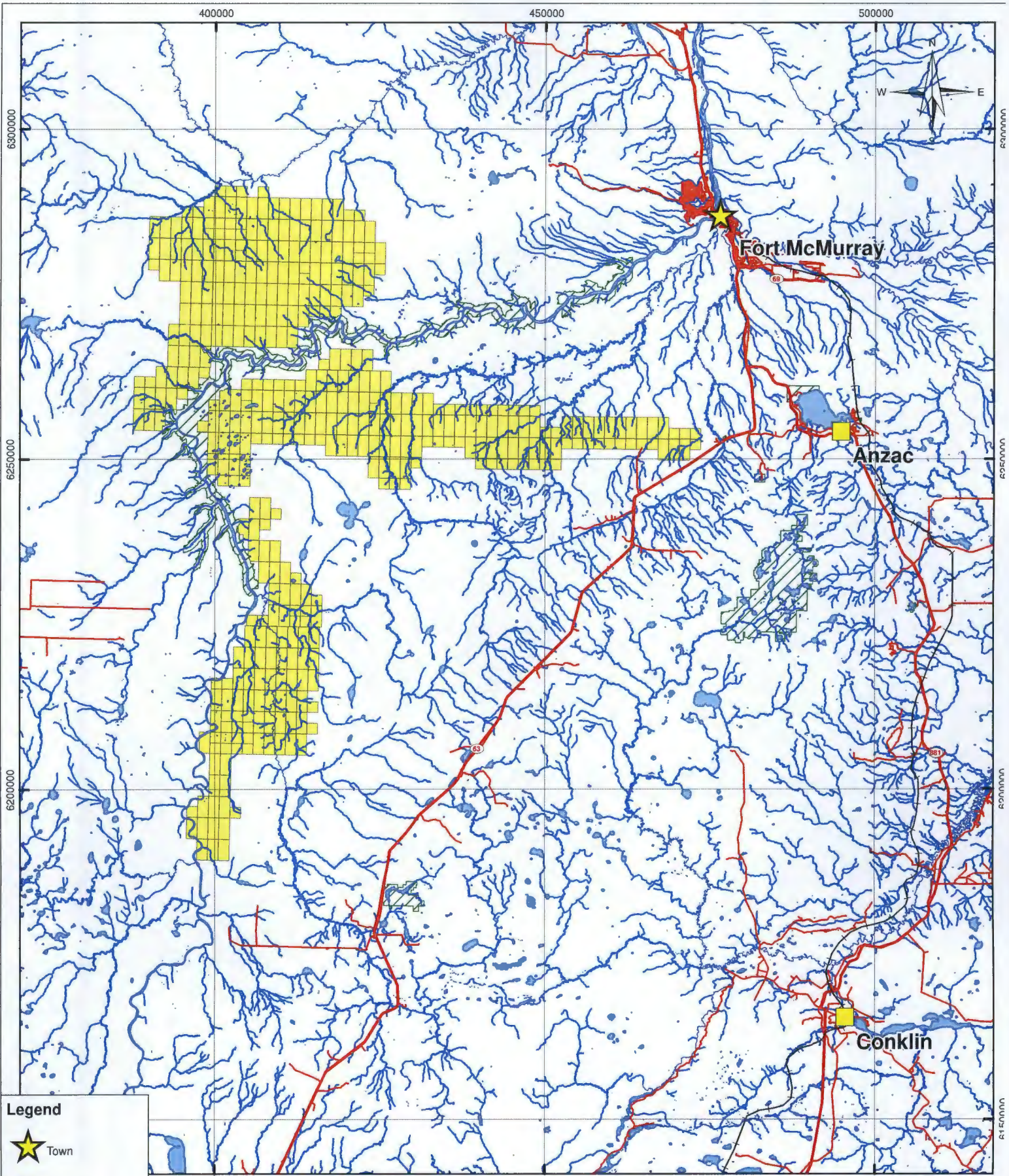
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**APPENDIX 1: COST STATEMENT FOR THE 2013 AND 2015 EXPLORATION WITHIN THE
PELICAN PERMITS**



a) <u>Personnel</u>		\$ 20,737.55
b) <u>Food and Accommodation</u>		\$ 1,048.08
c) <u>Transportation</u>		\$ 11,390.53
d) <u>Instrument Rental</u>		\$ 175.50
e) <u>Drilling</u>	n/a	\$ -
f) <u>Analyses</u>	n/a	\$ -
h) <u>Other</u> (Software Rental, Overhead, Supplies, Courier & Shipping)		\$ 996.82
<u>Total</u>		<u>\$ 34,348.48</u>
<u>Administration (10%)</u>		\$ 3,434.85
<u>Total + Administration</u>		<u>\$ 37,783.33</u>

