



# **ENGINEERING INSPECTION & REPORT**

**on**  
**ANZAC Community Centre,**  
**for**  
**Anzac Recreation and Social Society**



April 2019

**CMG Engineering Services Corporation**

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# **CMG ENGINEERING SERVICES CORPORATION**

## **ENGINEERING PROPERTY / BUILDING CONDITION ASSESSMENT**

### **ES.1 EXECUTIVE SUMMARY**

**CMG ENGINEERING SERVICES CORPORATION** (hereinafter known as CMG) was commissioned by Anzac Recreation and Social Society to conduct a Property / Building Condition Assessment (PCA) of the non-residential property located at ANZAC Community Centre (hereinafter known as the Site). The PCA was undertaken for general due diligence purposes as a follow-up report to provide more detail on the previous CMG report titled: “20181217-PCR-ANZAC\_CC\_CHRISTINA\_DR\_ANZAC\_AB-r56”.

The owner of the Subject Building, the Regional Municipality of Wood Buffalo, (the Municipality) requested that further information be provided in the form of:

- a site drainage assessment;
- a detailed building envelope assessment report, this would include the roof assembly (including attic space);
- a structural assessment report, this would include items like exterior wall component condition; and
- a mould assessment report, that followed regulatory testing requirements.

In addition the municipality requested clarification on:

- site drainage near the rink area;
- structural integrity (deteriorated wall plates, sheath and studs);
- roofing system defects;
- ventilation ducting separation;
- extent of the mould

On 2019/04/03, Mr. Blair Lowe, P.Eng and Mr John Layden, restoration consultant and red seal carpenter, performed a field review at the Subject Building to assess these remaining matters. Mr. Layden attends inspections with CMG from time to time, and has over 20 years of restoration experience in Alberta and has performed hundreds of restoration jobs including a high percentage of residential and commercial flood, and mould remediations.

This PCA is intended for due diligence purposes only, and does not constitute a building inspection, guarantee, warranty, or code compliance review. As requested, this report will not include an assessment of the non-structural elements including the asphalt and concrete paved areas, curbing, concrete walkways, landscaping, and hydrants, etc.

Selected photographs taken during the Site Visit can be found in the photographic annex in Appendix B.

### ES.1.1 PROPERTY DESCRIPTION

The Subject Property is located at the south side of Christina Dr in a predominately commercial area of ANZAC AB. For the purposes of this report it is assumed that Christina Dr is aligned east-west although this is not exactly be the case.

The Subject Property is likely approximately rectangular in shape. CMG did not receive any real property reports to calculate the area of the property. The subject property is graded approximately evenly with the neighbouring properties in all directions. The subject property is relatively flat with a slight downgrade from north-west to south-east. Snow and ice limited viewing of some of the exterior features and ground cover of the Subject Building and Subject Property.

For the purposes of this report, the single-tenant Subject Building was divided into many sections – one for each room as shown in a CMG reconstruction of the original blueprints to be found in Appendix A. The main entrance to the Subject Building is on the central east side of the Subject Building next to the east side asphalt parking area. Once inside the entrance is the theatre room or Hall (H) to the south, and the office area to the north. The south side of the Hall is a stage, and to the west of the stage is the old furnace room. Westward from the theatre room are men's and women's washrooms. Walking west from the main entrance foyer brings you to the multicultural room on the right, and a kitchen on the left. On the far west side is a furnace room on the north side of the hallway, and the ice rink change rooms and showers on the south. Based on measurements taken from the previous site visit, the approximate total footprint area of the building was measured to be 460m<sup>2</sup>.

All construction on this property is above grade, and no underground parking exists at the subject property. An estimated 20 asphalt paved surface parking spaces service all the buildings located on the subject property although this is a rough estimate since the parking area is shared with a neighbouring property, and no Site Survey was given to CMG showing the property lines.

The likely 1991 construction of the original portions of the building appeared to be a wood frame with cast-in-place concrete slabs-on-grade. The roof system was a metal roof that was attached to an externally rated OSB sheeting that was supported by a pre-engineered truss system. Exterior finishes of the building consisted of a combination of PVC siding with a faux brick facade on the lower section of the walls.

### ES 1.2 Assessment Summary

- Site drainage assessment:

The surficial drainage around the Subject Building was adequate, with some potential issues with the rink. The rink itself should have a 8cm (3") high asphalt curb or equivalent installed on its east side so that any melting water would travel to the south end of the rink away from the foundation.

The roof drains were all draining next too the foundation with some concrete water diversion pads diverting water away, and some with no means of re-routing the water. 1.2m long Downspout extensions or new concrete water diversion pads should be installed under or to any downspouts with small extensions.

- Detailed building envelope assessment report, this would include the roof assembly (including attic space):

The outer walls were all adequate with only the dressing room, and south east corner of the hall requiring any OSB replacement. The brick facade will have to be removed in this section, and the OSB replaced with a ***similar externally rated OSB*** at a height of 4' to allow for a standard size OSB sheet. Some PVC siding may need replacement as well if necessary. TYVEK or equivalent envelope seal should be placed over the new OSB and the building envelope should be properly sealed.

The attic areas and their insulation should be fine if the insulation height is reduced under the roof valley especially the one above the rink hall and mechanical room. All roof valleys should have a temperature activated heat tape installed on the roof surface so that these areas do not risk forming any more ice damming.

All rooftop protuberances including the flashing around them should be properly sealed so that no moisture can get in. The roof top sewer gas vent in the change room 1 (CR1) should be replaced, and reconnected as soon as possible. Any rotten OSB around it should be carefully cut out from underneath and a new piece sistered in place with PL9000 or equivalent. Cutting should be completed so that the roof itself is not penetrated, and no screws or nails should be used from below.

Poorly installed Insulation often blocks the soffits, and sometimes the areas next to the soffits such that cold air cannot pass through the upper rafters to the vents that are located at the peaks of the metal roof on this particular roof.

All heating stacks including the ones in the mechanical room and electrical rooms should be checked and properly insulated to ensure that they do not introduce heat into the attic areas. This may require new stacks, or additional insulation placed around existing stacks.

The metal door sill plate on the south-east corner of the hall should be sealed on the inside with epoxy and the space between the floor slab and the foundation wall in the dressing room should also be sealed with an appropriate epoxy.

Interior thermal scans were completed in both Site Visits, and the results were not able to be used since the building envelope and insulation were penetrated by previous testing and remediation. Holes in the walls and ceiling made a proper assessment of the thermal envelope impossible. The attic areas were cut open to the lower section of the building in several locations, and the vapour barrier was cut in most of the building by poor restoration work.

A March 2018 Reed Jones Christoffersen Ltd. (RJC) report identified some anomalies in the insulation of the Subject Building. The thermal photos of the foyer ceiling identified some cold spots. This section of the foyer ceiling is in a raised skylight area that is not connected to the main attic. Any poor insulation in this area will not introduce any heat into the main attic area. No evidence of moisture ingress was observed in the foyer skylight area during both of CMG's Site Visits.

The same report showed some issues with a beam connection and it is possible that a small amount of heat loss is present here, although not enough to heat the attic.

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Another thermal scan was completed in the office area. The photo of this same area shows the drywall removed in this location and insulation pushed down that would definitely cause this thermal loss, but could easily be remedied by pulling the insulation back up, repairing the vapour barrier and putting the drywall back on.

The kitchen cold spot could not be identified during the Site Visit. There is a large industrial kitchen fan up to the roof in the kitchen, and it should be insulated in the attic area so that it does not introduce heat there. The roof mounted fan would likely allow some cold air to enter the duct and hood fan in the kitchen.

The March 2018 RJC report showed horizontal ducting and although this may be a bad practice, this should be fine if the ducting is insulated as it appeared to be in the RJC photos. CMG did not observe any horizontal ducting during the Site Visit and could not locate it.

Some wall venting was identified by RJC as being improperly installed, and this should not affect the attic space, and can be repaired if and when the wall envelope is replaced. Some heat loss in the walls will not cause any issues other than higher heating costs. Vents can be caulked so that there is less outside air introduced into the outer building envelope. Connections on the inside should be checked for a seal so that warm and moist interior air is not introduced into the outer building envelope.

The March 2018 RJC report did not indicate any attic venting. This type of roofing supplied venting all along the ridges of the roofing system. Some aerial photos taken during the Site Visit in Appendix A and B show evidence of this. CMG also noted a high updraft of air from a hole in the attic area in the Men's Change Room (CR1) that also indicates adequate attic venting.

- Structural assessment report, this would include items like exterior wall component condition:

No structural elements had their function affected by rot and can all remain in place. Some fungicide can be sprayed on the affected stained sill plates and studs, and then sanded after 24 hours.

- Mould assessment report, that followed regulatory testing requirements:

CMG used a clean knife to cut samples from OSB and dimensional lumber into baggies that were sent to a lab the next day using a CMG chain of custody form (see Appendix C). Insulation samples were ripped from the larger batting and similarly bagged. Air samples were taken in various areas, and a control sample was taken outside upwind of the Subject Building. A Zefon brand Air-O-Cell model non-viable air sampler was used to take air samples. The Air-O-Cell was recently calibrated, and the calibration certification document can be found in Appendix C.

All sampling was completed and/or overseen by Mr. Blair Lowe, P.Eng. Mr. Lowe and Mr. Layden have taken mould sampling training, and Mr. Lowe is an environmental, and structural engineer registered with APEGA.

Detailed mould information about the Subject Building during the Site Visit can be found in section 4.6.4.1.

CMG found 15 different types of mould in bulk and non-viable air samples. In summary we found the following areas of greatest concern with respect to mould:

Janitor room and adjoining WC (WC4): The drywall behind the baseboard in both rooms was measured as **level 4 Stachybotrys**. This is the highest level of contamination in the Subject Building and is likely due to water on the floor of the janitor room next to the walls. Water from, for example spilled water next to the wall, could become trapped between the rubber baseboard and the wall. Warm wet drywall is prime feeding material for this type of mould. CMG removed some of the drywall material to look at the structural wall elements, and no evidence of mould was observed on the sill plate or studs in the wall there. The drywall should be removed to a height of 4'1" so that new sheets of drywall easily replace the existing drywall. Some fungicide should be sprayed on the floor after removal so that this mould does not spread. If possible the drywall should be placed so that it does not touch the floor slab or flooring and no baseboards should be replaced in these two rooms.

The Electrical Room (ER): The electrical room is located in the upper level to the west of the stage. The Attic (the upper west side of the stage on the south side of the hall) was measured at 5600 spores / m<sup>3</sup> of airborne spores. This was in the same room as the stack for the legacy furnaces that CMG identified as being poorly insulated. The mouldy drywall that was removed off the ceiling is likely the cause of the higher level airborne spores here. Aspergillus/Penicillium-like spores were in much higher numbers here at 2800 spores / m<sup>3</sup> (medium). Please minimize disturbance in removal of drywall in this area. The **ceiling drywall was sampled by CMG and measured at a level 3 Chaetomium**. Remediation for this area was reviewed in previous sections and direct skin contact with this type of mould should be avoided. A light airbourne amount was detected in this room likely from the disturbance of the drywall there. The **fir roof joist was sampled, and no mould was detected** and we do not expect the insulation to be affected either. All stained, and cracked drywall in this room should be removed and replaced, and the stack should be better insulated so that the attic area here stays cool and dry.

Rink Hall (RH): The Attic was was measured at 10800 spores / m<sup>3</sup>. The sample was taken near the stained valley roof joists although bulk samples of the wood revealed no mould, other areas such as drywall around the wood may have had some contamination. 4800 spores / m<sup>3</sup> (**medium**) were identified as the Cladosporium spores that will cause allergic reactions and should be handled with care, *but are not classified as toxic*. Another 1067 spores / m<sup>3</sup> (**light**) were Basidiospores that are also a concern in breathable air in large numbers (over 5000 spores / m<sup>3</sup>). The medium levels of the non-toxic Cladosporium spores indicates that there may be some insulation that should be replaced in this area. CMG recommends only removing insulation that is along the bottom 3m of the roof valley here. Since we want the attic to remain cool, some spray foam could be added to the bottom of the attic below the valley here or alternatively less insulation could be added here so that the air can flow under the valley.

Multicultural room (MC): The sill plate showed heavy mould growth, but it was surficial, so spraying fungicide, and sanding after 24 hours should be fine for remediation.

Mechanical Room (ME): Ceiling drywall was sampled and **Aspergillus/Penicillium spores and Chaetomium were rated 3** and stained areas of drywall should be carefully removed and replaced at this location. The **roof joist sample in the mechanical room showed a level of 0** or no spores found and we do not expect the insulation is affected, but should be removed below the roof valley to allow for better attic air flow.

Surprisingly all other mould measurements were light and should be sprayed with a fungicide to that they do not grow further. To be sure ANY stained areas should be sprayed with a fungicide, and stained structural wood should be sprayed, sanded after 24 hours, and then sprayed again.

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Any previous estimates for remediation should be reviewed and should be considerably lower since CMG now recommends that the insulation can be left in place in most of the Subject Building except the east wall of the dressing room and south-east corner of the hall.

If requested and at extra cost, CMG can prepare a new more accurate estimate for the mould and building envelope remediation with the help of our restoration consultant Mr. Jon Layden. Mr. Layden can be asked to prepare a team to complete some or all of the remediation, and CMG would not be involved in any construction to avoid any conflict of interest, but could be called upon for a final inspection at extra cost including non-viable air testing and a report once the construction has been completed.

For CMG Engineering Services:  
Blair Lowe, P. Eng., Principal and Chief Engineer



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## 1 INTRODUCTION:

The sections that follow present a brief overview of the assessment methodology, property/facility description, observations, and conclusions regarding the facility elements conditions and required maintenance items. This Building/Property Condition Assessment (PCA) is intended for due diligence purposes only and does not constitute a building inspection, guarantee, warranty, or code compliance review.

**CMG ENGINEERING SERVICES CORPORATION** (hereinafter known as CMG) was commissioned by Anzac Recreation and Social Society to conduct a PCA of the non-residential property located at ANZAC Community Centre (hereinafter known as the Site). The PCA was undertaken for general due diligence purposes and was completed in general accordance with current industry standards [American Society for Testing and Materials (ASTM) E-2018-15] except that invasive procedures were used as necessary.

The building assessment was conducted by Mr. Blair Lowe P.Eng. on 2019/04/03 (hereinafter known as the Site Visit). During the Site Visit, Mr. Lowe was accompanied by Mr. Jon Layden, restoration consultant. The purpose of the assessment was to visually assess the present condition of the on-site property elements, buildings and related structures.

As requested, this PCA does not include an assessment of the non-building elements including the asphalt covered areas, curbing, concrete walkways, landscaping, hydrants, etc.

Weather at the time of the site visit was -3 degrees Celsius with an atmospheric pressure of 97kPa and relative humidity of 30%.

## 2 PROPERTY DESCRIPTION:

The Subject Property is located at the south side of Christina Dr in a predominately commercial area of ANZAC AB. For the purposes of this report it is assumed that Christina Dr is aligned in an east-west orientation although this is not exactly the case.

The Subject Property is likely approximately rectangular in shape. CMG did not receive any real property reports to calculate the area of the property. The subject property is graded approximately evenly with the neighbouring properties in all directions. The subject property is relatively flat with a slight downgrade from north-west to south-east. Snow and ice limited viewing of some of the exterior features and ground cover of the Subject Building and Subject Property.

For the purposes of this report, the single-tenant Subject Building was divided into many sections – one for each room as shown in a CMG reconstruction of the original blueprints to be found in Appendix A. The main entrance to the Subject Building is on the central east side of the Subject Building next to the east side asphalt parking area. Once inside the entrance is the theatre room or Hall (H) to the south, and the office area to the north. The south side of the Hall is a stage, and to the west of the stage is the old furnace room. Westward from the theatre room are men's and women's washrooms. Walking west from the main entrance foyer brings you to the multicultural room on the right, and a kitchen on the left. On the far west side is a furnace room on the north side of the hallway, and the ice rink change rooms and showers on the south. Based on measurements taken from the previous site visit, the approximate total footprint area of the building was measured to be 460m<sup>2</sup>.

All construction on this property is above grade, and no underground parking exists at the subject property. An estimated 20 asphalt paved surface parking spaces service all the buildings located on the subject property although this is a rough estimate since the parking area is shared with a neighbouring property, and no Site Survey was given to CMG showing the property lines.

The likely 1991 construction of the original portions of the building appeared to be a wood frame with cast-in-place concrete slabs-on-grade. The roof system was a metal roof that was attached to an externally rated OSB sheathing that was supported by a pre-engineered truss system. Exterior finishes of the building consisted of a combination of PVC siding with a faux brick facade on the lower section of the walls.

### **3 SCOPE OF WORK:**

The work carried out by CMG in the completion of this undertaking was developed to reflect the requirements of the ASTM E-2018-15 protocol. Based on the requirements of the ASTM protocol, the subject assessment consisted of the following activities:

- Site visit that will include a mould sampling including non-viable air sampling, and bulk material sampling in affected areas; a building envelope assessment on the lower elements of the outer wall sheathing, vapour barrier, and insulation; a structural assessment on potentially affected structural elements, and a Site Drainage Assessment especially with respect to the skating rink and its drainage in the area to the west of the Subject Building.
- Evaluation of information lab analysis, and preparation of the report.

#### **3.1 LIMITATIONS:**

a. This inspection is subject to the usual limitations imposed by ownership of the property by another party, which restrict how we can examine structural detail and services hidden behind wall coverings, ceilings and other fabric. By its nature such an inspection is in some measure partial, covering only those spaces which were unlocked or otherwise open at the time of our inspection. What has been reported is taken as representative of the whole, even though not every square inch can be seen with the same degree of rigour. The report does not warrant absence of PCBs, UFFI, radon gas or asbestos at the property. We make no representation that we have examined the legal status of the property or any part of it or its boundaries, nor that we have drawn your attention to all the formalities of all possible compliance to Building Codes and Bylaws.

b. The Use of this report is subject to the Statement of Limitations presented below. This report was prepared for the exclusive use of Anzac Recreation and Social Society and the Regional Municipality of Wood Buffalo. This report is based on information and data collected during the completion of a Building Condition Assessment of the site carried by CMG Engineering Services Corporation outlined in the scope section above and is based solely on the site conditions encountered at the time of the assessment and the applicable guidelines and standards in place at the time of this investigation. Any use which a Third Party makes of this report, or any reliance on discussions to be made based on it, is the responsibility of such Third Parties. CMG Engineering Services Corporation accepts no responsibility for damages, if any, suffered by any Third Party because of decisions made or actions taken by the report.

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- c. The material in this report reflects the judgement of CMG Engineering Services Corporation makes no guarantee for the accuracy or completeness of any third party information. If new information is discovered during future work, CMG Engineering Services Corporation should not be requested to re-evaluate the conclusions presented in this report and to provide amendments as required without remuneration and without being pre-approved by CMG Engineering Services Corporation.
- d. This Assessment does not include, nor is it intended to include, any opinion regarding the suitability of any other structure on the site not in the Scope of this document for any particular function, the integrity of any other on-site buildings not in the Scope of this document or the geotechnical conditions on the site. Inspections of buildings, do not provide compliance with any environmental concerns. Should concerns regarding any issue other than structural matters that arise as a result of investigations, appropriately qualified professionals should address them.
- e. **STRUCTURAL:** No physical tests were conducted and no samples of building materials were collected. If there is a requirement to assess structural integrity, further analysis of the structural elements should be conducted by a specialist, including physical tests of the materials in accordance with the current applicable Canadian Standards Association (CSA) and ASTM test procedures, where appropriate, to allow determination of the load carrying capacity of the structural elements.
- f. **MECHANICAL:** The evaluation of the mechanical, plumbing, and electrical systems at the property, such as heating, ventilation and air conditioning (HVAC) systems, included discussions with the site contact, review of maintenance/servicing records for the systems, if provided, and a visual assessment of the units was conducted at the time of the site reconnaissance. The assessment did not include an intrusive investigation of wall and ceiling cavities, and mechanical, plumbing, and electrical systems. No physical tests were conducted on the mechanical, plumbing, and electrical operating systems.
- g. **Code Compliance:** A detailed code compliance review was not included as part of the scope of work. However, obvious deficiencies and hazardous or dangerous building or construction situations to the best of our knowledge were noted, if and where applicable.
- h. **Cost/Quantity Estimates:** The estimated costs outlined in this report are based on the conditions observed during the date of the site reconnaissance, and a minimum item repair cost threshold of \$1 000. Estimates of quantities are based on field observations and site interviews. Item repair and replacement costs are approximate only and based on the assessors past experience with similar facilities and issues and where applicable, from other knowledgeable sources (i.e. general contractor, licensed electrician, etc.). Quotations from qualified contractors should be obtained if or when a specific item or recommendation is to be addressed.
- i. This investigation did not constitute a detailed audit of Asbestos Containing Materials (ACM's). A more in depth examination of building materials may be required if future renovation, construction, or demolition would cause any potential ACM's to become damaged and/or airborne.
- j. This assessment is subject to any restrictions places by physical obstructions, precipitation, denied access, inaccessible areas, time constraints, cost constraints, readily available documentation, safety considerations, confidentiality, and availability of knowledgeable individuals for interview purposes. A building condition assessment is not intended to identify any contamination although we may recommend a Phase I or II Environmental Site Assessment if we happen to see the

potential for contamination. Information in this assessment may also change with time and information in this report is only accurate on the inspection date. This building assessment is a compilation and assessment of available data regarding the subject site and in no way should be considered as a recommendation or rejection of a potential property purchase but more a tool to make an informed decision.

k. This report is not to be reproduced or released to any other party in whole or in part, without the express written consent of CMG Engineering Services Corporation.

## **4 OBSERVATIONS:**

### **4.1 Site Observations:**

CMG performed a site review, and created a code system to label each room in the Subject Building. This code system was used for sample names and is referenced in the observations below. A partially restored blueprint drawing can be found in Appendix A with these labels.

Kitchen (K)  
Hall (H)  
Foyer (F)  
Coat Room (C)  
Office 3 (O)  
Board Room (BR)  
Mechanical Room (ME)  
IP Office (O3)  
Health (H2)  
Laundry (L)  
Janitor (J)  
Multicultural Room (MC)  
Change Room 1 (men's) (CR1)  
Change Room 2 (CR2)  
Men's WC (WCM)  
Women's WC (WCW)  
Storage 1 (S1)  
Dressing Room (D)  
Make-up air room (MA)  
North WC near front entrance (WC3)  
South WC near front entrance (WC4)  
Bar (BA)  
Rink Hall (RH)  
Electrical Room (ER)

#### **4.1.1 Topography:**

The general topography is a slight downward grade from the north end of the property to the south. A topological map could be commissioned by the Municipality for this property to give more detail although this should not be absolutely necessary. A rough topographical map can be found in the physical settings report (PSR) in Appendix A. The topological map in Appendix A shows the general topography for the area as going from north east to south west likely towards Lake Gregoire. The localized topography, however, is closer to being a slight downgrade from north to south.

#### **4.1.2 Storm Water Drainage:**

There was no water based precipitation during the Site Visit to confirm any drainage patterns. CMG did not observe any storm water drains on the property. The east side of the Subject Property appeared to have good drainage away from the Subject Building. The west side could benefit from an asphalt curb placed on the east side of the asphalt covered area likely used as a skating rink. This would prevent water from potentially pooling next to the foundation on the west side of the Subject Building. It should be noted that during the Site Visit any evidence of water ingress was most likely from the flood that occurred in late 2017 and rooftop ice damming, and building envelope issues, and we do not expect that storm water drainage is the cause of any damages in the Subject Building. CMG commissioned ERIS info to provide a general surficial geological information for the area. In Appendix A the physical settings report shows the general soil type for the area to be a sandy-silty, well drained soil. CMG did not perform any geotechnical tests to verify this. Based on this evidence, the natural structural base for the structure should have a higher than usual ability to carry water down to the ground water table level. No Fens or Swamp type hydrogeological conditions were reported by ERIS on the Subject Property.

#### **4.1.3 Ingress and Egress:**

See previous report for this information.

#### **4.1.4 Paving, Curbing, and Parking:**

See previous report for this information.

#### **4.1.5 Flatwork:**

See previous report for this information.

#### **4.1.6 Landscaping and Appurtenances:**

See previous report for this information.

#### **4.1.7 Recreational Facilities:**

See previous report for this information.

#### **4.1.8 Special Utility Systems:**

See previous report for this information.

## **4.2 Structural Frame and Building Envelope:**

### **4.2.1 Structural Frame:**

In our previous report we discussed the structural frame, and more detail is provided here. Apart from a minimal crack in the floor slab in change room 1, no defects or settlement were observed in the slab-on-grade flooring of the Subject Building by CMG during the Site Visit. This is important to note since other reports noted cracking in the flooring that CMG did not observe in either of our two site visits. The lack of any evidence of floor slab issues indicates that there are not any water issues relating to freeze thaw under the floor slab.

Even if the floor slabs were to move, this would not typically be a structural issue unless it were under structural walls. The outer foundation is likely a shallow continuous strip foundation with a continuous footing or concrete piles supporting the vertical portion. This is a typical design practice, and no foundation drawings were obtained by CMG.

During the Site Visit CMG observed the structural sills below the outer stud walls. Some concern was voiced by the Municipality about the structural integrity of these sill plates that are below and support the studs in the walls. During the second site visit, CMG observed only surficial staining and mould on sections of these structural elements. They can be lightly sanded to remove any staining and then sprayed with a fungicide such as “moldstop” or equivalent as a remediation. No rot was observed in any structural elements. Proper personal protective equipment should be worn, and a sander with a bag attachment, or (preferred) hand sanding should be used to remediate these elements.

Areas with potential staining on structural 2x6 wall sills would be beneath any of the valleys in the roof primarily on the west side of the Subject Building. CMG observed this in the multicultural room (MC) and the Men’s change room (CR1).

CMG also observed stained sills in the Dressing Room (D) likely due to a poor building envelope seal on the south side of the south-east hall door, and a break in the brick facade also just south of that doorway. Sill plates can again be cleaned and sanded down. More information on the wall sheeting and outer brick facade can be found in section 4.2.2 below.

The outer walls are load bearing 2x6 walls and some inner walls are also load bearing. CMG is not concerned with any lintel dimensional changes especially if the ice damming is taken care of. The 1990 Alberta Building Code could be referred to as far as an importance factor for snow loads and CMG is waiting to receive an archived version of this publication at the time of writing this report.

### **4.2.2 Building Envelope (and some internal walls):**

The municipality had some concerns about the internal elements of building envelope including the vapour barrier, OSB wall sheeting, the and the insulation quality of the building envelope.

There was no evidence that suggested that the original vapour barrier was installed incorrectly. Acoustical sealant was observed on all sandwiched studs that were revealed during the Site Visit. Cuts in the vapour barrier to reveal the walls should be carefully re-taped accordingly once remediation within the walls is complete. *In a restoration situation like this, normally the drywall would be carefully cut at 4’ above the floor in a way that the vapour barrier behind it was not cut. The vapour barrier could then have been lifted from the bottom to reveal the insulation and studs. This way there would be less requirement for taping the vapour barrier after remediation, and new 4’x8’ or 4’x10’ drywall sheets could be easily placed in the missing areas after remediation.*

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The wall insulation showed no signs of any serious heat loss. CMG used a thermal camera in both inspections, and saw only normal heat losses in each case. Large amounts of heat loss were observed in areas where the insulation and building envelope was disturbed and this would be expected in the colder weather during both inspections. *Without the building envelope sealed, this type of inspection is not reliable.* We did, however, see a normal amount of heat loss at the intersection between the ceiling and outer walls indicating that the insulation had not sagged there.

Based on the observations below, the following remediation should be completed:

From the doorway of the south west corner of the hall to the south end of the dressing room, the outer brick facade should be removed, and the *inner OSB behind it should be cut in a way that does not cut the stud wall behind it.* The height of the OSB that should be cut is approximately 600mm or 2 feet, and the remediation crew should ensure that all staining and rot in the OSB is included in this cut. *Externally rated OSB should replace this section of OSB and exposure rated or lower grade OSB will not be used.*

All other areas with evidence of mould in the building envelope can be sanded and sprayed with a fungicide such as “moldstop” to deter any new mould formation after the building envelope has been resealed.

A summary of each room with an outer wall is provided here for any building envelope issues and we have included some internal walls for simplicity:

Kitchen (K) No outer wall and so not part of the building envelope. No evidence of moisture damage observed here.

Hall (H) In the hall area CMG observed a band of damage to the OSB sheeting that was approximately 300mm high off the floor slab, and 600mm long starting from the south east corner of the room just south of the doorway, and along the outer wall to the north. The moisture ingress here appears to be caused by a poor moisture seal at the doorway on the south east corner of the hall that then went down the wall into the dressing room.

Foyer (F): No evidence of moisture damage observed here.

Coat Room (C): No evidence of moisture damage observed here.

Office 3 (O): No evidence of moisture damage observed here.

Board Room (BR): No evidence of moisture damage observed here.

Mechanical Room (ME): surficial staining to the bottom south west corner of the mechanical room.

IP Office (O3): CMG observed surficial staining on the outer OSB and sill plate below the studs that can be cleaned and sanded off.

Health (H2): No outer wall and so not part of the building envelope. CMG observed surficial staining that can be cleaned and sanded off.

Laundry (L): No evidence of mould damage observed here.

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Janitor (J): No outer wall and so not part of the building envelope. The janitor room had mould on the wall near the floor that likely grew behind the baseboards. The drywall should be cut out and removed in affected areas. See the mould section for more information on the type of mould that was detected here.

Multicultural Room (MC): Surficial damage to the sill plates and OSB was observed here and they can be sanded and sprayed with a fungicide.

Change Room 1 (CR1): Surficial damage to the OSB was observed here and they can be sanded and sprayed with a fungicide.

Change Room 2 (CR2): No evidence of mould damage observed here.

Men's WC (WCM): No evidence of mould damage observed here.

Women's WC (WCW): No evidence of mould damage observed here.

Storage 1 (S1): No evidence of mould damage observed here.

Dressing Room (D): In the dressing room CMG observed a band of damage to the OSB sheeting that was approximately 300mm high off the floor slab, and along the entire east wall. The moisture ingress here appears to be caused by a poor moisture seal at the doorway on the south east corner of the hall that then went down the wall in the dressing room.

Make-up air room (MA): Surficial damage to the sill plates and OSB was observed here and they can be sanded and sprayed with a fungicide.

North WC near front entrance (WC3): No evidence of mould damage observed here.

South WC near front entrance (WC4): This room had its south wall removed, and is now connected to the Janitor room. The walls should have the drywall removed to 4' above the floor, and replaced if no other mould is observed there. Since we did not see any penetration of mould through the Janitor room wall, we do not expect it here, although it should be checked anyway.

Bar (BA): No evidence of mould damage observed here.

Rink Hall (RH): Some of the OSB was replaced here on the west wall and so we did not disturb this area.

Electrical Room (ER): Surficial damage to the rafters and OSB was observed here and they can be sanded and sprayed with a fungicide.

### **4.3 Roofing:**

The metal roof surface was likely a steel composite material. The roof system is a hydrokinetic metal roof assembly that is designed to shed the water that lands on it. The problem with this particular roof is that warm air has been forming in the

attic area under the valleys of the roof that has caused ice damming. The best way to eliminate this is to remove all the soffits and check such that the airflow from the soffits can flow freely into the attic areas. Insulation often blocks the soffits, and sometimes the areas next to the soffits such that cold air cannot pass through the upper rafters to the vents that are located at the peaks of the metal roof on this particular roof. The valleys also likely have insulation against them with no air flow underneath, and so these areas will have the existing insulation properly installed by removing the ceiling finishings under the valleys, and ensuring there is an air gap above the insulation and below the valley roof sheeting. Once this has been completed we can eliminate the possibility that improperly placed insulation is causing any ice damming. To be sure, automatically activated heat tape should be installed in all valleys on the roof so that the top surface of the valleys in the roof will be heated in colder temperatures ensuring proper roof drainage.

The top of one of the valleys was showing signs of oxidization (see photos in appendix B). This area should be painted with rust paint and checked and repainted every year as required.

The valley roof connection should be checked to ensure that ice damming did not push any panels out of place. These should be put back if they are not already in place so that moisture cannot easily penetrate the valleys.