APPENDIX 2: SAMPLE DESCRIPTIONS




Year Collected	Sample No	Easting	Northing	Sample Type	Depth/Length (m)	Consolidation	Sample Description
2013	82226	528585	6380602	Test Pit	0.3	semi-consolidated	few rounded boulders up to 20cm wide, very mature, rnd-sub rnd, variable grain size (f.g.-m.g.), beige-w color, high qtz content
2013	82227	528614	6380707	Test Pit	1.75	unconsolidated	soft, white, c.g., rnd, well sorted, consistent, mature sand. Trace Fe-grains.
2013	82228	528584	6380700	Test Pit	1.22	unconsolidated	clean, white, m.g.-c.g., uniform sand with few impurities (Fe-grains).
2013	82229	528567	6380741	Test Pit	1	unconsolidated	wet, water saturated, beige-brown, f.g.-m.g., sub rnd-rnd, mature, uniform sand. Few fe-rich impurities.
2013	82230	528634	6380829	Test Pit	-	unconsolidated	white-br, c.g., well rnd, well sorted, mature sand. Few pbis within unit (sub rnd-rnd) but large enough to pick out.
2013	82231	528814	6381187	Test Pit	0.6	unconsolidated	gravely ovbd with common sub rnd-rnd pebbles up to 10cm. Beige brown, sub-rnd sand with high variability in grain size (f.g.-v.c.g.). Poorly sorted, high SiO2 content, few organics
2013	82232	528814	6381187	Test Pit	1.1	unconsolidated	white, f.g.-m.g., well sorted, mature, rnd, homogenous sand. Appears to be almost pure SiO2.
2013	82233	528818	6381320	Test Pit	-	unconsolidated	white-br, c.g.-m.g., very well sorted, rnd, homogenous, mature. Rare organics and pbis within. High SiO2 content.
2013	82234	526982	6378562	Test Pit	1	unconsolidated	f.g., poorly-moderately sorted, sub-rnd, w-br sand with more impurities than previously seen. Clearwater Fm?
2013	82235	529392	6383168	Test Pit	0.4	unconsolidated	white, m.g., well rounded, well sorted, mature, homogenous sand. Rare impurities and organics with mild sucrosic texture in the sun.
2013	82236	529392	6383168	Test Pit	1	unconsolidated	white, m.g.-c.g., well rnd, well sorted, mature, homogenous sand.
2013	82237	529467	6383229	Test Pit	1	unconsolidated	f.g.-c.g., poorly sorted, brown (fe-rich?) sand. Common large pbis (up to 20cm, well rnd).
2015	120726	396485	6193074	Strat	1	consolidated	weathered light brown, fresh light grey to tan, f.g. sand, rusty staining, bedding (10 cm), thin laminations, basal contact on poorly sorted, well rounded conglomerate
2015	120727	396554	6193052	Strat	1.5	consolidated	light brown weathered, brown fresh sand, coal beds, iron beds, poorly sorted, pebbles, cobbles, boulders, wavy bedding




Legend

-  Town
-  Hamlet

Roads

-  Primary Highway
-  Secondary Highway
-  Railway

Land Holdings

-  877384 Alberta Ltd.