The rafters in the rink hall were of specific concern, and although there is discolouration on these rafter elements, there was no rot observed, and sanding and spraying with fungicide can be used for remediation here. The rafters were affected likely by ice damming in the valley of the roof and a summary can be found in section 4.3. The restoration consultant also suggested that it was likely that the insulation was put into the rafter area too tightly and that this likely contributed the moisture ingress and ice damming here since the insulation would have a much lower R value when compressed. A spray foam insulation could be added to this area after remediation so that a thinner insulation barrier is possible.

Two other areas were of concern on the roof.

A sewer gas vent in the men's change room (CR1) roof was showing signs of moisture damage around the OSB. This was most likely caused by old caulking around the vent that has allowed moisture ingress. The vent should be replaced and reconnected. If the exterior rated OSB around the vent is getting soft, a small section can be cut out, and replaced with exterior rated OSB or plywood, and sistered into the surrounding OSB otherwise it can be sprayed with a fungicide, sanded 24 hours later, and sprayed again with a fungicide.

The older medium efficiency furnace had a stack on the south side of the Subject Building that was causing moisture to accumulate in the roof area. The caulking around the stack should be repaired, and the medium efficiency furnaces should have the stack replaced with one with better insulation quality and/or insulation added around the stack. See mould section below for more information on these two furnaces.

The new furnaces and the kitchen fan stack should all be insulated so that no extra heat goes into the attic below these roof top protuberances.

The roof itself is a few years from a 30 year lifespan in approximately 2021. Due to the lack of snow, CMG was able to get a much better look at the roof surface during this Site Visit, and a more accurate lifespan is assessed here. A roof like this should be able to last to 40 years, and the replacement cost should be less than \$75000 (2019) CAD with a similar roof surface, or the roof could be coated with a product like liquid rubber for much less to give it a 10 to 20 year further lifespan.

As is, if the roof were checked and any oxidization spots painted, heat tape positioned in the valleys, and roof protuberances checked and caulked annually, the roof should have no less than a 12 year lifespan.

#### **4.4 Building Interior:**

See building envelope for interior wall issues.

#### **4.5 Mechanical / Electrical:**

##### **4.5.1 Plumbing:**

###### **4.5.1.1 Storm Sewer:**

No storm sewers were observed on the Subject Property, although the eavestroughs from the roof drain into a pipe onto the ground. Each downspout extension should extend 1.2m from the foundation or have a concrete plate below the extension to draw the water away at grade level. Several eavestroughs were routed to empty next to the foundation. This can cause issues with the foundation as the soil around and under the footings and foundation walls could reduce their bearing pressure if moist and the outer bearing side pressure against the foundation wall would increase. The water next to the foundation also contributes to moisture ingress into the Subject Building.

###### **4.5.1.2 Sanitary Sewer:**

No issues are relevant here.

###### **4.5.1.3 Water Supply and Waste Piping:**

No relevant issues in this section.

##### **4.5.2 Gas Service and Supply:**

No relevant issues in this section.

##### **4.5.3 Heating Ventilation and Air Conditioning (HVAC):**

###### **4.5.3.1 Heating:**

See mould section below for heating issues.

###### **4.5.3.2 Air Conditioning and Ventilation:**

A make-up air unit was observed in the old furnace room. CMG was not able to determine its lifespan, and it did not appear to be operational at the time of the Site Visit as the front cover was off. The purpose of this unit is to replace air that is drawn out of the Subject Building when the kitchen fan is running. The unit is likely at the end of its lifespan, and would need to be replaced for a cost of less than \$20 000 (2019) CAD.

No air conditioning units were observed during the Site Visit.

#### **4.5.4 Electrical:**

##### **4.5.4.1 Electrical Supply:**

No relevant issues in this section.

##### **4.5.4.2 Lighting System:**

No relevant issues in this section.

#### **4.5.5 Vertical Transportation:**

There was no form of vertical transportation observed during the Site Visit.

#### **4.5.6 Life Safety/Fire Protection:**

No relevant issues in this section.

### **4.6 Additional Considerations:**

There are additional issues or conditions at the property in connection with commercial real estate that are outside the scope of the standard but we include them here:

#### **4.6.1 Outside Standard Practices:**

No non-scope considerations were considered in this PCA.

#### **4.6.2 Other Standards:**

No other standards were considered in this PCA.

#### **4.6.3 Additional Issues:**

Following are several non-scope considerations that users may want to assess in connection with commercial real estate. No implication is intended as to the relative importance of inquiry into such non-scope considerations, and this list of non-scope considerations is not intended to be all-inclusive:

##### **4.6.3.1 Seismic Considerations:**

No seismic considerations are generally required in the Site area.

##### **4.6.3.2 Design Consideration for Natural Disasters (Hurricanes, Tornadoes, High Winds, Floods, Snow, etc.):**

We did not get access to any design documents for the Site that document design considerations for Natural Disasters. These matters are covered in the local building code. We did not see any evidence during the Site Visit that could indicate that these standard design considerations were not met.

#### 4.6.3.3 Animal Infestation:

We did not encounter any evidence of animal infestation during the Site Visit.

#### 4.6.4 Environmental Considerations:

##### 4.6.4.1 Mould:

Mould was present in many of the rooms. As well CMG did non-viable air testing in several areas of the Subject Building as well as a control sample taken outside and upwind of the Subject Building. The reader should refer to the Subject Building layout in Appendix A to familiarise themselves with the approximate location of the samples.

A summary of the different types of mould detected are as follows:

- *Alternaria* sp. is a major allergen comprised of 40-50 species. Sensitivity to *Alternaria* sp. can lead to asthma. Up to 70% of people allergic to mould are allergic to *Alternaria* sp. It can cause skin diseases, especially in immunocompromised individuals.
- Ascospores (undifferentiated) is a major allergen and produces toxins. Prolonged exposure may lead to severe allergies and other health issues. Symptoms can include headache, respiratory problems, asthma, nausea, ringworm, and athlete's foot. In some cases, long term exposure can damage internal organs.

Concentrations of over 5000 sp/m<sup>3</sup> need to be removed.

- *Aspergillus*/*Penicillium*-like: *Aspergillus* is an allergenic mold, but it is also capable of becoming more toxic depending on the species and the environment affected. Most people breathe in *Aspergillus* spores every day without getting sick. However, people with weakened immune systems or lung diseases are at a higher risk of developing health problems due to *Aspergillus*. Certain *aspergillus* mold species are capable of producing aflatoxins, a known and deadly carcinogen. *Penicillium* is a fungi that looks similar and so it is counted with the *Aspergillus* spores. *Penicillium* is used in the pharmaceutical industry to produce antibiotics.
- *Arthrinium*: *Arthrinium* is normally found in plant debris and soil. There are no reported infections of *Arthrinium* in humans or animals according to <https://drfungus.org/knowledge-base/arthrinium-species/>.
- Basidiospores (undifferentiated) can cause health problems when found in large quantities. Health effects can include cold-like symptoms; skin problems such as itchiness, a rash, hives, and eczema; fatigue; headaches; depression; allergic alveolitis; type III hypersensitivity pneumonitis; and cryptococcal meningitis. Some species are pathogenic and can cause cryptococcosis, which is often fatal. Immunocompromised individuals are especially at risk for this disease.
- *Bipolaris*/*Drechslera* Group is allergenic and pathogenic. Pathogens can invade the cornea, aorta, bones, lungs, central nervous system. This may cause respiratory problems and skin problems such as itchiness, dermatitis, and eczema. While immunocompromised individuals are especially at risk, healthy individuals have also been known to be affected.

- Chaetomium sp. is a cellulolytic mould that has 80 different species. Few spores become airborne. It is known to produce mycotoxins, but the health effects are unknown. It may cause disease in immunocompromised individuals.
- Cladosporium sp.: Cladosporium typically causes allergic reactions to the eyes, nose, throat and skin. Exposure to cladosporium can cause skin rash and lesions, asthma, lung infections and sinusitis. While not considered to have toxic properties, cladosporium should not be handled directly due to its potential for causing skin and lung irritation.
- Erysiphe/Oidium Group is a type of mildew that is benign to humans. Due to similarity in appearance, it is easily mixed up with Trichothecium roseum which is toxic to humans.
- Ganoderma sp. is benign. It is used as an herbal medicine, but can have toxic effects when ingested over long periods of time.
- Nigrospora sp. is a potential mild allergen and has been isolated in a few very rare clinical cases, but any adverse effects on humans remains largely unknown.
- Pithomyces sp.- There are no reports on pithomyces sp. having any adverse health effects on humans.
- Smuts/Myxomycetes/Periconia has some allergenic properties, but is generally benign.
- Stachybotrys sp., known colloquially as “black mould”, is a well-known producer of mycotoxins. There has been a large fear surrounding black mould since an outbreak of infant pulmonary hemorrhage in Cleveland, Ohio in 1998-1994 was attributed to Stachybotrys poisoning. It remains controversial whether or not the outbreak was due to Stachybotrys. Illness due to Stachybotrys is referred to as Stachybotryotoxicosis. Symptoms appear after prolonged heavy exposure. Irritation of the mouth, throat and nose, and respiratory problems are some common symptoms. Toxin exposure from inhalation is very low compared to ingestion, which can cause bone marrow suppression and immunotoxicity. Any surfaces with this on it should be remediated.
- Hyphal Fragments are a potential allergen.

#### 4.6.4.1.1 Air sampling:

The numbers of spores in the air sampling should not be compared to the numbers in other reports seen on this property since there were likely different environmental conditions, different instruments were used for sampling, and a different lab was used to count the spores. In this report we rate the airborne mould levels as **light medium and heavy**.

The outside air control sample was taken for 10 minutes due to the cold temperatures. Based on this sample the lab counted 247 spores per m<sup>3</sup>. This is a light amount of mold, and quite minimal considering the air temperatures during the Site Visit.

The lower level of the foyer was measured at 533 spores per m<sup>3</sup>. This is a **light** amount of mould with no Aspergillus/Penicillium-like spores. A small amount of Stachybotrys were present likely from migration from the drywall surface of the Janitor room lower walls.

The attic in the foyer was sampled, and measured 1733 spores per m<sup>3</sup>. No aspergillus spores were detected, and only the same spores found in the outside air were found here. The slightly warmer temperatures in the attic, and lack of wind allowed these to be of a slightly higher volume, although still **light**.

The air intake of the medium efficiency furnaces on the west side of the stage area was found to have a spore count of only 334 spores per m<sup>3</sup> (**light**). This is important since we also took samples at the heat register in the hall area.

The HVAC, Hall, east wall near a heat register (Vent) was measured to be 3466 spores per m<sup>3</sup>. This is still a **light** level of spores, although no Stachybotrys spores were detected. The Aspergillus/Penicillium-like spores were measured at a **light** amount of 667 spores / m<sup>3</sup>, and Ascospores at a **light** amount of 400 spores / m<sup>3</sup>, Cladosporium at a **light** amount of 1133 spores / m<sup>3</sup> and Basidiospores at a **light** amount of 200 spores / m<sup>3</sup>. In spite of this, the furnace, and/or the ducting is showing a small amount of introduction of mould, and at the very least, the filters should be changed in the furnaces before this HVAC is tested again and filters should be changed in all furnaces in a quarterly period with higher quality hepa filters if possible. Should further tests reveal higher

The storage attic was similar to the foyer attic at 734 spores / m<sup>3</sup> (**light**). A small amount of Aspergillus/Penicillium-like spores were observed here that were not in the foyer attic.

The Janitor room was measured at 1333 spores / m<sup>3</sup> (**light**). A large amount of Stachybotrys spores was observed in a bulk sample here, but it was not disturbed enough to become more seriously airborne before the bulk sample was taken. Stachybotrys toxin exposure from inhalation is very low compared to ingestion.

The Mechanical room measured 2134 spores / m<sup>3</sup> (**light**). A light amount of Stachybotrys sp. was detected and Basidiospores was measured both at a very light 267 spores / m<sup>3</sup>.

The Electrical Room Attic (the upper west side of the stage on the south side of the hall) was measured at 5600 spores / m<sup>3</sup>. This was in the same room as the stack for the legacy furnaces that CMG identified as being poorly insulated. The mouldy drywall that was removed off the ceiling is likely the cause of the higher level airborne spores here. Aspergillus/Penicillium-like spores were in much higher numbers here at 2800 spores / m<sup>3</sup> (**medium**). Please minimize disturbance in removal of drywall in this area.

Rink Hall Attic was measured at 10800 spores / m<sup>3</sup>. The sample was taken near the stained valley roof joists although bulk samples of the wood revealed no mould, other areas such as drywall around the wood may have had some contamination. 4800 spores / m<sup>3</sup> (**medium**) were identified as the Cladosporium spores that will cause allergic reactions and should be handled with care, *but are not classified as toxic*. Another 1067 spores / m<sup>3</sup> (**light**) were Basidiospores that are also a concern in breathable air in large numbers (over 5000 spores / m<sup>3</sup>).

#### 4.6.4.1.2 Bulk Samples:

Samples were cut out of the OSB, drywall and insulation in areas of concern during the Site Visit. Each sample was rated on a scale of 0 to 4 with:

- 1 = Trace amount of fungi;
- 2 = Small amount of growth;

3 = Moderate growth; and  
4 = Heavy growth.

Mechanical Room (ME): Ceiling drywall was sampled and **Aspergillus/Penicillium spores and Chaetomium were rated 3** and stained areas of drywall should be carefully removed at this location. The **roof joist sample in the mechanical room showed a level of 0** or no spores found.

Rink Hall (RH): The pre-engineered **roof truss bulk sample in the rink hall showed no evidence of mould (0)**. Sanding of the stained areas of the roof joists, and spraying with fungicide is still a good idea here to remove any staining.

Office (O): Discoloured **exterior insulation was sampled and no mould (level 0) was detected**.

Health (H2): No evidence mould was measured in the insulation, and **level 2 Stachybotrys** was measured in the **OSB**. The OSB can be treated with a fungicide, and then sanded in that order so that most of the Stachybotrys spores are destroyed before sanding takes place. The mould here was likely from moisture ingress through the roof valley above that likely had ice damming issues.

Janitor Room (J): The drywall behind the baseboard was measured as **level 4 Stachybotrys**. This is the highest level of contamination in the Subject Building and is likely due to water on the floor of the janitor room next to the walls. Water from for example, leaky mop bucket, next to the wall, could become trapped between the rubber baseboard and the wall. Warm wet drywall is prime feeding material for this type of mould. CMG removed some of the drywall material to look at the structural wall elements, and no evidence of mould was observed on the sill plate or studs in the wall there.

South WC (WC4): The wall had been removed between the bathroom and the Janitor Room, and the west wall of the Janitor room continued into this bathroom. A similar **level 4 Stachybotrys was measured in a drywall sample here**.

Multicultural Room (MC): CMG took a sample from the sill plate beside the window and the lab measured **level 4 Aspergillus/Penicillium-like** spores. The mould was surficial, and no rot was observed in any of the studs, or sill plates there. A sample was also taken from the **stained OSB above the sill plate, and no mould was detected**.

Change Room 1 (CR1): Change room 1 had an exterior wall, and CMG took a sample from the **OSB, and level 2 Epicoccum spores** were detected. The OSB was not soft, and this can be treated with a fungicide, and lightly sanded. The **exterior insulation was sampled, and no mould was detected**.

Women's WC: (WCW): The women's WC had an exterior wall, and **no mould spores were detected in the OSB sample. Rust particles were detected by the lab the same sample**. The **bottom sill at this location was also sampled, and no mould was detected**. The exterior insulation was sampled, and **no mould was detected**.

Dressing Room (D): This room is located on the main level to the east of the stage. The east wall in this room was the worst affected area. The **exterior insulation, exterior OSB, the bottom sill plate, and the exterior wood stud were all sampled, and all were measured at level 3 Arthriniium**. The OSB was rotten and needs to be replaced, but the structural wood elements were not and can be sprayed with fungicide, and sanded. According to <https://drfungus.org/knowledge-base/arthrinium-species/>, “[t]here are no infections so far reported due to *Arthriniium* in humans or animals.” and “*Arthriniium* is a cosmopolitan filamentous fungus isolated from plant debris and soil.”. CMG observed the floor slab was

separated below this area by approximately 5mm, and based on this fungus, we see evidence that the contamination came from below, although the moisture ingress likely came from the building envelope issues in this section. The separated section should be sealed with an epoxy, and the outer building envelope should be rebuilt to 4 feet above grade. No structural elements need to be replaced here.

Electrical Room (ER): The electrical room is located in the upper level to the west of the stage. The **ceiling drywall was sampled by CMG and measured at a level 3 Chaetomium**. Remediation for this area was reviewed in previous sections and direct skin contact with this type of mould should be avoided. A light airborne amount was detected in this room likely from the disturbance of the drywall there. The **fir roof joist was sampled, and no mould was detected**.

Make-up Air Room (MA): This room is located on the main level to the west of the stage below the electrical room. A **level 2 of Cladosporium and Stachybotrys** was measured in the exterior wall drywall here. A **sample of the exterior insulation next to the OSB measured no mould**.

Hall (H): The **insulation from the main hall was sampled, and no mould was detected**. Insulation often takes on a dirty appearance especially at the lower portions and this is usually not from mould. **The 2x6 sill plate on the south side of the exterior door was sampled, and level 2 Stachybotrys was detected here**.

Foyer (F): the insulation by the front entrance to the foyer was sampled, and **no mould was detected**. CMG also sampled the **blown in insulation in the foyer attic and no mould was detected**.

Coat Room (C): The **exterior insulation in the coat room to the south of the main foyer entrance was sampled, and no mould was detected**.

Office (O): The **exterior insulation in the office to the north of the main foyer entrance was sampled, and no mould was detected**.

Board Room (BR): the **exterior insulation and a stained sill plate from the exterior wall of the board room was sampled, and no mould was detected**. A stained portion of OSB was also sampled and an Unidentified Fungi was **detected at level 2**. The OSB and sill plate can be sprayed with a fungicide, and sanded.

#### 4.6.4.2 Indoor Air Quality:

Apart from mould levels, the indoor air quality was satisfactory at the time of the site visit.

#### 4.6.4.3 Property Security Systems:

We did not test any of the cameras or security equipment on the property.

#### 4.6.5 Long Term Costs:

No long term costs were identified in this assessment.

## **5 CODE COMPLIANCE OVERVIEW:**

A detailed code compliance review was not included as part of the scope of work.

## **6 CLOSURE:**

Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid. This report is only valid for the point in time the observations and research were conducted.

The activities listed below generally are excluded from, or otherwise represent limitations to, the scope of a PCA prepared in accordance with the ASTM E 2018-15 guidelines. These should not be construed as all-inclusive or imply that any exclusion not specifically identified is a PCA requirement under the ASTM guide.

- a. Removing or relocating materials, furniture, storage containers, personal effects, debris material or finishes: conducting exploratory probing or testing; dismantling or operating of equipment or appliances; or disturbing personal items or property, that obstructs access or visibility.
- b. Preparing engineering calculations (civil, structural, mechanical, electrical, etc.) to determine any system's, component's, or equipment's adequacy or compliance with any specific or commonly accepted design requirements or building codes, or preparing designs or specifications to remedy any physical deficiency.
- c. Taking measurements or quantities to establish or confirm any information or representations provided by the owner or user, such as size and dimensions of the subject property or building; any legal encumbrances, such as easements; dwelling unit count and mix; building property line setbacks or elevations; number and size of parking spaces; etc.
- d. Reporting on the presence or absence of pests, such as wood-damaging organisms, rodents, or insects, unless evidence of such presence is readily apparent during the course of the field observer's walk-through survey, or such information is provided by the owner, user, property manager, etc. CMG is not required to provide a suggested remedy for treatment or remediation, determine the extent of infestation, nor provide opinions of probable costs for treatment or remediation of any deterioration that may have resulted.
- e. Reporting on the condition of subterranean conditions, such as underground utilities, separate sewage disposal systems, wells; systems that are either considered process-related or peculiar to a specific tenancy or use; wastewater treatment plants; or items or systems that are not permanently installed.
- f. Entering or accessing any area of the premises deemed to pose a threat of dangerous or adverse conditions with respect to the field observer or to perform any procedure that may damage or impair the physical integrity of the property, any system, or component.
- g. Providing an opinion on the condition of any system or component that is shut down, or whose operation by the field observer may increase significantly the registered electrical demand-load; however, CMG will provide an opinion of its physical condition to the extent reasonably possible considering its age, obvious condition, manufacturer, etc.
- h. Evaluating acoustical or insulating characteristics of systems or components.

- i. Providing an opinion on matters regarding security of the subject property and protection of its occupants or users from unauthorized access.
- j. Operating or witnessing the operation of lighting or other systems typically controlled by time clocks, or that are normally operated by the building's operation staff or service companies.
- k. Providing an environmental assessment or opinion on the presence of any environmental issues such as asbestos, hazardous wastes, toxic materials, the location and presence of designated wetlands, indoor air quality (IAQ), etc.

## 7 References

CMG used the following website pages to help explain the different mould types in the structure:

ERIS Information Limited Partnership – for their physical settings report in Appendix A.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2828207/>

<https://estechlab.com/resources/fungal-and-mold-glossary/>

<https://www.bustmold.com/resources/mold-library/ascospores/>

<https://www.bustmold.com/resources/mold-library/bipolaris/>

<https://www.moldbacteria.com/mold/stachybotrys.html>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2828207/>

<https://www.cdc.gov/mold/stachy.htm>

<https://www.moldbacteria.com/mold/alternaria.html>

<https://www.moldbacteria.com/mold/chaetomium.html>

<https://www.moldbacteria.com/mold-types.html>

<https://www.mold-advisor.com/basidiospores.html>

<https://www.bustmold.com/resources/mold-library/basidiospores/>

<https://www.bustmold.com/resources/mold-library/ganoderma/>

[http://www.canna.ca/oidium\\_and\\_mildew](http://www.canna.ca/oidium_and_mildew)

<https://drfungus.org/knowledge-base/nigrospora-species/>

<https://drfungus.org/knowledge-base/arthriniun-species/>

## **8 APPENDICES**

Appendix A – Site Location, Aerial Photograph, Real Property Report, Physical Settings Report

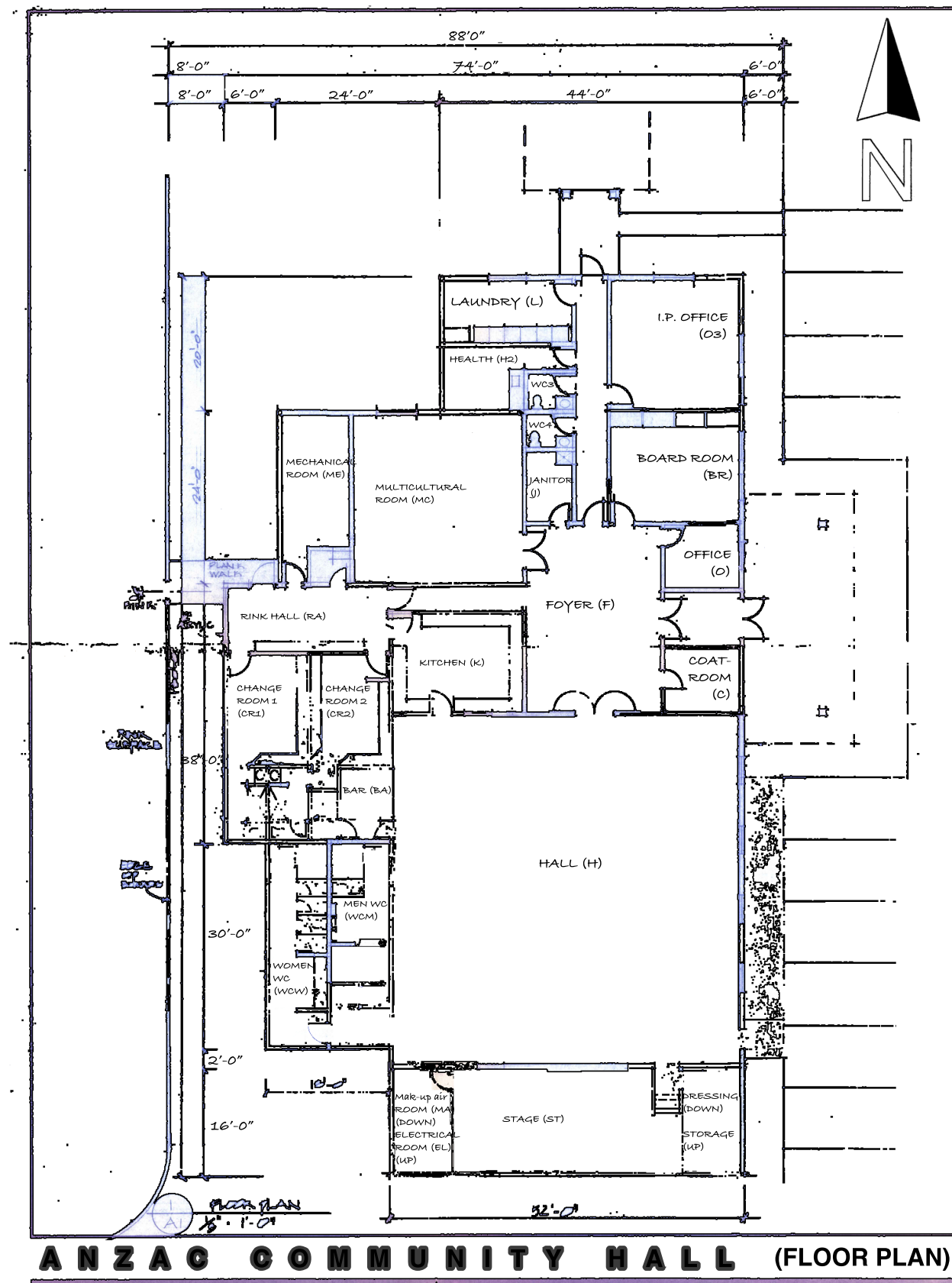
Appendix B – Photo Galleria

Appendix C – Chain of custody document, Non-viable air lab results, Bulk lab results, calibration certificate

# **APPENDIX A — Site Location Map, 2019/04/03 Aerial Photo, Floor Plan, Physical Settings Report**









## Property Information

Order Number:	20190605223p
Date Completed:	June 5, 2019
Project Number:	1823
Project Property:	1823 ANZAC community hall Wood Buffalo AB TOP
Coordinates:	
Latitude:	56.44812852
Longitude:	-111.04465659
UTM Northing:	6255957.79265 Metres
UTM Easting:	497247.179304 Metres
UTM Zone:	UTM Zone 12V
Elevation:	497.00 m
Slope Direction:	S

Property Information.....	1
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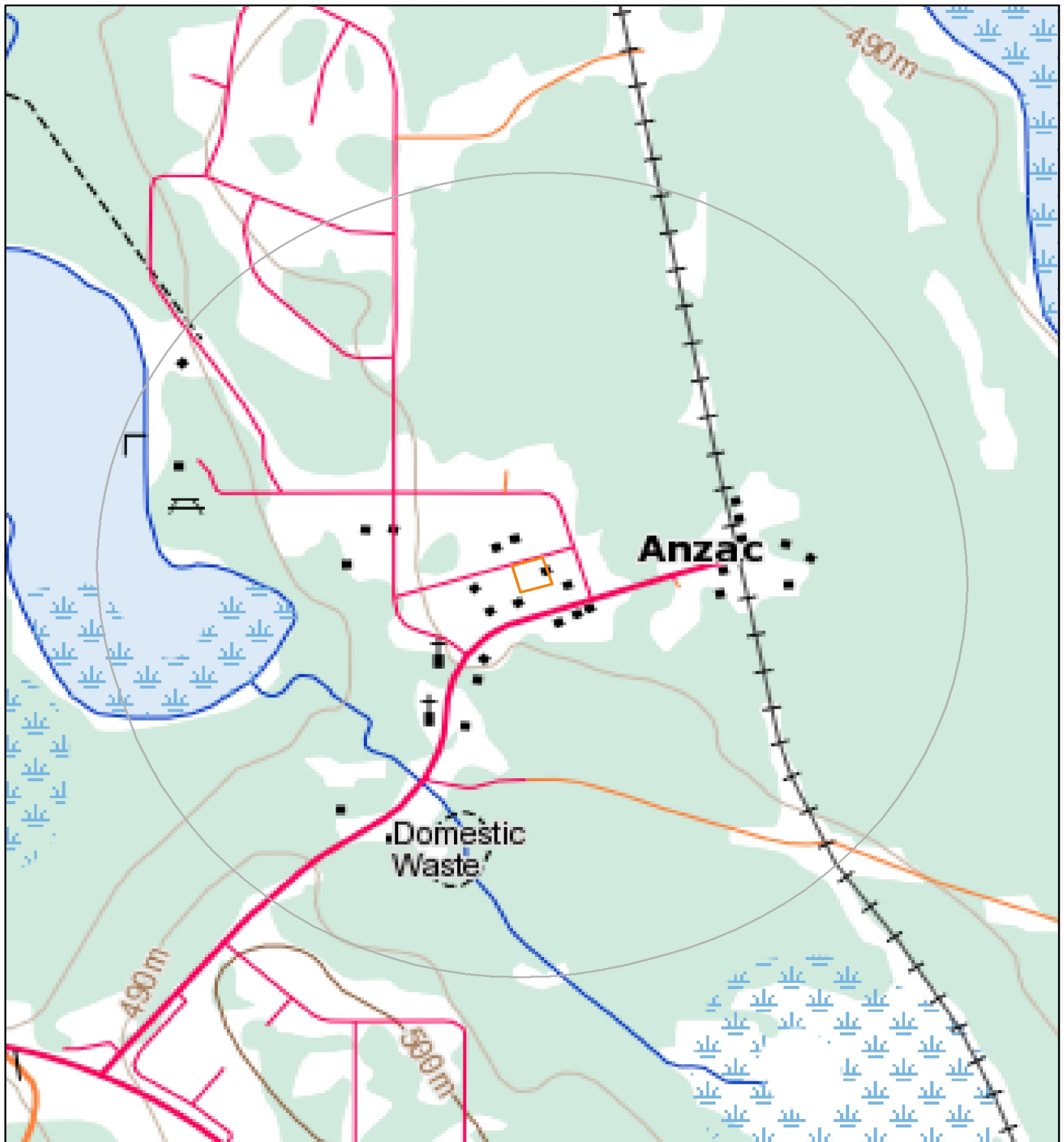
The ERIS **Physical Setting Report - PSR** provides comprehensive information about the physical setting around a site and includes a complete overview of topography as well as hydrologic, geologic and soil characteristics. The location and detailed attributes of oil and gas wells, water wells, and radon are also included for review.

The compilation of both physical characteristics of a site and additional attribute data is useful in assessing the impact of migration of contaminants and subsequent impact on soils and groundwater.

### Disclaimer

This Report does not provide a full environmental evaluation for the site or adjacent properties. Please see the terms and disclaimer at the end of the Report for greater detail.