1:750,000

Coordinate System: UTM NAD83, Zone 12N

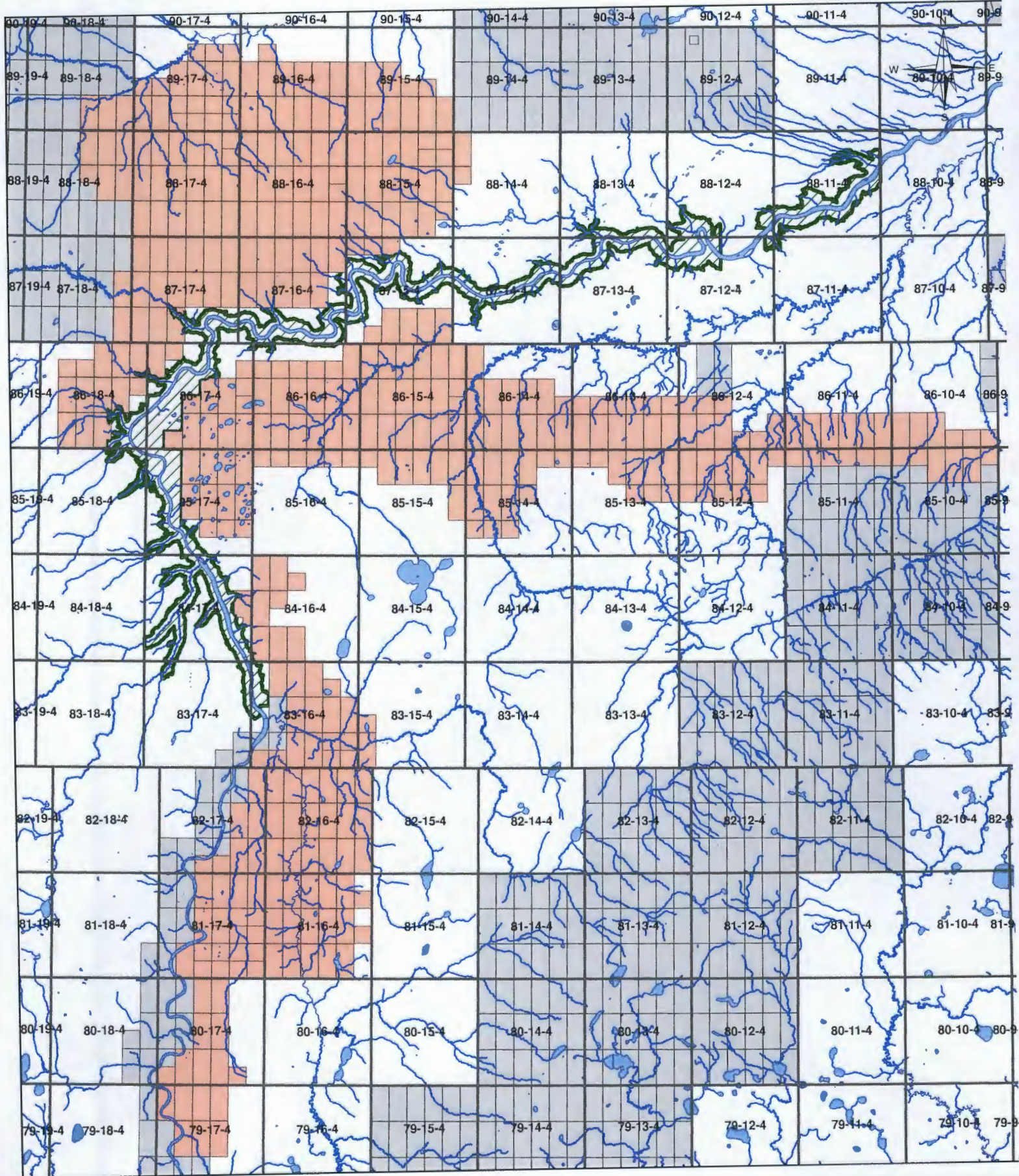
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Edmonton, Alberta