## Topographic Information



## Topographic Map

**Address: ANZAC community hall, Wood Buffalo, AB**

Data source: Toporama (1:50K) by Natural Resource Canada. Publication date: 2013-07-19  
Legend available at [ftp://ftp.geogratis.gc.ca/pub/nrcan\\_rncan/raster/toporama/doc/Toporama\\_en\\_Legend.pdf](ftp://ftp.geogratis.gc.ca/pub/nrcan_rncan/raster/toporama/doc/Toporama_en_Legend.pdf)

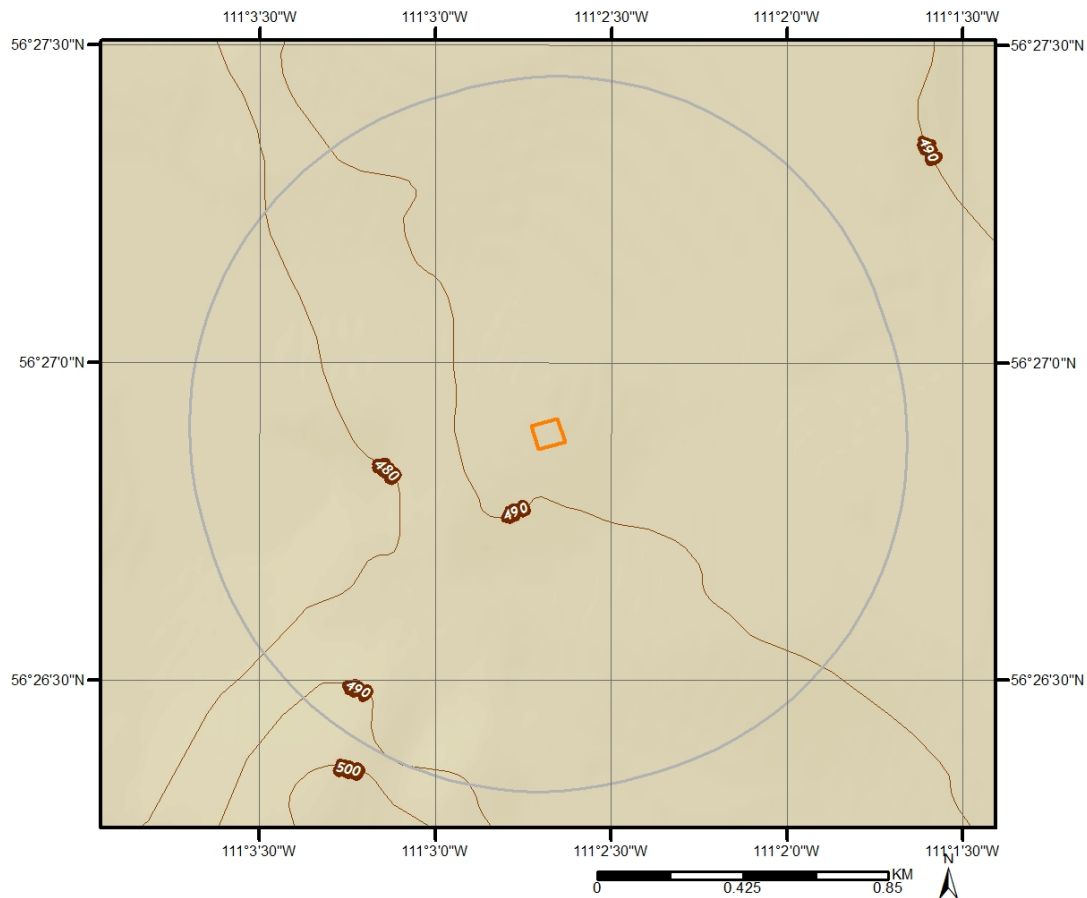


## Topographic Information

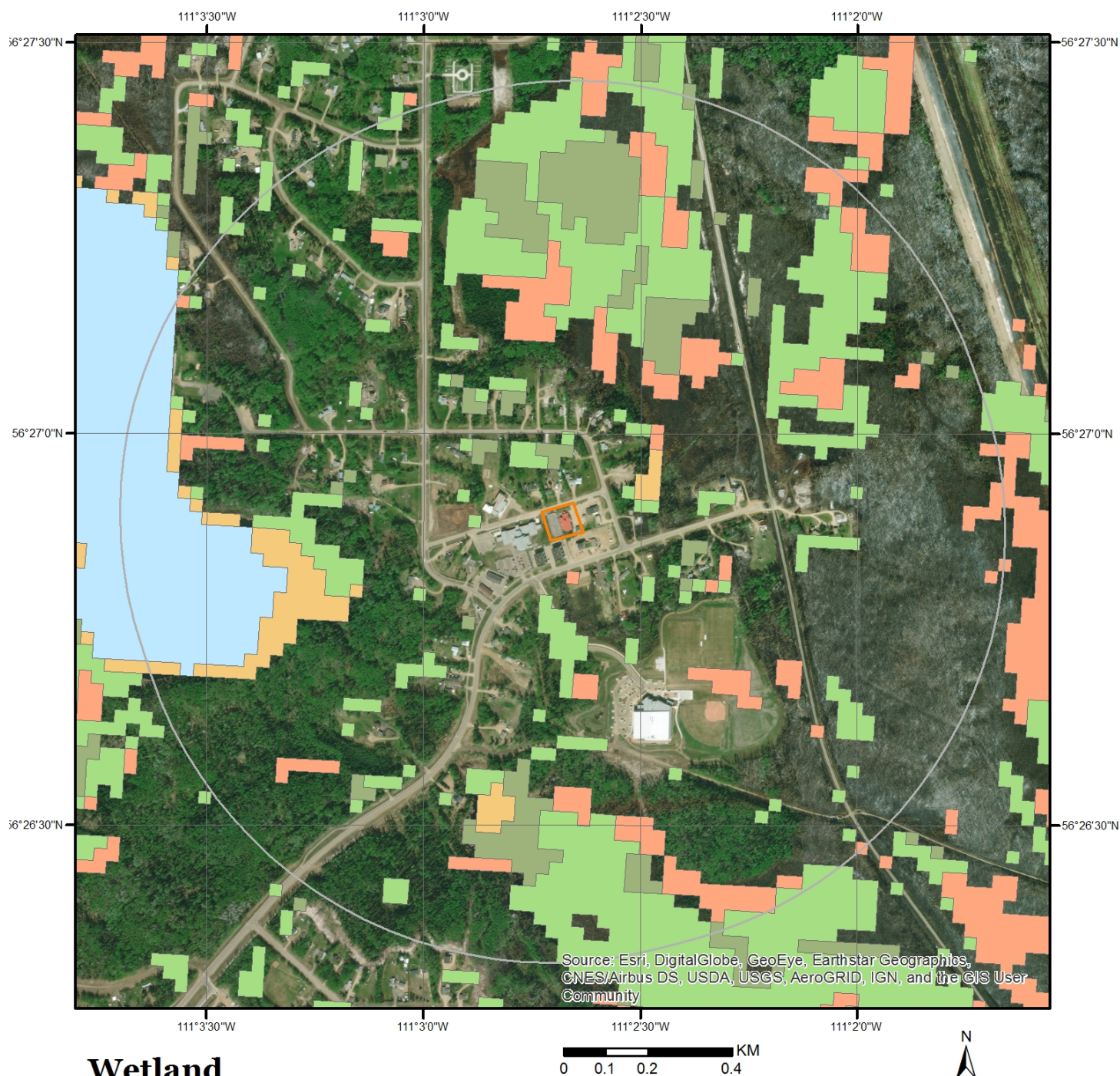
The previous topographic map(s) show general topographic information in the surrounding area of the project property, using Toporama data or a provincial source when available. Below are shaded relief map(s), derived from Digital Elevation data to depict terrain in further detail.

Topographic information at project property:

Elevation: 497.00 m  
Slope Direction: S



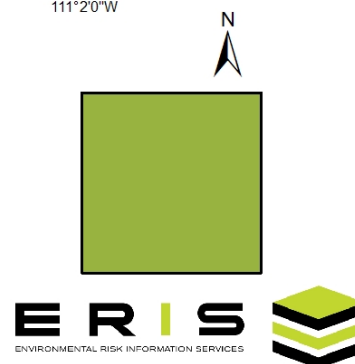
## Hydrologic Information



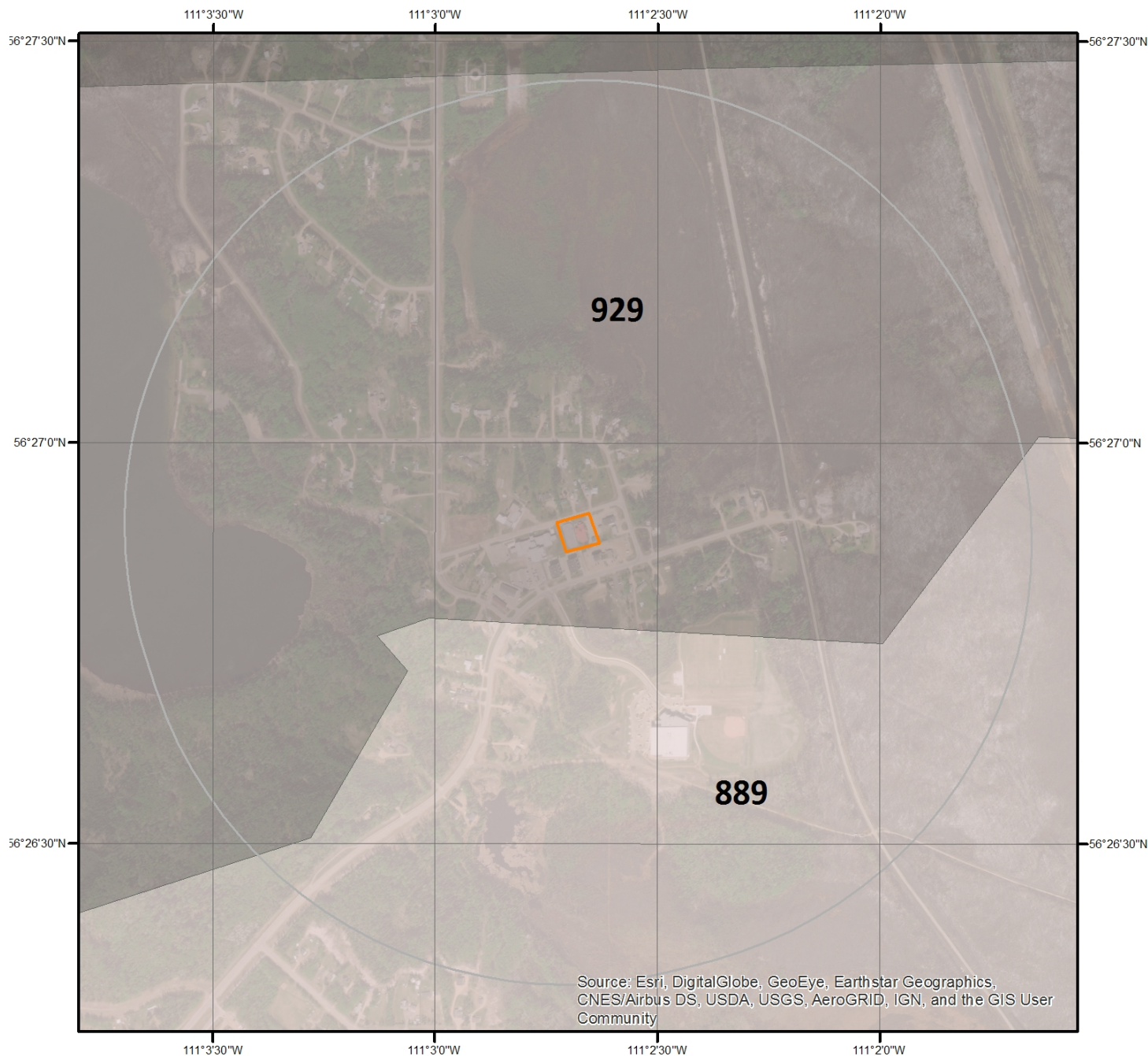
### Wetland

This map shows wetland existence. Data coverage is shown to the right.  
Gray indicates no data available in the area.

- |   |  |
|---|--|
|  Bog   |  Open Water |
|  Fen   |  Swamp      |
|  Marsh |  |



## Geologic Information



### Bedrock Geology

0 0.2 0.4 KM

This map shows bedrock geologic units in the area. Please refer to the report for detailed descriptions. Data coverage is shown to the right. Gray indicates no data available in the area.



## Geologic Information

Detailed bedrock geology information about each unit within the search radius is provided below.

---

### Unit ID 889

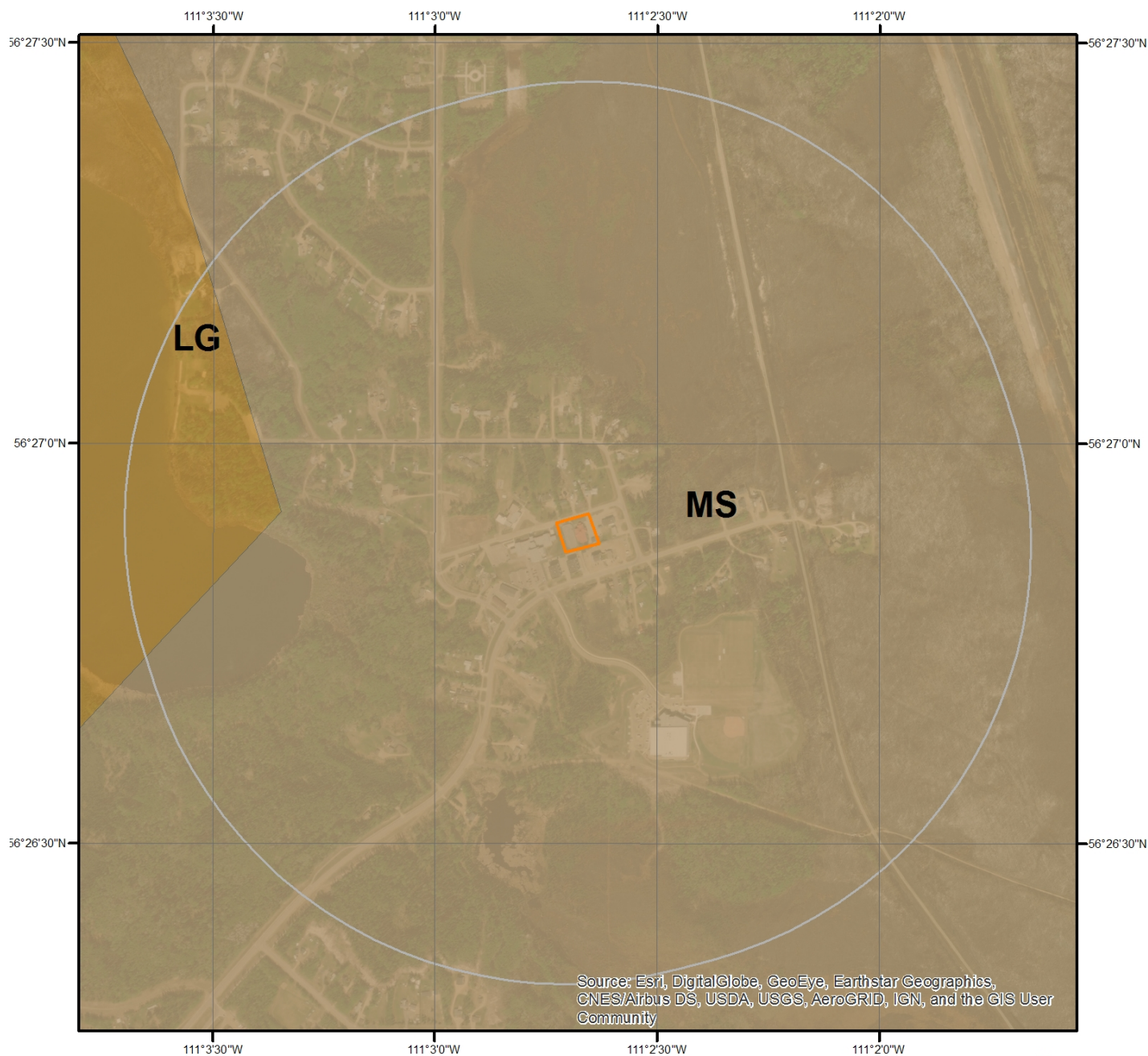
Unit Name:	Pelican Formation
Lithology:	Sandstone, siltstone, and mudstone
Environment:	Marine shoreface
Age:	Lower Cretaceous
Geological Regions:	Plains

---

### Unit ID 929

Unit Name:	Joli Fou Formation
Lithology:	Mudstone
Environment:	Offshore marine
Age:	Lower Cretaceous
Geological Regions:	Plains

## Geologic Information



### Surficial Geology

This map shows surficial geologic labels in the area. Please refer to the report for detailed descriptions. Data coverage is shown to the right. Gray indicates no data available in the area.



## Geologic Information

Detailed surficial geology information about each unit within the search radius is provided below.

---

### Unit ID LG

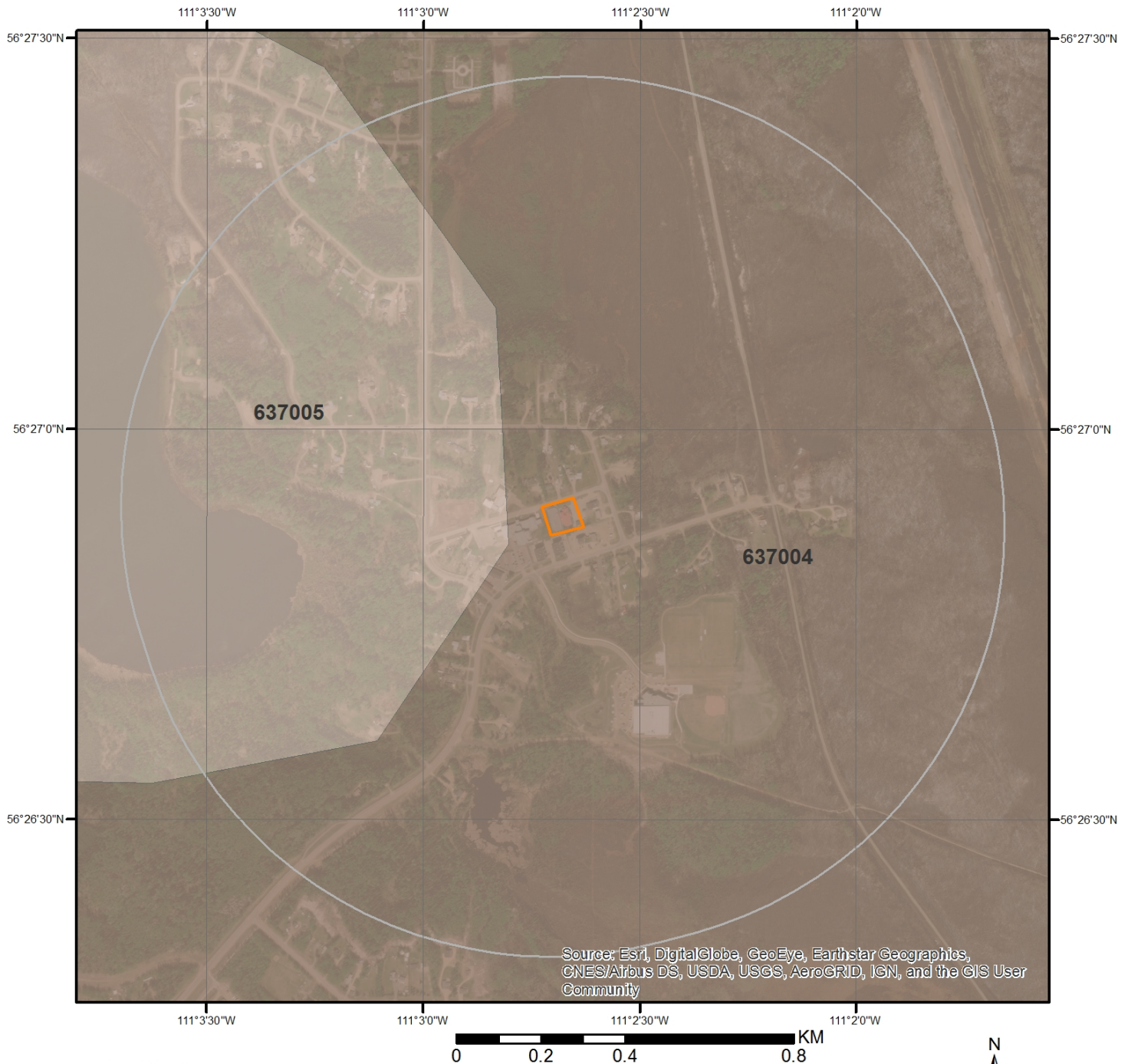
Unit Name:	Glaciolacustrine Deposits
Unit Description:	Primarily fine-grained, distal sediments deposited in or along the margins of glacial lakes.
Texture:	a) Offshore sediment; rhythmically laminated to massive fine sand, silt and clay, locally debris released from floating ice. b) Littoral and nearshore sediments; massive to stratified, well-sorted silty sand, pebbly sand and minor gravel.
Age:	Pleistocene

---

### Unit ID MS

Unit Name:	Stagnant Ice Moraine
Unit Description:	Sediments resulting from the collapse and slumping of englacial and supraglacial debris in response to the melting of buried stagnant ice near the glacial margin. Characterized by low to high-relief hummocky topography.
Texture:	Sediment is mainly till but locally includes stratified glaciolacustrine or glaciofluvial sediments.
Age:	Pleistocene

## Soil Information



### Soil Map

This map shows soil units around the target property. Please refer to the report for detailed soil descriptions.



## Soil Information

Detailed soil information about each unit within the search radius is provided below.

### Soil Landscapes of Canada (SLC)

**SLC Polygon ID:** 637004

#### Component

<b>Component ID:</b>	63700401	<b>Surface Stoniness:</b>	Slightly Stony
<b>Soil ID:</b>	ABKNS~~~~~N	<b>Occupied by Component(%):</b>	60
<b>Component Number:</b>	1	<b>Slope Gradient:</b>	Gentle

#### Soil Name

<b>Soil Name:</b>	KINOSIS	<b>Type of Root Restricting Layer:</b>	n/a
<b>Layer that Restricts Root Growth:</b>	No root restricting layer	<b>Soil Drainage Class:</b>	Well drained
<b>Kind of Surface Material:</b>	Mineral		
<b>Water Table Characteristics:</b>	Never		
<b>Parent Material Class 1,2,3:</b>	Medium; Not Applicable;		
<b>Mode of Deposition 1,2,3:</b>	Till (Morainal); Not Applicable; Not Applicable		
<b>Parent Material Chemical Property 1,2,3:</b>	AN; -; -		

#### Soil Layer

<b>Layer Number:</b>	1	<b>Very Fine Sand(%):</b>	-9
<b>Horizon:</b>	LFH	<b>Total Sand(%):</b>	-9
<b>Depth(cm):</b>	-6-0	<b>Total Silt(%):</b>	-9
<b>pH in Calcium Chloride:</b>	3.5	<b>Total Clay(%):</b>	-9
<b>Saturated Hydraulic Conductivity(cm/h):</b>	30	<b>Organic Carbon(%):</b>	37.8
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	2	<b>Very Fine Sand(%):</b>	8
<b>Horizon:</b>	Ae	<b>Total Sand(%):</b>	52
<b>Depth(cm):</b>	0-10	<b>Total Silt(%):</b>	46
<b>pH in Calcium Chloride:</b>	3.7	<b>Total Clay(%):</b>	2
<b>Saturated Hydraulic Conductivity(cm/h):</b>	30	<b>Organic Carbon(%):</b>	0.6
<b>Electrical Conductivity(dS/m):</b>	0		

## Soil Information

Layer Number:	3	Very Fine Sand(%):	10
Horizon:	Bt	Total Sand(%):	46
Depth(cm):	10-25	Total Silt(%):	30
pH in Calcium Chloride:	4.3	Total Clay(%):	24
Saturated Hydraulic Conductivity(cm/h):	3	Organic Carbon(%):	0.7
Electrical Conductivity(dS/m):	0		

Layer Number:	4	Very Fine Sand(%):	9
Horizon:	Bt	Total Sand(%):	44
Depth(cm):	25-53	Total Silt(%):	30
pH in Calcium Chloride:	4.4	Total Clay(%):	26
Saturated Hydraulic Conductivity(cm/h):	3	Organic Carbon(%):	0.3
Electrical Conductivity(dS/m):	0		

Layer Number:	5	Very Fine Sand(%):	9
Horizon:	BC	Total Sand(%):	45
Depth(cm):	53-90	Total Silt(%):	30
pH in Calcium Chloride:	4.5	Total Clay(%):	25
Saturated Hydraulic Conductivity(cm/h):	3	Organic Carbon(%):	0.2
Electrical Conductivity(dS/m):	0		

Layer Number:	6	Very Fine Sand(%):	10
Horizon:	BC	Total Sand(%):	47
Depth(cm):	90-120	Total Silt(%):	30
pH in Calcium Chloride:	5.1	Total Clay(%):	23
Saturated Hydraulic Conductivity(cm/h):	3	Organic Carbon(%):	0.1
Electrical Conductivity(dS/m):	0		

### Component

Component ID:	63700402	Surface Stoniness:	Slightly Stony
Soil ID:	ABKNSgl~~~N	Occupied by Component(%):	20
Component Number:	2	Slope Gradient:	Little or none

### Soil Name

Soil Name:	KINOSIS	Type of Root Restricting Layer:	n/a
Layer that Restricts Root Growth:	No root restricting layer	Soil Drainage Class:	Imperfectly drained
Kind of Surface Material:	Mineral		

## Soil Information

**Water Table** Never  
**Charateristics:**  
**Parent Material Class** Moderately Fine; Not Applicable;  
**1,2,3:**  
**Mode of Deposition** Till (Morainal); Not Applicable; Not Applicable  
**1,2,3:**  
**Parent Material Chemical** AN; -; -  
**Property 1,2,3:**

### Soil Layer

<b>Layer Number:</b>	1	<b>Very Fine Sand(%):</b>	-9
<b>Horizon:</b>	LFH	<b>Total Sand(%):</b>	-9
<b>Depth(cm):</b>	-5-0	<b>Total Silt(%):</b>	-9
<b>pH in Calcium Chloride:</b>	3.4	<b>Total Clay(%):</b>	-9
<b>Saturated Hydraulic Conductivity(cm/h):</b>	30	<b>Organic Carbon(%):</b>	40
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	2	<b>Very Fine Sand(%):</b>	10
<b>Horizon:</b>	Ae	<b>Total Sand(%):</b>	33
<b>Depth(cm):</b>	0-5	<b>Total Silt(%):</b>	58
<b>pH in Calcium Chloride:</b>	4.5	<b>Total Clay(%):</b>	9
<b>Saturated Hydraulic Conductivity(cm/h):</b>	30	<b>Organic Carbon(%):</b>	0.7
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	3	<b>Very Fine Sand(%):</b>	10
<b>Horizon:</b>	Ae	<b>Total Sand(%):</b>	36
<b>Depth(cm):</b>	5-12	<b>Total Silt(%):</b>	52
<b>pH in Calcium Chloride:</b>	4.5	<b>Total Clay(%):</b>	12
<b>Saturated Hydraulic Conductivity(cm/h):</b>	10	<b>Organic Carbon(%):</b>	0.5
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	4	<b>Very Fine Sand(%):</b>	8
<b>Horizon:</b>	Btgj	<b>Total Sand(%):</b>	27
<b>Depth(cm):</b>	12-25	<b>Total Silt(%):</b>	38
<b>pH in Calcium Chloride:</b>	4.2	<b>Total Clay(%):</b>	35
<b>Saturated Hydraulic Conductivity(cm/h):</b>	3	<b>Organic Carbon(%):</b>	0.7
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	5	<b>Very Fine Sand(%):</b>	10
<b>Horizon:</b>	Btgj	<b>Total Sand(%):</b>	36
<b>Depth(cm):</b>	25-45	<b>Total Silt(%):</b>	30
<b>pH in Calcium Chloride:</b>	4.3	<b>Total Clay(%):</b>	34
<b>Saturated Hydraulic Conductivity(cm/h):</b>	3	<b>Organic Carbon(%):</b>	0.3

## Soil Information

Electrical  
Conductivity(dS/m): 0

Layer Number:	6	Very Fine Sand(%):	10
Horizon:	BCgj	Total Sand(%):	37
Depth(cm):	45-100	Total Silt(%):	33
pH in Calcium Chloride:	4.6	Total Clay(%):	30
Saturated Hydraulic Conductivity(cm/h):	1	Organic Carbon(%):	0.2
Electrical Conductivity(dS/m):	0		

### Component

Component ID:	63700403	Surface Stoniness:	None
Soil ID:	ABMLD~~~~~N	Occupied by Component(%):	20
Component Number:	3	Slope Gradient:	Little or none

### Soil Name

Soil Name:	MCLELLAND	Type of Root Restricting Layer:	n/a
Layer that Restricts Root Growth:	No root restricting layer	Soil Drainage Class:	Very poorly drained
Kind of Surface Material:	Organic		
Water Table	Always		
Charateristics:			
Parent Material Class 1,2,3:	Mesic; Not Applicable;		
Mode of Deposition 1,2,3:	Fen Peat; Not Applicable; Not Applicable		
Parent Material Chemical Property 1,2,3:	AN; -; -		

### Soil Layer

Layer Number:	1	Very Fine Sand(%):	-9
Horizon:	Of	Total Sand(%):	-9
Depth(cm):	0-25	Total Silt(%):	-9
pH in Calcium Chloride:	5	Total Clay(%):	-9
Saturated Hydraulic Conductivity(cm/h):	60	Organic Carbon(%):	45
Electrical Conductivity(dS/m):	0		
Layer Number:	2	Very Fine Sand(%):	-9
Horizon:	Om	Total Sand(%):	-9
Depth(cm):	25-86	Total Silt(%):	-9
pH in Calcium Chloride:	6	Total Clay(%):	-9

## Soil Information

Saturated Hydraulic Conductivity(cm/h):	3	Organic Carbon(%):	40
Electrical Conductivity(dS/m):	0		
Layer Number:	3	Very Fine Sand(%):	-9
Horizon:	Om	Total Sand(%):	-9
Depth(cm):	86-160	Total Silt(%):	-9
pH in Calcium Chloride:	6	Total Clay(%):	-9
Saturated Hydraulic Conductivity(cm/h):	3	Organic Carbon(%):	40
Electrical Conductivity(dS/m):	0		

SLC Polygon ID: 637005

### Component

Component ID:	63700501	Surface Stoniness:	None
Soil ID:	ABNAM~~~~~N	Occupied by Component(%):	50
Component Number:	1	Slope Gradient:	Little or none

### Soil Name

Soil Name:	NAMUR	Type of Root Restricting Layer:	n/a
Layer that Restricts Root Growth:	No root restricting layer	Soil Drainage Class:	Moderately well drained
Kind of Surface Material:	Mineral		
Water Table Characteristics:	Never		
Parent Material Class 1,2,3:	Fine; Not Applicable;		
Mode of Deposition 1,2,3:	Fluvial; Not Applicable; Not Applicable		
Parent Material Chemical Property 1,2,3:	AN; -; -		

### Soil Layer

Layer Number:	1	Very Fine Sand(%):	-9
Horizon:	LFH	Total Sand(%):	-9
Depth(cm):	-6-0	Total Silt(%):	-9
pH in Calcium Chloride:	5.7	Total Clay(%):	-9
Saturated Hydraulic Conductivity(cm/h):	30	Organic Carbon(%):	38.3
Electrical Conductivity(dS/m):	0		
Layer Number:	2	Very Fine Sand(%):	1

## Soil Information

<b>Horizon:</b>	C	<b>Total Sand(%):</b>	3
<b>Depth(cm):</b>	0-18	<b>Total Silt(%):</b>	29
<b>pH in Calcium Chloride:</b>	4.6	<b>Total Clay(%):</b>	68
<b>Saturated Hydraulic Conductivity(cm/h):</b>	0	<b>Organic Carbon(%):</b>	2.4
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	3	<b>Very Fine Sand(%):</b>	2
<b>Horizon:</b>	C	<b>Total Sand(%):</b>	2
<b>Depth(cm):</b>	18-38	<b>Total Silt(%):</b>	38
<b>pH in Calcium Chloride:</b>	4.9	<b>Total Clay(%):</b>	60
<b>Saturated Hydraulic Conductivity(cm/h):</b>	0	<b>Organic Carbon(%):</b>	1.8
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	4	<b>Very Fine Sand(%):</b>	1
<b>Horizon:</b>	C	<b>Total Sand(%):</b>	1
<b>Depth(cm):</b>	38-65	<b>Total Silt(%):</b>	27
<b>pH in Calcium Chloride:</b>	4.7	<b>Total Clay(%):</b>	72
<b>Saturated Hydraulic Conductivity(cm/h):</b>	0	<b>Organic Carbon(%):</b>	1.8
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	5	<b>Very Fine Sand(%):</b>	1
<b>Horizon:</b>	C	<b>Total Sand(%):</b>	1
<b>Depth(cm):</b>	65-100	<b>Total Silt(%):</b>	40
<b>pH in Calcium Chloride:</b>	4.7	<b>Total Clay(%):</b>	59
<b>Saturated Hydraulic Conductivity(cm/h):</b>	0	<b>Organic Carbon(%):</b>	1.8
<b>Electrical Conductivity(dS/m):</b>	0		

### Component

<b>Component ID:</b>	63700502	<b>Surface Stoniness:</b>	None
<b>Soil ID:</b>	ABMRN~~~~~N	<b>Occupied by Component(%):</b>	30
<b>Component Number:</b>	2	<b>Slope Gradient:</b>	Little or none