SOUTH OF FORT McMURRAY,
NORTH-EAST ALBERTA

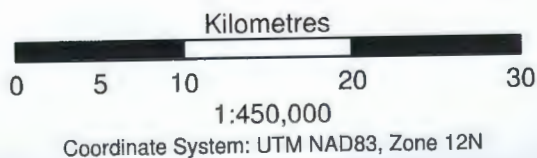
Fig. 3.1
Access Map

HL 2016.C



Legend

-  Protected Areas
- Land Holdings**
-  877384 Alberta Ltd.
-  Others



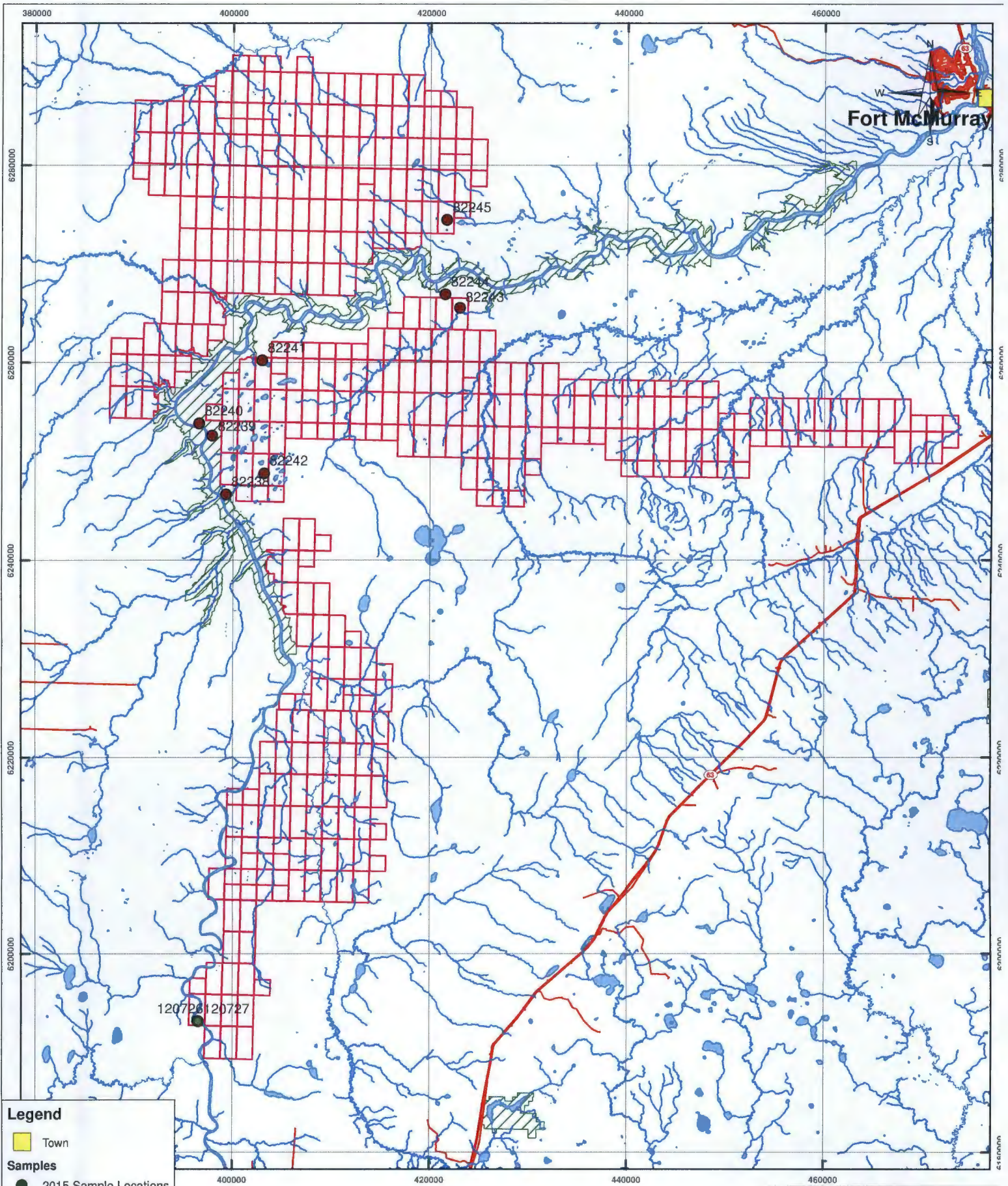
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DG Dahrouge Geological Consulting Ltd.
Edmonton, Alberta

SOUTH OF FORT McMURRAY,
NORTH-EAST ALBERTA

Fig. 4.1
Permit Map

WM 2016.C



Legend

- Town
- Samples**
- 2015 Sample Locations
- 2013 Sample Locations
- Land Holdings**
- Dahrouge
- Roads**
- Primary Highway
- Secondary Highway