### Soil Name

<b>Soil Name:</b>	MARIANA	<b>Type of Root Restricting Layer:</b>	n/a
<b>Layer that Restricts Root Growth:</b>	No root restricting layer	<b>Soil Drainage Class:</b>	Very poorly drained
<b>Kind of Surface Material:</b>	Organic		
<b>Water Table Characteristics:</b>	Always		

## Soil Information

**Parent Material Class** Mesic; Moderately Fine;  
1,2,3:  
**Mode of Deposition** Sphagnum Peat; Till (Morainal); Not Applicable  
1,2,3:  
**Parent Material Chemical** AN; UD; -  
**Property 1,2,3:**

### Soil Layer

<b>Layer Number:</b>	1	<b>Very Fine Sand(%):</b>	-9
<b>Horizon:</b>	Of	<b>Total Sand(%):</b>	-9
<b>Depth(cm):</b>	0-25	<b>Total Silt(%):</b>	-9
<b>pH in Calcium Chloride:</b>	3	<b>Total Clay(%):</b>	-9
<b>Saturated Hydraulic Conductivity(cm/h):</b>	60	<b>Organic Carbon(%):</b>	45
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	2	<b>Very Fine Sand(%):</b>	-9
<b>Horizon:</b>	Om	<b>Total Sand(%):</b>	-9
<b>Depth(cm):</b>	25-80	<b>Total Silt(%):</b>	-9
<b>pH in Calcium Chloride:</b>	4	<b>Total Clay(%):</b>	-9
<b>Saturated Hydraulic Conductivity(cm/h):</b>	3	<b>Organic Carbon(%):</b>	40
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	3	<b>Very Fine Sand(%):</b>	10
<b>Horizon:</b>	Ckg	<b>Total Sand(%):</b>	30
<b>Depth(cm):</b>	80-100	<b>Total Silt(%):</b>	35
<b>pH in Calcium Chloride:</b>	7.2	<b>Total Clay(%):</b>	35
<b>Saturated Hydraulic Conductivity(cm/h):</b>	1	<b>Organic Carbon(%):</b>	0.3
<b>Electrical Conductivity(dS/m):</b>	0		

### Component

<b>Component ID:</b>	63700503	<b>Surface Stoniness:</b>	None
<b>Soil ID:</b>	ABDOV~~~~N	<b>Occupied by Component(%):</b>	20
<b>Component Number:</b>	3	<b>Slope Gradient:</b>	Little or none

### Soil Name

<b>Soil Name:</b>	DOVER	<b>Type of Root Restricting Layer:</b>	n/a
<b>Layer that Restricts Root Growth:</b>	No root restricting layer	<b>Soil Drainage Class:</b>	Moderately well drained
<b>Kind of Surface Material:</b>	Mineral		

## Soil Information

**Water Table** Never  
**Charateristics:**  
**Parent Material Class** Fine; Not Applicable;  
**1,2,3:**  
**Mode of Deposition** Glaciolacustrine; Not Applicable; Not Applicable  
**1,2,3:**  
**Parent Material Chemical** AN; -; -  
**Property 1,2,3:**

### Soil Layer

<b>Layer Number:</b>	1	<b>Very Fine Sand(%):</b>	-9
<b>Horizon:</b>	LF	<b>Total Sand(%):</b>	-9
<b>Depth(cm):</b>	-5-0	<b>Total Silt(%):</b>	-9
<b>pH in Calcium Chloride:</b>	5.6	<b>Total Clay(%):</b>	-9
<b>Saturated Hydraulic Conductivity(cm/h):</b>	30	<b>Organic Carbon(%):</b>	38.5
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	2	<b>Very Fine Sand(%):</b>	3
<b>Horizon:</b>	Ae	<b>Total Sand(%):</b>	8
<b>Depth(cm):</b>	0-4	<b>Total Silt(%):</b>	83
<b>pH in Calcium Chloride:</b>	3.6	<b>Total Clay(%):</b>	9
<b>Saturated Hydraulic Conductivity(cm/h):</b>	30	<b>Organic Carbon(%):</b>	1.5
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	3	<b>Very Fine Sand(%):</b>	4
<b>Horizon:</b>	Ae	<b>Total Sand(%):</b>	11
<b>Depth(cm):</b>	4-14	<b>Total Silt(%):</b>	78
<b>pH in Calcium Chloride:</b>	4.4	<b>Total Clay(%):</b>	11
<b>Saturated Hydraulic Conductivity(cm/h):</b>	10	<b>Organic Carbon(%):</b>	0.7
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	4	<b>Very Fine Sand(%):</b>	7
<b>Horizon:</b>	Bt	<b>Total Sand(%):</b>	15
<b>Depth(cm):</b>	14-32	<b>Total Silt(%):</b>	41
<b>pH in Calcium Chloride:</b>	4.4	<b>Total Clay(%):</b>	44
<b>Saturated Hydraulic Conductivity(cm/h):</b>	1	<b>Organic Carbon(%):</b>	0.6
<b>Electrical Conductivity(dS/m):</b>	0		
<b>Layer Number:</b>	5	<b>Very Fine Sand(%):</b>	7
<b>Horizon:</b>	Bt	<b>Total Sand(%):</b>	15
<b>Depth(cm):</b>	32-55	<b>Total Silt(%):</b>	42
<b>pH in Calcium Chloride:</b>	4.4	<b>Total Clay(%):</b>	43
<b>Saturated Hydraulic Conductivity(cm/h):</b>	1	<b>Organic Carbon(%):</b>	0.6

## Soil Information

Electrical  
Conductivity(dS/m): 0

Layer Number: 6  
Horizon: BC  
Depth(cm): 55-80  
pH in Calcium Chloride: 6.3  
Saturated Hydraulic  
Conductivity(cm/h): 0  
Electrical  
Conductivity(dS/m): 0

Very Fine Sand(%): 7  
Total Sand(%): 16  
Total Silt(%): 38  
Total Clay(%): 46  
Organic Carbon(%): 0.5

Layer Number: 7  
Horizon: Ck  
Depth(cm): 80-100  
pH in Calcium Chloride: 7.2  
Saturated Hydraulic  
Conductivity(cm/h): 0  
Electrical  
Conductivity(dS/m): 0

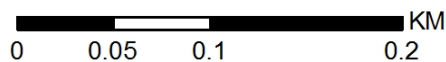
Very Fine Sand(%): 4  
Total Sand(%): 10  
Total Silt(%): 35  
Total Clay(%): 55  
Organic Carbon(%): 0

## Wells and Additional Sources



### Wells & Additional Sources

- ▲ Sites with Higher Elevation
- Sites with Same Elevation
- ▼ Sites with Lower Elevation
- Sites with Unknown Elevation



**Wells and Additional Sources Summary****Federal Sources****National Energy Board Wells**

Map Key	ID	Distance (m)	Direction
No records found			

**Provincial Sources****Alberta Oil and Gas Wells**

Map Key	Licence NO	Distance (m)	Direction
3	B0002570	197.39	W

**Alberta Orphan Wells**

Map Key	ID	Distance (m)	Direction
No records found			

**Alberta Water Well Information Database**

Map Key	Well ID	Distance (m)	Direction
1	279530	43.69	ENE
2	279471	178.95	SSW

**Groundwater Well Network**

Map Key	ID	Distance (m)	Direction
No records found			

**Horizontal Wells**

Map Key	ID	Distance (m)	Direction
No records found			

**Well Licenses**

Map Key	Well ID	Distance (m)	Direction
4	00/14-09-086-07W4/0	249.58	W
4		249.58	W

**Private Sources****Oil and Gas Wells**

## Wells and Additional Sources Summary

Map Key	ID	Distance (m)	Direction
No records found			

## Wells and Additional Sources Detail Report

### Alberta Oil and Gas Wells

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
3	W	0.20	197.39	494.00	AOGW

Licence NO:	B0002570	ATS Coordinates:	14-9-86-7-4
Licence Date:	19481230	Structure:	
Mode:	ABANDONED	Type:	
Well Status Date:	19490326	Fluid:	
Total Depth (m):	0546.50	Licencee:	Petro-Canada
Final Drill Date:	19490323		
Well Name:	BEAR-WESTMOUNT #1		
Licencee Address:	Box 2844, 150 - 6 Avenue SW Floor 10 Calgary, AB T2P 3E3		

### Alberta Water Well Information Database

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
1	ENE	0.04	43.69	496.95	WWIS

Well ID:	279530	Elevation Source:	Not Obtained
Driller ID:	24039	Method of Drilling:	
Licence No:		GPS Obtained:	Map
GIC Well ID:	279530	Boundary From:	
GOA Well Tag No:		Distance North:	
Elevation (ft):		Distance South:	
Depth (ft):		Distance East:	
Date Completed:		Distance West:	
Proposed Use:		Additional Desc:	
Lot:	4	Validated?:	Yes
Block:	11	Submitted?:	Yes
Plan:	7920314	Location Locked?:	Yes
Type of Work:		Longitude:	-111.04344
Flowing Well:		Latitude:	56.448454
Date Started:		LSD:	15
Water Req Per Day:		Section:	9
Gas Present:		Township:	86
Oil Present:		Range:	7
Flow Rate:		Meridian:	4
Drilling Company:		DLS Coordinates:	15-9-86-7-4
Owner Mailing Address:			
Driller Mailing Address:			

Well Report ID:	279530	Annular Seal Mat:	Loose
Well Owner ID:	10574810	Annular Seal from:	0
Driller ID:	2533726	Annular Seal to:	170

## Wells and Additional Sources Detail Report

Drill Company ID:	24039	Annular Seal Amt:	
Drill Instance ID:	8335364	Annular Seal Units:	
Drill Comp Well ID:		Drilling Method:	Rotary
Existing Well ID:		Drilling Start Dt:	11/1/1983 0:00:00
Date Received:	2/14/1984 0:00:00	Drilling End Dt:	11/1/1983 0:00:00
Type of Work:	New Well	Pack Type:	Sand
Plug Date:		Pack Grain Size:	#1
Plug Material Type:		Pack Amount:	6
Plug Mat Amount:		Pack Units:	Yards
Plugged Units:		Loc Verify Method:	Map
Well Use:	Domestic	Dist Casing Ground:	
Other Well Use:		Artesian Flow?:	No
Total Depth Drill:	199	Artesian Flow Rate:	
Finish Well Depth:		Gas Depth:	
Casing Material:	Galvanized Steel	Encounter Gas?:	No
Casing OD:	4.5	Flow Ctrl Install?:	No
Casing Thickness:	0.156	Recommended Rate:	10
Casing Bottom:	199	Recom Intake Depth:	185
Liner Material:	Unknown	Pump Installed?:	Yes
Liner OD:	0	Pump Install Depth:	
Liner Thickness:	0	Pump Model:	18
Liner Top:	0	Pump Horsepower:	1/2
Liner Bottom:	0	Well Disinfected?:	No
Perforation by:	Unknown	Other Log:	
Screen Material:	Stainless Steel	Divert Water Src:	
Screen Size OD:	5	Divert Water Amt:	
Screen Attachment:	Attached To Casing	Diversion Dt/Time:	
Screen Top Fitting:	Threaded	Is Submitted?:	Yes
Screen Bot Fitting:	Plug	Is Validated?:	Yes
Encounter Saline Water?:	No		
Saline Water Depth:			
Potability Sample Taken?:	No		
Potable Sample Sent to AENV?:	No		
Approval Holder Sign Date:			
Drilling Report Given to Owner:	No		
Model Output Rating:			
Remedial Action:			
Flow Control Description:			
Pump Type Installed:	SUB		
Created by:			
Submitted by:			
Additional Comments:	GIC CHANGED LOCATION FROM LSD 00 SEC 25 ON 2009/02/13 TO AGREE WITH PLAN #.		
Well Owner ID:	10574810		
Owner Name:	FARISH PLUMBING		

## Wells and Additional Sources Detail Report

PO Box: 5154  
Address:  
City: FT MCMURRAY  
Postal Code:  
Province: AB  
Country: CA

Driller ID: 2533726  
Last Name: DRILLER  
Middle Initial: NA  
First Name: UNKNOWN  
Journeyman No: 1  
Is Active?: Yes

Starting Well ID: 1420000  
Ending Well ID: 1424999  
Last Well ID Used: 1422061  
Company Name: LAKELAND DRILLING LTD.  
Street Address: BOX 1388  
City: ST PAUL  
Province: AB  
Country: CA  
Postal Code: T0A 3A0  
E-Mail: gwinfo@gov.ab.ca  
Is Active?: Yes

Geophysical Log ID: 5728573  
Log Type: Gamma  
Log Taken?: No  
Sent to AENV?: No

Geophysical Log ID: 5325498  
Log Type: Electric  
Log Taken?: No  
Sent to AENV?: No

Borehole ID: 427141  
Diameter: 0  
From: 0  
To: 199

## Wells and Additional Sources Detail Report

Screen ID: 1094724  
From: 185  
To: 195  
Slot Size: 0.012

Depth: 121  
Water Bearing: No  
Colour:  
Description:  
Material: Sandstone

Depth: 199  
Water Bearing: No  
Colour:  
Description:  
Material: Sandstone

Depth: 20  
Water Bearing: No  
Colour: Brown  
Description:  
Material: Clay

Depth: 118  
Water Bearing: No  
Colour: Blue  
Description:  
Material: Clay

Depth: 160  
Water Bearing: No  
Colour: Blue  
Description:  
Material: Clay

Depth: 140  
Water Bearing: No  
Colour: Blue  
Description:  
Material: Clay

## Wells and Additional Sources Detail Report

Depth: 143  
Water Bearing: No  
Colour:  
Description:  
Material: Sandstone

Depth: 180  
Water Bearing: No  
Colour: Blue  
Description:  
Material: Clay

Depth: 162  
Water Bearing: No  
Colour:  
Description:  
Material: Sandstone

Pump Test ID: 10278148  
Test Date: 11/1/1983 0:00:00  
Start Time: 1/12/1900 0:00:00  
Taken from Top of Casing: No  
Static Water Level: 100  
End Water Level: 114  
Water Removal Type: Pump  
Water Removal Rate: 10  
Removal Depth from: 114  
Reason for Short Test:

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
2	SSW	0.18	178.95	493.00	WWIS

Well ID:	279471	Elevation Source:	Not Obtained
Driller ID:	11110	Method of Drilling:	
Licence No:		GPS Obtained:	Map
GIC Well ID:	279471	Boundary From:	
GOA Well Tag No:		Distance North:	
Elevation (ft):		Distance South:	
Depth (ft):		Distance East:	
Date Completed:		Distance West:	
Proposed Use:		Additional Desc:	
Lot:		Validated?:	Yes

## Wells and Additional Sources Detail Report

Block:	2	Submitted?:	Yes
Plan:	792034	Location Locked?:	Yes
Type of Work:		Longitude:	-111.046307
Flowing Well:		Latitude:	56.446264
Date Started:		LSD:	NH
Water Req Per Day:		Section:	9
Gas Present:		Township:	86
Oil Present:		Range:	7
Flow Rate:		Meridian:	4
Drilling Company:		DLS Coordinates:	NH-9-86-7-4
Owner Mailing Address:			
Driller Mailing Address:			

Chem Analysis ID: 2079244  
Well Report ID: 279471  
Sample No: 5993  
Sample Date: 7/3/1981 0:00:00  
Analysis Date: 7/20/1981 0:00:00  
Laboratory: AE  
Water Level:  
Aquifer:  
Remarks:

Chemical Analysis ID: 2079244  
Element Name: Total Hardness  
Element Symbol: TH  
Decimal Places: 4  
Value: 129

Chemical Analysis ID: 2079244  
Element Name: Bicarbonate  
Element Symbol: HCO3  
Decimal Places: 4  
Value: 531.054355

Chemical Analysis ID: 2079244  
Element Name: Electrical Conductivity  
Element Symbol: EC  
Decimal Places: 0  
Value: 808

Chemical Analysis ID: 2079244

## Wells and Additional Sources Detail Report

Element Name: Nitrite  
Element Symbol: NO2  
Decimal Places: 4  
Value: -0.0504

Chemical Analysis ID: 2079244  
Element Name: Fluoride  
Element Symbol: F  
Decimal Places: 4  
Value: 0.14