Kilometres

0 5 10 20 30

1:500,000

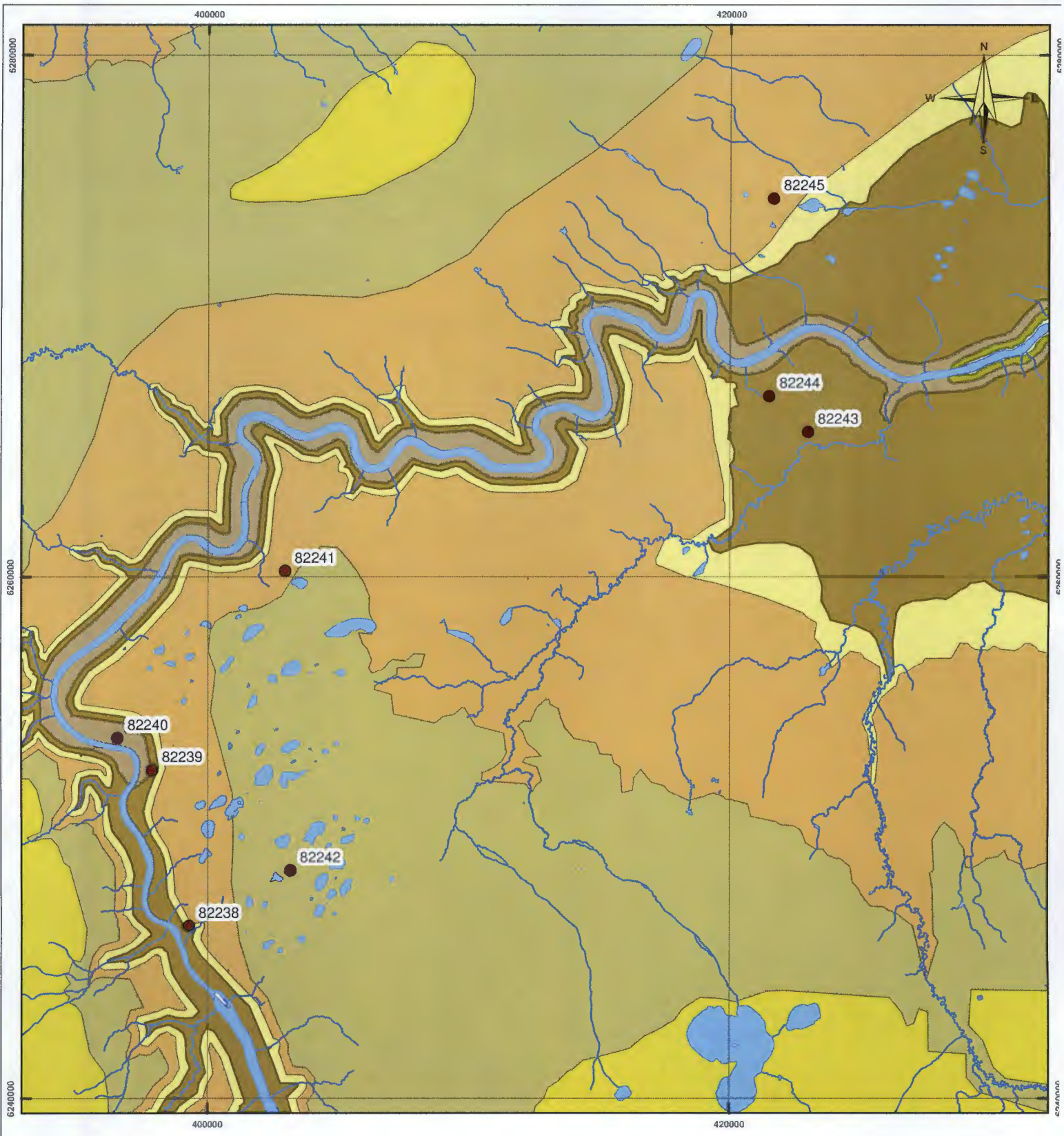
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Fig. 4.2
Sample Location Map

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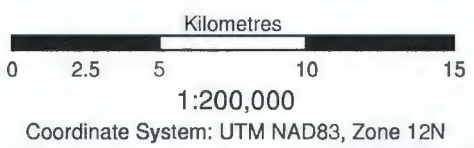
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- 2013 Sample Locations

Surface Geology

Unit Name

- Clearwater Formation
- Fish Scales and Belle Fourche Formations
- Grand Rapids Formation
- Joli Fou Formation
- McMurray Formation
- Pelican Formation
- Wabiskaw Member
- Westgate Formation