Chemical Analysis ID: 2079244  
Element Name: Nitrate plus Nitrite  
Element Symbol: NO2\_NO3\_N  
Decimal Places: 4  
Value: -0.0504

Chemical Analysis ID: 2079244  
Element Name: pH  
Element Symbol: PH  
Decimal Places: 2  
Value: 8.3

Chemical Analysis ID: 2079244  
Element Name: Sulphate  
Element Symbol: SO4  
Decimal Places: 4  
Value: 28.0423

Chemical Analysis ID: 2079244  
Element Name: total Kjeldahl nitrogen  
Element Symbol: TKN  
Decimal Places: 4  
Value: 0

Chemical Analysis ID: 2079244  
Element Name: Calcium  
Element Symbol: CA  
Decimal Places: 4  
Value: 24.9999

## Wells and Additional Sources Detail Report

Chemical Analysis ID: 2079244  
Element Name: Sodium  
Element Symbol: NA  
Decimal Places: 4  
Value: 134.0003

Chemical Analysis ID: 2079244  
Element Name: Total Phosphorus  
Element Symbol: TP  
Decimal Places: 4  
Value: 0

Chemical Analysis ID: 2079244  
Element Name: Ion Balance  
Element Symbol: IONBAL  
Decimal Places: 4  
Value: 0.91

Chemical Analysis ID: 2079244  
Element Name: Ammonium  
Element Symbol: NH4  
Decimal Places: 4  
Value: 0

Chemical Analysis ID: 2079244  
Element Name: Total Alkalinity  
Element Symbol: TA  
Decimal Places: 4  
Value: 435

Chemical Analysis ID: 2079244  
Element Name: Hydroxide  
Element Symbol: OH  
Decimal Places: 4  
Value: 0

Chemical Analysis ID: 2079244  
Element Name: Silica  
Element Symbol: SIO2  
Decimal Places: 4

## Wells and Additional Sources Detail Report

Value: 9.1

Chemical Analysis ID: 2079244

Element Name: Iron

Element Symbol: FE

Decimal Places: 4

Value: 0.41

Chemical Analysis ID: 2079244

Element Name: Total Dissolved Solids

Element Symbol: TDS

Decimal Places: 0

Value: 471

Chemical Analysis ID: 2079244

Element Name: Potassium

Element Symbol: K

Decimal Places: 4

Value: 4.704

Chemical Analysis ID: 2079244

Element Name: Chloride

Element Symbol: CL

Decimal Places: 4

Value: -1.0011

Chemical Analysis ID: 2079244

Element Name: Magnesium

Element Symbol: MG

Decimal Places: 4

Value: 16.013504

Well Report ID: 279471

Well Owner ID: 10574751

Driller ID: 2533726

Drill Company ID: 11110

Drill Instance ID: 8337868

Drill Comp Well ID:

Existing Well ID:

Date Received: 7/10/1981 0:00:00

Type of Work: Chemistry

Annular Seal Mat:

Annular Seal from: 0

Annular Seal to: 0

Annular Seal Amt:

Annular Seal Units:

Drilling Method: Unknown

Drilling Start Dt:

Drilling End Dt:

Pack Type:

## Wells and Additional Sources Detail Report

Plug Date:		Pack Grain Size:	
Plug Material Type:		Pack Amount:	
Plug Mat Amount:		Pack Units:	
Plugged Units:		Loc Verify Method:	Map
Well Use:		Dist Casing Ground:	
Other Well Use:		Artesian Flow?:	No
Total Depth Drill:	130	Artesian Flow Rate:	
Finish Well Depth:		Gas Depth:	
Casing Material:		Encounter Gas?:	No
Casing OD:	0	Flow Ctrl Install?:	No
Casing Thickness:	0	Recommended Rate:	
Casing Bottom:	0	Recom Intake Depth:	
Liner Material:		Pump Installed?:	No
Liner OD:	0	Pump Install Depth:	
Liner Thickness:	0	Pump Model:	
Liner Top:	0	Pump Horsepower:	
Liner Bottom:	0	Well Disinfected?:	No
Perforation by:		Other Log:	
Screen Material:		Divert Water Src:	
Screen Size OD:	0	Divert Water Amt:	
Screen Attachment:		Diversion Dt/Time:	
Screen Top Fitting:		Is Submitted?:	Yes
Screen Bot Fitting:		Is Validated?:	Yes
Encounter Saline Water?:	No		
Saline Water Depth:			
Potability Sample Taken?:	No		
Potable Sample Sent to AENV?:	No		
Approval Holder Sign Date:			
Drilling Report Given to Owner:	No		
Model Output Rating:			
Remedial Action:			
Flow Control Description:			
Pump Type Installed:			
Created by:			
Submitted by:			
Additional Comments:			

Well Owner ID: 10574751  
 Owner Name: BURKA, FRED  
 PO Box:  
 Address: ANZAC  
 City:  
 Postal Code:  
 Province:  
 Country:

## Wells and Additional Sources Detail Report

Driller ID: 2533726  
Last Name: DRILLER  
Middle Initial: NA  
First Name: UNKNOWN  
Journeyman No: 1  
Is Active?: Yes

Starting Well ID: 1973500  
Ending Well ID: 1973599  
Last Well ID Used: 1973599  
Company Name: UNKNOWN DRILLER  
Street Address: UNKNOWN  
City: UNKNOWN  
Province: AB  
Country: CA  
Postal Code:  
E-Mail: gwinfo@gov.ab.ca  
Is Active?: No

Geophysical Log ID: 5728172  
Log Type: Gamma  
Log Taken?: No  
Sent to AENV?: No

Geophysical Log ID: 5325097  
Log Type: Electric  
Log Taken?: No  
Sent to AENV?: No

Borehole ID: 426740  
Diameter: 0  
From: 0  
To: 130

### Well Licenses

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
4	W	0.25	249.58	492.31	AERW

Well ID: Agent:  
Well Status: Operator:  
Keylist: Field:

## Wells and Additional Sources Detail Report

License No:	B0002570	Pool:	
Licence Status:	RecExempt	OS Area:	
Licence Date:	26 Mar 1949	OS Dep:	
Stat Date:		Max Tvd:	
Well Fluid:		Ground Elevation:	494.4
Well Mode:		Surf Loc:	14-09-086-07W4
Well Type:		EDCT:	BWL
Well Structure:		Rating Ev:	J
Scheme Type:		Op Surv Prov:	
Scheme Subt:		FD Date:	
Bttm/Surface Hole:	Surface Holes	Total Dep:	
Fluid Short Desc:		KBE:	495.9
Mode Short Desc:		Latitude:	56.448073
Type Short Desc:		Longitude:	-111.049464
Update:			
Structure Short Description:			
Licensee:			

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
4	W	0.25	249.58	492.31	AERW

Well ID:	00/14-09-086-07W4/0	Agent:	
Well Status:	0002000000	Operator:	
Keylist:	0864070914000	Field:	0640
License No:	B0002570	Pool:	00000000
Licence Status:	Issued	OS Area:	A001
Licence Date:	1948-12-30	OS Dep:	00000000
Stat Date:	1949-03-26	Max Tvd:	0
Well Fluid:	N/A	Ground Elevation:	494.4
Well Mode:	ABD	Surf Loc:	
Well Type:	N/A	EDCT:	
Well Structure:	N/A	Rating Ev:	
Scheme Type:		Op Surv Prov:	
Scheme Subt:		FD Date:	1949-03-23
Bttm/Surface Hole:	Bottom Holes	Total Dep:	546.5
Fluid Short Desc:	Not Applicable	KBE:	495.9
Mode Short Desc:	ABANDONED	Latitude:	56.448073
Type Short Desc:	Not Applicable	Longitude:	-111.049464
Update:			
Structure Short Description:	Not Applicable		
Licensee:	Suncor Energy Inc.		

## Radon Information

Detailed radon information for the project property is provided below.

### Radon Zone Information

<b>ID:</b>	144852	<b>Radon Rank:</b>	LOW
------------	--------	--------------------	-----

### Health Canada Radon Information

<b>Health Region:</b>	4829
<b>Health Region Name:</b>	Northern Lights Health Region
<b>Province or Territory:</b>	AB
<b>Number Homes in Survey:</b>	144
<b>% Below 200 Bq/m3:</b>	99.3
<b>% Above 200 Bq/m3:</b>	0.7
<b>200 to 600 Bq/m3:</b>	0.7
<b>% Above 600 Bq/m3:</b>	0

## Appendix

### **Federal Sources**

#### **Bedrock Geology of Canada**

#### **BEDROCK GEOLOGY**

The Geological Map of Canada is scaled at 1:5,000,000. This map is created by Geological Survey of Canada and published by Natural Resources Canada.

#### **Health Canada Radon Information**

#### **RADON**

This source is the results from the Cross-Canada Survey of Radon Concentrations in Homes, a two-year study conducted by Health Canada's National Radon Program. The aims of this study were to obtain an estimate of the proportion of the Canadian population living in homes with radon gas levels above the guideline of 200 Bq/m<sup>3</sup>, to identify previously unknown areas where radon gas exposure may constitute a health risk, and to build, over time, a map of indoor radon gas exposure levels across Canada.

#### **National Energy Board Wells**

#### **NEBP**

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

#### **Soil Landscapes of Canada (SLC)**

#### **SLC**

Major characteristics of soil and land such as surface form, slope, water table depth, permafrost and lakes.

#### **Surficial Geology of Canada**

#### **SURFICIAL GEOLOGY**

This map contains information on surficial materials and associated landforms left by the retreat of the last glaciers and non glacial environments. It is based on compilation of existing maps. This data was authored by the Geological Survey of Canada and published by Natural Resources Canada.

#### **Toporama**

#### **TOPORAMA**

Toporama covers the entire area of Canada's landmass and provides topographic, geo-referenced, and symbolic information in a raster format at 1:50,000 scale. This is a digital topographic reference product made available by Natural Resources Canada (NRCan).

### **Provincial Sources**

#### **Alberta Detailed Soil Survey (DSS3)**

#### **SOIL SURVEY**

Soil surveys have been published for most of the agricultural areas, and many surrounding areas, across Canada. Data from these surveys comprise the most detailed soil inventory information in the National Soil DataBase. Data is made available by Agriculture and Agri-Food Canada

#### **Alberta Oil and Gas Wells**

#### **AOGW**

The Alberta Energy Utilities Board - now the Alberta Energy Regulator (AER) - maintained a database of oil and gas wells drilled in the province of Alberta. The database contains information on well name, licensee name, license number, location, status, total well depth and date of final drilling. Please note that this database will not be updated, information on wells drilled after September 2003 can be found in the Oil and Gas Wells (OGW) database under the 'Private Source Database' section.

#### **Alberta Orphan Wells**

#### **ORP**

Orphan wells are wells that have not been properly abandoned and whose operators are defunct or insolvent. In Alberta, orphan wells fall under the responsibility of the Orphan Well Association, which works under the delegated authority of the Alberta Energy Regulator (AER) - formerly the Energy Resources Conservation Board (ERCB). The data includes Location, Well ID, License Name and License Number.

#### **Alberta Water Well Information Database**

#### **WWIS**

List of wells in the Alberta Water Well Information Database made available by Alberta Environment and Parks, containing approximately 500,000 records with nearly 5,000 drilling reports added annually. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location; some locations will be accurate to the quarter section only. The Province of Alberta advises that the data may not be fully checked, and disclaims all responsibility for its accuracy. This data was previously collected from the Groundwater Information

## Appendix

Center of the Natural Resource Service.

### **Bedrock Geology of Alberta**

### **BEDROCK GEOLOGY**

This dataset represents the compilation of existing geological maps and original geological mapping by Alberta Geological Survey (AGS) staff. Mapping in support of the dataset included field observations and creating three-dimensional models of subsurface stratigraphy based on the interpretation of geophysical logs from oil and gas wells. Each three-dimensional formation surface was projected to a model of the bedrock surface, and the intersection formed the first approximation of the position of the geological contact at the base of the surficial deposits. This data is made available by Alberta Geological Survey.

### **Groundwater Well Network**

### **GROUNDWATER**

Groundwater level, chemical analysis and water quality data from monitoring wells that are part of the Groundwater Observation Well Network (GOWN).

### **Horizontal Wells**

### **HORW**

Defined as drilling directionally at a wellbore inclination angle exceeding 85 degrees, horizontal drilling can help increase resource recovery while minimizing surface impact. Recent improvements in the technology have made it possible to combine horizontal drilling with hydraulic fracturing to help coax oil and natural gas out of tight rock. Today, more than half of western Canada's wells are being drilled horizontally. Data includes: well locations (LE,LS,SE,TWP,RG,M,E), licence numbers, well names, Business Associate (BA) codes, licensee abbreviations, spud dates, final drilling dates, total depth, true vertical depth, and last updated dates. Made available by the Alberta Energy Regulator (AER) - formerly the Energy Resources Conservation Board (ERCB).

### **Surficial Geology of Alberta**

### **SURFICIAL GEOLOGY**

This dataset, made available by Alberta Geological Survey, is a compilation of existing surficial map information for Alberta, edited for mapping continuity and generalized to make it suitable for presentation and use at 1:1,000,000 scale. It is the dataset used to create Alberta Geological Survey Map 601: Surficial Geology of Alberta.

### **Well Licenses**

### **AERW**

Locations of Well Licenses made available by the Alberta Energy Regulator (AER) as ST37. Includes Active, Suspended, Abandoned, Drilled and Cased Oil, Gas, Crude Bitumen well licenses, as well as Observation, Injection, Disposal, and Undefined well licences.

### **Wetlands of Alberta**

### **WETLAND**

The Alberta Merged Wetland Inventory depicts wetlands within the province of Alberta for the period 1998 to 2015 classified to the Canadian Wetland Classification System (CWCS) at the major class level: marsh, bog, fen, swamp, and open water. This database is made available by Alberta Environment and Parks.

## **Private Sources**

### **Oil and Gas Wells**

### **OGWW**

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at [www.nickles.com](http://www.nickles.com).

### **Radon Zone Information**

### **RADON**

The Radon Potential Map is developed by Radon Environmental Management Corporation. Its objective was to illustrate the relative variation of radon risk across the country, and in 2011 it published its first geologic Radon Potential Map of Canada.

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## **APPENDIX B — Photo Galleria**



20191217 ice over rink hall and multicultural room.JPG



external grade OSB on wall sheeting.JPG



outside relative humidity and temperature.JPG



samples taken by CMG staff throughout the Subject Building.JPG



temperature and relative humidity in hall area.JPG



looking north towards rink hallway door.JPG



reconnect water vent and replace OSB around top.JPG



surficial damage to sill plate in change room 1.JPG



vent in change room 1.JPG



downgrade drainage on south east corner of rink.JPG



no downspouts extend more than 0.3m from foundation wall.JPG



roof downspouts should extend 1.2m away from foundation.JPG



suitable concrete drainage device.JPG



water pooling in rink area far from rink entrance.JPG



east wall on south side of Subject Building.JPG



space between floor slab and foundation wall should be filled with epoxy.JPG



tar or felt paper under vinyl PVC siding showing some wear in a couple spots.JPG



vinyl siding showing some signs of wear in two places on east wall.JPG



evidence of potential mould in drywall below old furnace stack.JPG



old furnace stack not insulated.JPG



surficial damage in joists below old furnace stack in electrical room..JPG



east side of roof with valley over foyer.png



Number 1 Douglas Fir lintels.JPG

DJI\_0001.MOV



south roof and skylight over foyer.png



sill under doorway should be sealed with silicone.JPG



potential mould in janitor room. No damage to studs behind drywall.JPG



rubberized baseboard in Janitor Room harboured mould growth.JPG



south west corner of Subject Building outside of mechanical room.JPG



2x6 sill plate in multicultural room before sample taken.JPG



cinderblock outer wall finishing on west side of Subject Building.JPG



east side of multicultural room 2x6 stud wall.JPG



evidence staining on 2x6 sill plate is surficial.JPG



more surficial staining in multicultural room outer wall.JPG



valley in roof above rink entrance door to rink hall on west side of Subject Building.JPG



2x10 joists support roof sheeting.JPG



north roof looking east.png



north roof showing valleys.png



rink hall rafters below a valley in roof.JPG



roof sheathing is exterior rated OSB.JPG



surficial damage to rafters in rink hall.JPG