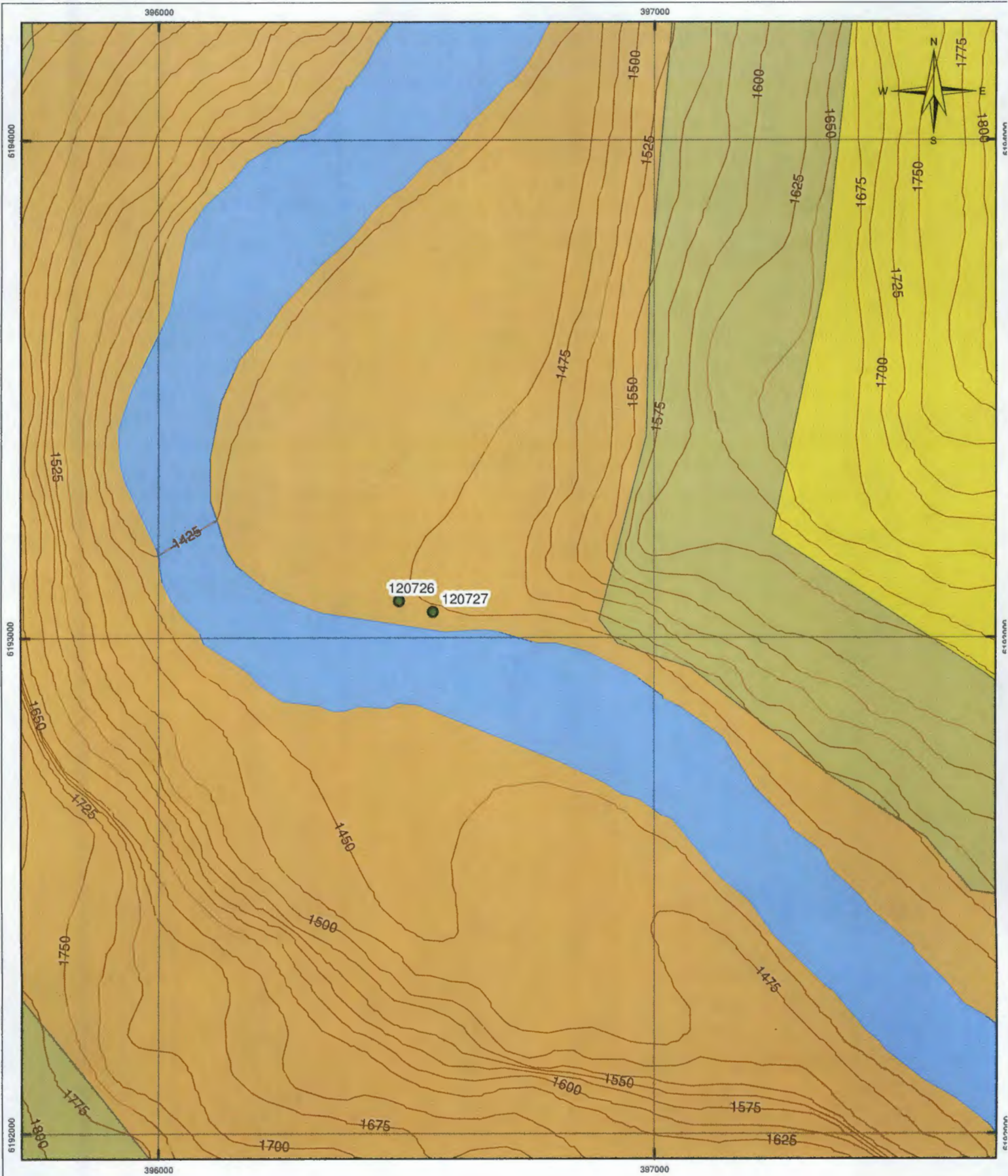
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SOUTH OF FORT McMURRAY,
NORTH-EAST ALBERTA

Fig. 4.3
2013 Sample Location Map

HL 2016.c



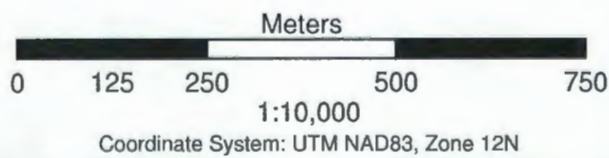
Legend

- 2015 Sample Locations
- Contours 25 ft

Surface Geology

Unit Name

- Fish Scales and Belle Fourche Formations
- Westgate Formation
- Pelican Formation

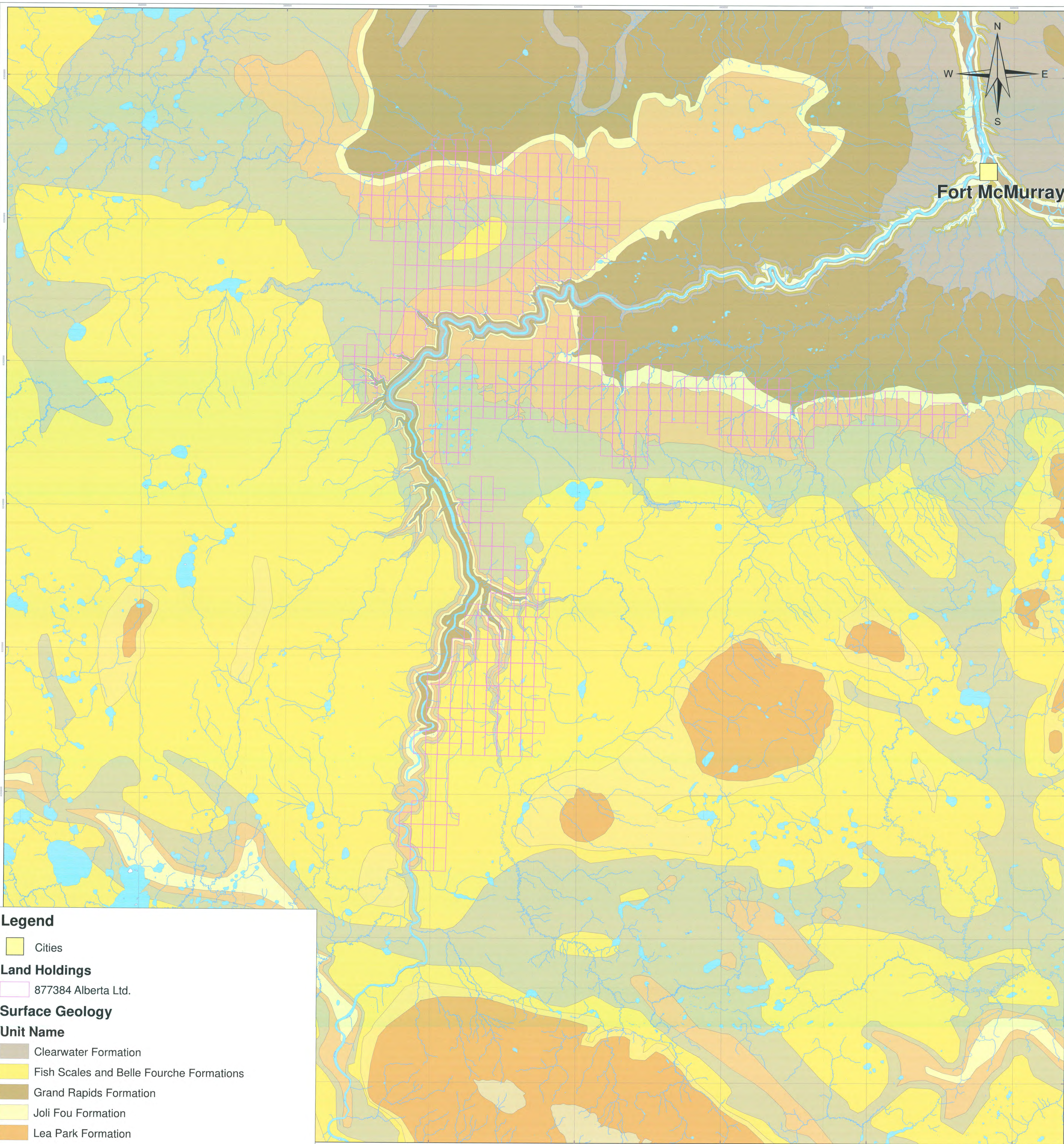


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Fig. 4.4
2015 Detailed Sample Location Map

HL 2016.C



Legend

- Cities
- Land Holdings**
- 877384 Alberta Ltd.
- Surface Geology**
- Unit Name**
- Clearwater Formation
- Fish Scales and Belle Fourche Formations
- Grand Rapids Formation
- Joli Fou Formation
- Lea Park Formation
- McMurray Formation
- Pelican Formation
- Second White Specks, Carlile, and Niobrara Formations
- Wabiskaw Member
- Wapiti Formation (lower part)
- Waterways Formation
- Westgate Formation



1:200,000

Coordinate System: UTM NAD83, Zone 12N

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Fig. 5.1
Geology